Leavenworth National Fish Hatchery Surface Water Intake Fish Screens and Fish Passage Project Final Environmental Impact Statement

Estimated Lead Agency Total Costs Associated with Developing and Producing this EIS: $1,286,000
Mission Statements

The Department of the Interior conserves and manages the Nation’s natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation’s trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

The mission of the United States Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.
Leavenworth National Fish Hatchery Surface Water Intake Fish Screens and Fish Passage Project Final Environmental Impact Statement

Proposed action: Reclamation and the U.S. Fish and Wildlife Service propose to rehabilitate the Leavenworth National Fish Hatchery surface water intake and delivery system on Icicle Creek by building new headworks, installing National Marine Fisheries Service-compliant fish screens, constructing a creek-width roughened channel and replacing and lining the surface water conveyance pipeline to the Hatchery.

Lead agency: Bureau of Reclamation, Columbia-Pacific Northwest Region 9

Responsible official: Regional Director, Bureau of Reclamation, Interior Region 9, Columbia-Pacific Northwest Region 9

Cooperating agencies: U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers
Confederated Tribes and Bands of the Yakama Nation

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<tr>
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<th>Full Phrase</th>
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<tr>
<td>APE</td>
<td>Area of Potential Effects</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>CEQ</td>
<td>Council on Environmental Quality</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>cfs</td>
<td>cubic feet per second</td>
</tr>
<tr>
<td>CIPP</td>
<td>cure-in-place pipe</td>
</tr>
<tr>
<td>CLSM</td>
<td>controlled low-strength material</td>
</tr>
<tr>
<td>COIC</td>
<td>Cascade Orchard Irrigation Company</td>
</tr>
<tr>
<td>Colville Tribes</td>
<td>Confederated Tribes of the Colville Reservation</td>
</tr>
<tr>
<td>COR</td>
<td>Contracting Officer’s Representative</td>
</tr>
<tr>
<td>CUA</td>
<td>contractor use area</td>
</tr>
<tr>
<td>CWA</td>
<td>Clean Water Act</td>
</tr>
<tr>
<td>dB</td>
<td>decibels</td>
</tr>
<tr>
<td>dBA</td>
<td>decibels A-weighted</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>Ecology</td>
<td>Washington State Department of Ecology</td>
</tr>
<tr>
<td>EDNA</td>
<td>environmental designation for noise abatement</td>
</tr>
<tr>
<td>EFH</td>
<td>Essential Fish Habitat</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>EO</td>
<td>Executive Order</td>
</tr>
<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>ESA</td>
<td>Endangered Species Act</td>
</tr>
<tr>
<td>ESU</td>
<td>evolutionarily significant unit</td>
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<tr>
<td>Forest Service</td>
<td>U.S. Department of Agriculture, Forest Service</td>
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<td>ESA Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Washington State Fish Passage and Habitat Enhancement Restoration Programmatic</td>
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</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<tr>
<td>HPA</td>
<td>Hydraulic Project Approval</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>IAA</td>
<td>Interagency Acquisition Agreement</td>
</tr>
<tr>
<td>IO&amp;MA</td>
<td>Intake Operations and Maintenance Area</td>
</tr>
<tr>
<td>ITA</td>
<td>Indian Trust Assets</td>
</tr>
<tr>
<td>JARPA</td>
<td>Joint Aquatic Resources Permit Application</td>
</tr>
<tr>
<td>Leq</td>
<td>equivalent sound level</td>
</tr>
<tr>
<td>LFC</td>
<td>Leavenworth Fisheries Complex</td>
</tr>
<tr>
<td>LNFH, Hatchery</td>
<td>Leavenworth National Fish Hatchery</td>
</tr>
<tr>
<td>LOS</td>
<td>Level of Service</td>
</tr>
<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
</tr>
<tr>
<td>NHPA</td>
<td>National Historic Preservation Act</td>
</tr>
<tr>
<td>NMFS</td>
<td>National Marine Fisheries Service</td>
</tr>
<tr>
<td>NOI</td>
<td>Notice of Intent</td>
</tr>
<tr>
<td>NPDES</td>
<td>National Pollution Discharge Elimination System</td>
</tr>
<tr>
<td>NRHP</td>
<td>National Register of Historic Places</td>
</tr>
<tr>
<td>NTU</td>
<td>nephelometric turbidity unit</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>operations and maintenance</td>
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<tr>
<td>OFD</td>
<td>One Federal Decision</td>
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<tr>
<td>OHWM</td>
<td>ordinary high water mark</td>
</tr>
<tr>
<td>pH</td>
<td>Potential of hydrogen</td>
</tr>
<tr>
<td>PISMA</td>
<td>Pipeline Intake and Sediment Management Area</td>
</tr>
<tr>
<td>Reclamation</td>
<td>U.S. Department of the Interior, Bureau of Reclamation</td>
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<tr>
<td>RM</td>
<td>river mile</td>
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<tr>
<td>ROD</td>
<td>Record of Decision</td>
</tr>
<tr>
<td>ROW</td>
<td>right-of-way</td>
</tr>
<tr>
<td>RPM</td>
<td>reasonable and prudent measure</td>
</tr>
<tr>
<td>SEPA</td>
<td>State Environmental Policy Act</td>
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<tr>
<td>SPCC</td>
<td>Spill Prevention, Control, and Countermeasure Plan</td>
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<tr>
<td>SWISP</td>
<td>Surface Water Intake Fish Screens and Fish Passage</td>
</tr>
<tr>
<td>TCP</td>
<td>Traditional Cultural Property</td>
</tr>
<tr>
<td>THPO</td>
<td>Tribal Historic Preservation Officer</td>
</tr>
<tr>
<td>TMDL</td>
<td>total maximum daily load</td>
</tr>
<tr>
<td>USACE</td>
<td>U.S. Department of the Army, Corps of Engineers</td>
</tr>
<tr>
<td>USC</td>
<td>United States Code</td>
</tr>
<tr>
<td>USFWS</td>
<td>U.S. Department of the Interior, Fish and Wildlife Service</td>
</tr>
<tr>
<td>Acronym</td>
<td>Meaning</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>VE</td>
<td>Value Engineering</td>
</tr>
<tr>
<td>VPM</td>
<td>virtual public meeting</td>
</tr>
<tr>
<td>WAC</td>
<td>Washington Administrative Code</td>
</tr>
<tr>
<td>Washington State DAHP</td>
<td>Washington State Department of Archaeology and Historic Preservation</td>
</tr>
<tr>
<td>WDFW</td>
<td>Washington State Department of Fish and Wildlife</td>
</tr>
<tr>
<td>WDNR</td>
<td>Washington State Department of Natural Resources</td>
</tr>
<tr>
<td>WUA</td>
<td>weighted usable area</td>
</tr>
<tr>
<td>Yakama Nation</td>
<td>Confederated Tribes and Bands of the Yakama Nation</td>
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Executive Summary

ES.1 Introduction

The United States (U.S.) Department of the Interior (DOI), Bureau of Reclamation (Reclamation) has prepared this Environmental Impact Statement (EIS) for the Leavenworth National Fish Hatchery (hereafter, LNFH or Hatchery) Surface Water Intake Fish Screens and Fish Passage (SWISP) Project (Map 1-1 in Appendix A). In this EIS, Reclamation evaluated the impacts of the SWISP Project on the natural and human environment. The U.S. Fish and Wildlife Service (USFWS) through its role as owner and operator of the LNFH has assisted with the preparation of this EIS and served as a cooperating agency throughout the process. The U.S. Army Corps of Engineers (USACE) and the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation) also served as cooperating agencies on the Project (see Section 1.5).

This EIS complies with the National Environmental Policy Act of 1969, as amended (NEPA; 42 United States Code [USC], Section 4321 et seq.), the Council on Environmental Quality’s (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR], Parts 1500-1508, as updated July 16, 2020)\(^1\), the U.S. Department of Interior’s NEPA Regulations (43 CFR, Part 46), and other relevant federal and state laws and regulations.

Reclamation and USFWS are proposing to rehabilitate, replace, and modernize the LNFH surface water intake and delivery system on Icicle Creek near Leavenworth, Washington by building new headworks, installing National Marine Fisheries Service (NMFS)-compliant fish screens, constructing a creek-width roughened channel, and replacing and lining the surface water conveyance pipeline to the LNFH. Additional details and description of the proposed action can be found in Chapter 2, Proposed Action and Alternatives.

As the lead federal agency, Reclamation has prepared the Final EIS, in cooperation with the USFWS, USACE, and Yakama Nation, and with the participation of Chelan County, the Confederated Tribes of the Colville Reservation (Colville Tribes), NMFS, Washington State Department of Archaeology and Historic Preservation (Washington State DAHP), Washington State Department of Ecology (Ecology), Washington State Department of Fish and Wildlife (WDFW), and the Washington State Department of Natural Resources (WDNR).

Chapter 1 of this EIS presents the purpose and need for action, lead, cooperating, and participating agencies, and a detailed account of the public involvement process. Chapter 2 provides a description of each alternative considered for analysis and identifies Reclamation’s preferred alternative. Chapter 3 presents the affected environment and the potential and anticipated impacts

\(^1\) CEQ’s Updated Regulations Implementing the Procedural Provision of NEPA, effective September 14, 2020, were applied to this EIS.
on the human and natural environment that could occur from implementing the alternatives. Chapter 4 summarizes the coordination and consultation with agencies, Tribes, stakeholders, and the public, during preparation of the Draft and Final EIS, including a summary that identifies all alternatives, information, and analyses submitted by State, Tribal, and local governments and other public commenters for consideration by the lead and cooperating agencies in developing the Final EIS (per 40 CFR 1502.17).

**ES.2 Purpose of and Need for Action**

The need for the proposed action is to comply with the NMFS 2017 Biological Opinion (NMFS 2017a) and current screening and fish passage criteria for anadromous fish passage facilities, improve employee safety when operating and maintaining the intake and delivery structures, and increase reliability and longevity of the water delivery system.

The purpose of the SWISP Project is to minimize take of ESA-listed fish species, provide fish passage that complies with current regulatory criteria, and ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek.

**ES.3 Decisions to be Made**

This EIS supports federal decisions related to the SWISP Project. It provides necessary information for approving, modifying, or denying the proposal. Based on the analysis in this EIS, Reclamation will make the following decisions:

- Whether or not to rehabilitate, replace, and modernize the LNFH surface water intake facilities on Icicle Creek
- Whether or not to rehabilitate, replace, and modernize the 1.1-mile surface water conveyance pipeline from the intake facilities on Icicle Creek to the LNFH fish production facilities

The USFWS will also be signing the Record of Decision (ROD) for the SWISP Project EIS. The USFWS will make the following decision:

- Whether to support the construction of the proposed project by continuing the Interagency Acquisition Agreement (#R18PG00084) and operation of the proposed facilities once constructed

The USFWS decision will be based on consistency with Endangered Species Act (ESA) biological opinions relating to operations and maintenance (O&M) of LNFH and Leavenworth Fisheries Complex facilities and the Federal Columbia River Power System. In addition, the USFWS decision will be based on whether the USFWS concurs with Reclamation that the preferred alternative meets all current and applicable requirement under the ESA and Clean Water Act (CWA), provides a safe and reliable surface water intake and delivery system, and will sufficiently support Hatchery production, specifically the federal government’s legal obligations under the *U.S. v. Oregon* Management Agreement (Agreement Parties 2018).
In accordance with Section 404 of the CWA, the USACE intends to issue Nationwide Permits for
the SWISP Project and requires the Final EIS and ROD to complete the permitting process.
Reclamation will provide the SWISP USFWS Biological Opinion and the signed ROD to the
USACE to complete the Washington State Joint Aquatic Resources Permit Application (JARPA)
permitting process. The USACE will not be signing the ROD.

Additional federal decisions will be made as part of permitting and consultation processes, including
those under the CWA and Section 7 of the ESA. State jurisdiction decisions would be made as
discussed under Permitting in Section 2.4.2.

**ES.4 Project Alternatives**

The Final EIS assesses the potential environmental impacts of the four alternatives under
consideration: The No Action alternative (see Map 2-1 and Map 2-2 in Appendix A) and three
action alternatives: Alternatives B, the Proposed Action (see Map 2-3 and Map 2-4 in Appendix
A), Alternative C, the Preferred Alternative (see Map 2-5 and Map 2-6 in Appendix A), and
Alternative D (see Map 2-3 and Map 2-4 in Appendix A).

The SWISP Project consists of six components:

1. Intake and Fish Screens
2. Fish Passage
3. Sediment Management
4. Conveyance Pipeline
5. Temporary Hatchery Water Supply
6. Access and Staging

The different ways these components can be implemented are called Project elements. Alternatives
development involved identifying the different elements available for each component. For example,
to address the temporary Hatchery water supply needed during construction (a component),
Reclamation assessed a gravity-fed surface water bypass at the existing intake facilities, pumping
from additional groundwater wells, or pumping surface water from the spillway pool (elements) to
meet this need.

The SWISP Project alternatives development process involved external cooperating and
participating agency collaboration, public involvement, and internal engineering and conceptual
design analysis. During the scoping period, Reclamation asked for public and agency input on the
scope of the analysis and for alternatives to be considered. Reclamation analyzed the scoping
comments it received and published a Scoping Report in June 2020 (Reclamation 2020a).
Reclamation coordinated with cooperating and participating agencies and the public to define a
comprehensive suite of Project elements and screened each element to determine which would be
carried forward for combination into complete alternatives and detailed analysis in the Draft EIS.
Screening criteria were used to evaluate each element’s ability to satisfy the purpose and need for
action, its technological and economic practicability and feasibility, and its ability and likelihood to
comply with applicable legal requirements, including specifically the CWA and Section 7 of the ESA. The screening process is further detailed in the SWISP Project Alternatives Compilation Report (Reclamation 2020c).

**ES.4.1 No Action Alternative**

The No Action alternative is continuation of current O&M of the LNFH surface water intake and delivery system on Icicle Creek. The existing intake and delivery system, constructed in 1939 and 1940, would remain in its current degraded condition and would likely continue to deteriorate. Under the No Action alternative, all existing features listed below would remain in place and would not be modified, improved, or rehabilitated.

- Low-head diversion dam
- Intake channel
- Intake trashrack structure
- Access road
- Fish ladder/Sediment sluice
- Gatehouse
- Outlet channel
- Conveyance pipeline
- Sand settling basin
- Inside and outside screen chambers

The diversion dam would continue to divert water from Icicle Creek to the intake channel, through an unscreened diversion. An unscreened diversion allows fish, including ESA-listed fish, to enter the water delivery system. The existing fish ladder/sediment sluice would not be modified to alter flow or enhance fish passage. The intake trashrack structure at the entrance to the concrete intake channel would remain in operation and would continue to prevent debris from entering the concrete intake channel. The existing sediment sluice would remain in place, requiring accumulated sediment to be removed from the intake channel. The gatehouse would remain in place and the outlet channel would continue to direct bypassed water and sluice material (sediment) from the gatehouse back to Icicle Creek. Collectively, the existing footprint of the intake access road, intake channel and intake trashrack structure, and gatehouse, including the existing stairs to the gatehouse from Icicle Creek Road, cover approximately 0.06 acres (Reclamation GIS 2020; see Table 2-4). The aging 31- to 33-inch diameter buried concrete pipeline would continue to convey water up to 42 cfs from the gatehouse to the Hatchery. No sections would be lined or replaced; however, the USFWS would, independent of the SWISP Project, install a flowmeter as part of the ongoing O&M at LNFH. Sediment from Icicle Creek would continue to be transported to the Hatchery.

**ES.4.2 Action Alternatives**

The action alternatives components are summarized in Table ES-1, Action Alternatives Analyzed in this EIS. Processes common to each action alternative are described following the table.

Under each of the action alternatives, construction of the SWISP Project would occur in three phases. Phase I would include construction of the intake access road and rehabilitation of the intake structures and facilities and would include work within the ordinary high water mark of Icicle Creek.
Table ES-1. Action Alternatives Analyzed in this EIS

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Intake and Fish Passage</th>
<th>Sediment Management</th>
<th>Conveyance Pipeline</th>
<th>Temporary Hatchery Water Supply</th>
<th>Access and Staging</th>
</tr>
</thead>
<tbody>
<tr>
<td>B – Proposed Action</td>
<td>Construct the headworks and roughened channel, incorporating the existing low-head diversion dam and intake channel and portion of the fish ladder/sediment sluice; remove unincorporated portion (Figure A-1 and Figure A-2 in Appendix A). Install NMFS-compliant self-cleaning, cylindrical screens at the diversion headworks (Figure A-3 in Appendix A) and install a floating log boom trash protection feature upstream of the screens. Construct a low-flow boulder weir fishway and roughened channel to provide NMFS-compliant fish passage (Figure A-4 in Appendix A). Remove the intake trashrack structure and place a new pipeline in the intake channel to connect the headworks to the conveyance pipeline. Fill the intake channel to cover the pipeline and</td>
<td>Multiple elements to manage sediment accumulated at the intake would include a ramp on the upstream side of the roughened channel to help mobilize sediment over the feature; a vertical access pipe behind the screens to facilitate flushing sediment with a submerged hose and nozzle using screened water; and a series of pipes, valves and outlet channel at the Pipeline Intake and Sediment Management Area (PISMA) to flush sediment through the intake pipeline back to Icicle Creek (Figure A-3 and Figure A-6 in Appendix A). The PISMA would be placed at the former gatehouse location.</td>
<td>Replace the conveyance pipeline using cut and cover trenching on USFWS property (2,180 feet) and rehabilitate the pipeline by lining with cure-in-place pipe (CIPP) on private parcels (approximately 4,000 feet; Maps 2-3 and 2-4 in Appendix A). Construct several temporary access point contractor use areas (CUAs) to provide ingress and egress for pipe lining on private lands (Figure A-7 and Figure A-8 in Appendix A). Replace the current control valve system at the sand settling basin on USFWS property with a new control valve vault to allow safe pipe filling operations (Map 2-3 in Appendix A). Decommission the existing pipeline and abandon this segment in place once control valve connections are made. All rehabilitation, replacement, and modernization of the LNFH intake and delivery facilities would conclude at the control valve system; the sand</td>
<td>Maintain a 40 cfs water supply to LNFH during Phase I construction via a gravity-fed bypass pipeline connected to the existing conveyance pipeline approximately 200-300 feet below the intake construction area (Map 2-4 in Appendix A) and through pumping with diesel-powered pumps from the spillway pool as needed. Several temporary pumping options for screen locations at the spillway pool and pipeline alignments to the sand settling basin will be examined prior to installation and approved by USFWS in coordination with the Yakama Nation and the Colville Tribes (Figure A-12 and Figure A-13 in Appendix A). Maintain a 20 cfs water supply to LNFH during Phase II construction between April 17 to May 13, with provisions for emergency extension up to May 20, when pipeline replacement, lining with</td>
<td>Locate staging and storage sites for construction equipment and materials, and construction staff administration and vehicle parking, at various locations on LNFH grounds. Trucks hauling construction equipment and containing construction materials would turn around approximately 1.25 miles southwest of the intake access road, at the Forest Service and Alpine Lakes Wilderness Area kiosk on Icicle Creek Road. Construction access to the conveyance pipeline would use existing roads, temporary access routes, and the pipeline right-of-way (Figure A-9 and Figure A-10 in Appendix A).</td>
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## Executive Summary (Table ES-1: Action Alternatives Analyzed in this EIS)

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<thead>
<tr>
<th>Alternative</th>
<th>Intake and Fish Passage</th>
<th>Sediment Management</th>
<th>Conveyance Pipeline</th>
<th>Temporary Hatchery Water Supply</th>
<th>Access and Staging</th>
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<td>B – Proposed Action (continued)</td>
<td>create the Intake Operations and Maintenance Area (IO&amp;MA) (<a href="#">Figure A-1</a> and <a href="#">Figure A-2</a> in Appendix A.) Construction of Phase I components would occur up to 24 hours per day, and up to seven days per week with additional noise reduction measures from 7:00 p.m. to 7:00 a.m., during an in-water work window from July 1 to November 15.</td>
<td>(see above)</td>
<td>settling basin and inside and outside screen chambers would remain unaltered. Phase II construction would use a 7:00 a.m. to 10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and Washington Administrative Code (WAC) 173-60-040 to represent the most conservative level of impacts due to workday length. However, Phase II specifications will require workday hours of 7:00 a.m. to 7:00 p.m., five days per week, and approval by Reclamation’s Contracting Officer’s Representative (COR) to extend work hours from 7:00 p.m. to 10:00 p.m. or to six days per week on a case-by-case basis.</td>
<td>CIPP, and pipeline interconnections are underway. This would occur through pumping with diesel-powered pumps from the spillway pool adjacent to LNFH as needed.</td>
<td>(see above)</td>
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<td>C</td>
<td>Same as Alternative B</td>
<td>Same as Alternative B</td>
<td>Same as Alternative B except Reclamation would line the entire upper segment (520 feet) of the conveyance pipeline on USFWS property with CIPP instead of replacing it. Reclamation would replace 1,660 feet of pipeline on USFWS property on the lowest segment of pipeline only; the</td>
<td>Same as Alternative B</td>
<td>Same as Alternative B</td>
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### Alternative Intake and Fish Passage

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<th>Alternative</th>
<th>Intake and Fish Passage</th>
<th>Sediment Management</th>
<th>Conveyance Pipeline</th>
<th>Temporary Hatchery Water Supply</th>
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<tr>
<td>C (continued)</td>
<td>(see above)</td>
<td>(see above)</td>
<td>remaining 4,520 feet of pipeline would be lined with CIPP (<a href="#">Map 2-5 and Map 2-6 in Appendix A</a>). As a result, the mature trees in the Icicle Creek riparian zone along this segment would not be removed.</td>
<td>(see above)</td>
<td>(see above)</td>
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<td>D</td>
<td>Same as Alternative B except construction of Phase I components would be limited to workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days a week, during an in-water work window from July 1 to October 31. However, the Project specification requires workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation's COR approval.</td>
<td>Same as Alternative B</td>
<td>Same as Alternative B</td>
<td>Same as Alternative B with the addition of maintaining a 40 cfs water supply to LNFH over an eight-month period from November 1, 2022 to June 30, 2023 during Phase I construction via two high-capacity diesel-powered pumps operating at the spillway pool 24 hours per day, seven days per week. An operational third pump would be on site as a backup.</td>
<td>Same as Alternative B</td>
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Phase I construction under Alternatives B and C would occur up to 24 hours per day, six days per week, and up to seven days per week, with additional noise reduction measures from 7:00 p.m. to 7:00 a.m. during the in-water work window from July 1 to November 15. Construction would likely occur over two seasons within the in-water work window. Phase I construction under Alternative D would occur between the hours of 7:00 a.m. and 10:00 p.m., five days per week, and up to six days per week, during the in-water work window from July 1 to October 31. Construction would likely occur over four seasons (2022, 2023, 2024, and 2025) within the in-water work window. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to November 15 (Alternatives B and C) or October 31 (Alternative D) would be an exception to the general and approved in-water work window.

Phase II for all action alternatives does not include in-water work and would include replacement and lining of the conveyance pipeline. For Phase II, Reclamation analyzed a 7:00 a.m. to 10:00 p.m. workday, five days per week, and up to six days per week, in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040, to represent the most conservative level of impacts due to workday length. However, Phase II specifications require workday hours of 7:00 a.m. to 7:00 p.m., five days per week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s COR approval.

The majority of Phase II pipeline lining and some pipeline replacement construction would occur over three seasons (2022, 2023, and 2024) for four to five weeks between April and May under all action alternatives. Phase II pipeline replacement on the lowest segment of pipeline on USFWS property would occur year-round where practicable. There would likely be temporal overlap between parts of Phase I and Phase II construction, particularly during the replacement of the lowest segment of pipeline on USFWS property. Under Alternatives B and D, 2,180 feet of pipeline would be replaced using cut and cover trenching on USFWS property on the uppermost and lowest segments of pipeline; the remaining approximately 4,000 feet of pipeline would be lined with CIPP. Under Alternative C, Reclamation would line the entire upper segment (520 feet) of the conveyance pipeline on USFWS property with CIPP instead of replacing it. Reclamation would replace 1,660 feet of pipeline on USFWS property on the lowest segment of pipeline only; the remaining 4,520 feet (including the upper segment on USFWS property) of pipeline would be lined with CIPP.

Alternatives B and D would result in approximately 9.19 acres of surface disturbance during Phase I and Phase II construction, and Alternative C would result in approximately 8.02 acres of surface disturbance (Reclamation GIS 2020; see Table 2-4). Most of this disturbance would be temporary and would be restored to pre-construction conditions. Under Alternative C, because Reclamation would line the entire upper segment of the conveyance pipeline on USFWS property with CIPP instead of replacing it as proposed under Alternatives B and D, there would be approximately 1.17 fewer acres of surface disturbance as compared to Alternatives B and D. Further, fewer mature trees in the Icicle Creek riparian zone would be removed. For all action alternatives, approximately 0.62 acres would be within the footprint of permanent Project components and would not be restored to pre-construction conditions.

Phase III for all action alternatives would be implemented by the USFWS and would include revegetation of upland and riparian areas that are proposed to be disturbed during earlier phases of
construction within the intake construction area (see Map 2-4 in Appendix A and Appendix D, Draft Phase III Riparian Revegetation Plan). Phase III revegetation would occur as soon as practicable after Phase I and Phase II construction activities are complete.

Reclamation would implement Best Management Practices (BMPs) to protect water quality and other resources and promote soil conservation during Project construction and O&M. The list of BMPs used to complete the resource analyses is included in Appendix B.

Several federal and state regulatory permit approvals would be required before construction begins. Reclamation has prepared a biological assessment for the USFWS to determine the potential impacts of the agency preferred action on the threatened Bull Trout (*Salvelinus confluentus*) and its designated critical habitat and the gray wolf (*Canis lupus*) (Reclamation 2020e). Reclamation determined, and the USFWS concurred, that the proposed action may affect but is not likely to adversely affect the gray wolf. The USFWS issued a Biological Opinion for Bull Trout and its designated critical habitat on March 4, 2021, thereby concluding ESA Section 7 formal consultation (USFWS 2021). The USFWS' SWISP Biological Opinion states that the action, as proposed, is not likely to jeopardize the continued existence of the Bull Trout and is not likely to destroy or adversely modify designated critical habitat. A term and condition requiring monitoring and reporting was included in the Incidental Take Statement to implement the stipulated reasonable and prudent measure (RPM; see Section B.4 in Appendix B).

Reclamation will use the JARPA form to apply for applicable permits, including CWA Section 404 Nationwide Permits and CWA Section 401 Water Quality Certification from the USACE, and Hydraulic Project Approval from the WDFW. Because the action alternatives include use of Icicle Creek Road on National Forest system lands, the construction contractor will secure the required road use approval from the U.S. Department of Agriculture, Forest Service, most likely under a road use permit. Chelan County will be conducting a State Environmental Policy Act review for the SWISP Project.

O&M activities would periodically occur on an as-needed basis as determined by Hatchery staff. Hatchery O&M is subject to both the National Pollution Discharge Elimination System permit from the U.S. Environmental Protection Agency and O&M consultations under the ESA Section 7 with NMFS and USFWS (USFWS 2011; NMFS 2017a). Extraordinary maintenance will continue to be handled on a case-by-case basis as determined to be necessary by the Hatchery.

**ES.4.3 Alternative Elements Considered but Eliminated**

Federal agencies are required to explore and evaluate all reasonable alternatives and to discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR, Subpart 1502.14). Through the alternatives screening process, Reclamation, with input from the USFWS as a cooperating agency, eliminated several stand-alone alternatives and alternative elements because they did not meet the purpose of and need for action, or because they would not meet the technical, socioeconomic, or regulatory screening criteria as outlined in the Alternatives Compilation Report (Reclamation 2020c).
ES.5 Summary of Environmental Consequences

The purpose of the environmental consequences analysis is to describe the anticipated environmental and socioeconomic impacts that would result from each alternative, including the No Action alternative. Chapter 3, Affected Environment and Environmental Consequences, presents the anticipated and potential impacts on the human and natural environment that could occur from implementing the alternatives. Key findings of the impact analysis of the action alternatives are summarized in Table ES-2, Summary of Environmental Consequences from Action Alternatives.

Under the No Action alternative, the LNFH would continue current O&M of the LNFH surface water intake and delivery system on Icicle Creek, which were constructed in 1939 and 1940. Routine maintenance would not comprehensively address the continued deterioration of the existing intake and delivery system which cause O&M problems for the Hatchery. The requirements of the NMFS 2017 Biological Opinion (NMFS 2017a) and current screening and fish passage criteria for anadromous fish passage facilities would not be met. The existing low-head diversion dam would continue to impede fish passage, and ESA-listed fish would continue to become entrained\(^2\) in the unscreened intake. Existing safety issues would continue during snow and ice conditions, especially during frazil ice\(^3\) events.

ES.6 Preferred Alternative

In accordance with the NEPA implementing regulations (40 CFR 1502.14[d] and 43 CFR 46.425(a)), Reclamation and USFWS have identified Alternative C as the preferred alternative. In addition, the USFWS and USACE have concurred with Reclamation’s selection of Alternative C as the preferred alternative. While Reclamation and USFWS have identified a preferred alternative in this Final EIS, actual selection of an alternative for implementation will not occur until the ROD. The decision on the alternative to implement will consider public comments received on the Draft EIS and the full analysis presented in Chapter 3.

\(^2\) Entrainment means the entrapment of fish into a watercourse diversion that has no screen or into high velocity water along the face of an improperly designed screen (Washington Area Code 220-660-030).

\(^3\) Frazil ice is a collection of loose ice crystals that form in supercooled turbulent water that float, are suspended in the water column, or attach to the low-head diversion dam and intake structures.
### Table ES-2. Summary of Environmental Consequences from Action Alternatives

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<tr>
<td><strong>Air Quality and Climate</strong></td>
<td>Construction would generate temporary and localized fugitive dust, greenhouse gas emissions, and other air pollutants, which would be minimized using standard dust control and other BMPs. Contribution to global greenhouse gas emissions are expected to be well below 25,000 metric tons of carbon dioxide equivalents per year, which is the greenhouse gas reporting requirement threshold under 40 CFR 98. The types of emissions from O&amp;M would be similar but reduced compared with Alternative A because less maintenance would be needed.</td>
<td>Impacts from construction would be similar to Alternative B, but emissions would be slightly reduced because there would be less construction activity associated with the shorter length of conveyance pipeline being replaced. Contribution to global greenhouse gas emissions would be well below the greenhouse gas reporting requirement threshold under 40 CFR 98 of 25,000 metric tons of carbon dioxide equivalents per year. Emissions associated with O&amp;M of the LNFH would be the same as described under Alternative B.</td>
<td>Impacts from construction would be similar to Alternative B, but emissions would be greater because of the increased Phase I construction timeline and the need for additional diesel-powered pumping for the temporary Hatchery water supply. Contribution to global greenhouse gas emissions would be well below the greenhouse gas reporting requirement threshold under 40 CFR 98 of 25,000 metric tons of carbon dioxide equivalents per year. Emissions associated with O&amp;M of the LNFH would be the same as described under Alternative B.</td>
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<td><strong>Geology and Soils</strong></td>
<td>Construction would result in localized effects from ground disturbance and movement of geologic materials. BMPs to minimize surface disturbance, control erosion, and reclaim temporarily disturbed areas would reduce impacts. Permanent facilities would result in the irretrievable commitment of soil resources in limited areas.</td>
<td>Impacts would be similar to Alternative B, but slightly reduced because there would be less construction activity associated with the shorter length of conveyance pipeline being replaced.</td>
<td>Impacts would be the same as described under Alternative B.</td>
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<td><strong>Water Resources</strong></td>
<td>Intake rehabilitation would greatly reduce sediment diversion, allowing it to remain in the creek and contribute to stream conditions. Surface disturbances from construction within the 100-year floodplain would occur. Surface disturbances and equipment use in and around the stream would increase water temperature and lowered dissolved oxygen would be reduced.</td>
<td>Impacts would be similar to Alternative B, but slightly reduced because less conveyance pipeline would be replaced and fewer shade-producing trees would be removed. As a result, effects from increased water temperature and lowered dissolved oxygen would be reduced.</td>
<td>Impacts would be similar to those described under Alternative B, except Alternative D would involve additional seasons of cofferdam use (four construction seasons instead of two). This would increase surface disturbances and equipment use in and adjacent to Icicle Creek.</td>
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<tr>
<td>Water</td>
<td>adjacent to Icicle Creek could result in contaminants (e.g., soil, lubricants, fuel, etc.) entering the creek and affecting water quality. There would be two weeks of cofferdam use during November, a month when prolonged precipitation or rain-on-snow events could overtop, dislodge, or destroy the cofferdam. Cofferdam failure during high flows could release tons of rock into Icicle Creek and a plume of accumulated sediment. Shade-producing trees would be removed, allowing an increase in water temperature and a lowering of dissolved oxygen. BMPs and permit conditions would reduce impacts.</td>
<td>(see above)</td>
<td>Creek that could result in contaminants (e.g., soil, lubricants, fuel, etc.) entering the creek and affecting water quality. Additionally, cofferdam use would end on October 31 each year, avoiding cofferdam use during November when prolonged precipitation or rain-on-snow events could overtop, dislodge, or destroy the cofferdam.</td>
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<tr>
<td>Biological</td>
<td>Alternative B would comply with current NMFS fish screening and passage criteria for anadromous salmonids and would reduce take of ESA-listed fish compared with current conditions. Construction would temporarily affect ESA-listed fish, critical habitat, and essential fish habitat, but BMPs (Appendix B) and conservation measures developed during ESA Section 7 consultation with the USFWS, and in the NMFS 2017 FPRP III programmatic Biological Opinion (NMFS 2017b), would reduce effects. Fish passage and aquatic habitat quantity, quality, and connectivity would be improved post-Project implementation. Lead-containing materials on Hatchery infrastructure would be removed and disposed of in accordance with current regulations.</td>
<td>Alternative C would comply with current NMFS fish screening and passage criteria for anadromous salmonids and would reduce take of ESA-listed fish compared with current conditions. Impacts on fish and aquatic habitat and vegetation would be similar to Alternative B, but slightly reduced because less conveyance pipeline would be replaced, and fewer shade-producing trees would be removed. Effects on terrestrial wildlife species would be the same as described under Alternative B.</td>
<td>Alternative D would comply with current NMFS fish screening and passage criteria for anadromous salmonids and would reduce take of ESA-listed fish compared with current conditions. The types of impacts on fish and aquatic habitat would be similar to Alternative B, but the time frame over which they occur would differ. This may increase impacts to fish and aquatic habitat because, although the daily and seasonal timeframe would be shorter, the total time needed to complete the Project would be longer. There would also be additional impacts from Phase I construction temporary Hatchery water supply diesel-powered pumping for a longer period, inundation of the partially constructed intake headworks.</td>
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<td>Resources (continued)</td>
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<td><strong>Biological Resources</strong> (continued)</td>
<td>with CFRs and associated safety regulations. Effects on vegetation would be minor and effects on terrestrial wildlife species would be minor or negligible. (see above)</td>
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<td><strong>Cultural Resources</strong></td>
<td>There would be no adverse effect on historic properties, archaeological sites eligible for listing in the National Register of Historic Places, or Native American Traditional Cultural Properties per the no adverse effect determination by the Washington State DAHP on March 12, 2020. An inadvertent discovery plan would be followed, and professional archaeological monitoring would occur during Phase II pipeline replacement activities on USFWS property.</td>
<td>Impacts would be the same as described under Alternative B.</td>
<td>Impacts would be the same as described under Alternative B.</td>
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<tr>
<td><strong>Land Use, Utilities, and Service Systems</strong></td>
<td>Existing intake facilities and the conveyance pipeline would be modified, replaced, rehabilitated, and new intake elements would be constructed. Effects on land use would be unchanged. There would be no change in the current land uses, zoning, landownership, or entitlements. Relocation of at least one power pole and minor upgrades to the overhead electrical infrastructure could result in a temporary lapse in electrical supply to area users.</td>
<td>Impacts would be the same as described under Alternative B.</td>
<td>Impacts would be the same as described under Alternative B.</td>
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<td><strong>Noise and Vibration</strong></td>
<td>Equipment and vehicle use associated with construction would raise ambient noise levels for sensitive receptors and increase vibration. Expected loudest noise levels would be generated by a pneumatic tool (Phase I construction) and hot air blower (Phase II construction). Increases in ambient noise levels could occur for up to 24 hours per day, and up to seven days per week during construction. Noise BMPs would reduce effects.</td>
<td>Impacts would be similar to those described under Alternative B. However, under Alternative C, starting at the PISMA, the conveyance pipeline would be lined with CIPP to the USFWS parcel boundary, which could result in a slight increase in the duration of noise from use of the hot air blower. Additionally, Alternative C would require fewer truck trips to access the intake construction area, resulting in less construction noise for sensitive receptors along Icicle Road/Icicle Creek Road.</td>
<td>There would be no Phase I construction work from 10:00 p.m. to 7:00 a.m. under Alternative D, which would reduce daily noise impacts as compared with Alternative B. However, the overall duration of Phase I construction noise impacts would be experienced over four years under Alternative D, as compared to two under Alternative B. Additionally, the two diesel-powered pumps associated with the temporary Hatchery water supply for Phase I construction would operate 24 hours per day and seven days per week for a period of eight months, as opposed to approximately 10 days under Alternative B.</td>
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<td><strong>Transportation and Traffic</strong></td>
<td>Heavy vehicle traffic using Icicle Road and Icicle Creek Road and the turnaround at the Forest Service and Alpine Lakes Wilderness kiosk would temporarily reduce the Level of Service (LOS) in these areas. Prohibiting parking at the turnaround would reduce access. Impacts could be greatest during weekends and in summer when traffic volumes and demands for access are highest. Traffic control BMPs would reduce effects.</td>
<td>Temporary reductions in LOS would be less than those described under Alternative B because there would be fewer heavy equipment vehicle trips accessing the intake construction area. Impacts on access would be the same as described under Alternative B.</td>
<td>Temporary reductions in LOS would be similar to those described under Alternative B during daytime hours. Overall daily impacts to traffic and transportation would be reduced under Alternative D as compared with Alternative B, as construction activities after 10:00 p.m. would not occur. However, these impacts would be experienced over a total of four construction seasons under Alternative D, instead of two seasons under Alternative B.</td>
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<td>Recreation</td>
<td>Temporary impacts to recreational conditions and access would occur during construction, which may temporarily depress recreational visitation rates by approximately 8 percent. Long-term benefits to recreational fishing would result from enhanced fish passage and aquatic ecosystem productivity. Noise from Phase II construction on private lands along the conveyance pipeline alignment could be audible to visitors and guests utilizing indoor and outdoor private recreational facilities. Light from Phase I nighttime construction could potentially affect visitors and guests at recreation facilities, but impacts are anticipated to be minor.</td>
<td>Impacts on recreational opportunities, conditions, and access would be similar to those described under Alternative B, but impact intensity would be reduced because there would be less excavation of the conveyance pipeline and associated truck traffic and delays.</td>
<td>There would be less of a decline in annual recreation visits at the Snow Lake Trailhead (6 percent) as compared to Alternative B due to a shorter in-water work window. However, overall impacts to recreationists would be experienced over a longer total time period compared with Alternative B as Phase I construction-related disturbances, including noise, traffic delays, and temporary loss of recreationist parking along Icicle Creek Road and at the Snow Lakes Trailhead would extend for an additional two years, including during the peak recreation season for two additional seasons, compared with Alternative B. Impacts from Phase II construction would be the same as those described under Alternative B.</td>
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<td>Visual Resources</td>
<td>Temporary impacts would occur from construction-related activities such as use of heavy machinery and warning signs, which would sharply contrast with the natural lines, form, and color within the existing viewshed, and construction noise, light, and level of the activity would draw the attention of the casual observer. Impacts from vegetation removal would diminish over time as planted and seeded vegetation matured. Impacts from O&amp;M would be slightly less due to an expected reduction in frequency of O&amp;M activities.</td>
<td>Impacts would be similar to those described under Alternative B but would be reduced because there would be less construction-related activity due to lining a greater length of the conveyance pipeline. Disturbance in the Icicle Creek riparian zone would be reduced, reducing visual impacts to the characteristic landscape.</td>
<td>Impacts would be similar to those described under Alternative B, however overall impacts to visual resources would be experienced over a longer total time period compared with Alternative B as Phase I construction-related impacts would extend over four years, as compared with two years under Alternative B.</td>
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## Executive Summary (Table ES-2: Summary of Environmental Consequences from Action Alternatives)

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<td>Socioeconomics and Environmental</td>
<td>Temporary recreational access constraints and delays would reduce recreational visits and related values and spending. Similarly, there would be temporary economic impacts in terms of value of lost time for motorists due to delays during constriction. There would not be disproportionate environmental effects on low-income, minority or Tribal populations.</td>
<td>Impacts on socioeconomics would be similar to those described under Alternative B, but intensity of impacts would be reduced given that the degree of economic impacts from traffic disturbances would be reduced. Impacts on environmental justice would be the same as Alternative B.</td>
<td>Impacts on socioeconomics would be the same as described under Alternative B, but the impacts would be experienced over a longer total time period compared with Alternative B, as Phase I construction-related impacts would extend over four years, as compared with two years under Alternative B. Impacts on environmental justice would be the same as Alternative B.</td>
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<td>Justice</td>
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<td>Hazardous Materials and Public Health</td>
<td>Lead-based materials on Hatchery infrastructure would be removed in accordance with CFRs and associated safety regulations. Construction activities occurring from 10:00 p.m. to 7:00 a.m. could temporarily increase the risk of vehicle accidents, and the associated construction noise and light from during this period may temporarily affect nearby residents and guests. Long-term work conditions would be improved, which would decrease risk of worker injury.</td>
<td>Impacts would be the same as described under Alternative B.</td>
<td>Impacts due to hazardous materials would be the same as described under Alternative B. The two additional Phase I construction seasons would continue the risk of impacts to public health and safety described under Alternative B for an additional two years. Because Phase I construction work would not take place past 10:00 p.m. under Alternative D, the risk of vehicular accidents and noise impacts to sensitive receptors near the intake structure from 10:00 p.m. to 7:00 a.m. would be reduced as compared with Alternative B. Noise levels would exceed the nighttime Class A environmental designation for noise abatement of 45 decibels A-weighted or less for several residences off East Leavenworth Road and Cemetery Road near the spillway pool resulting from diesel-powered pumping for the Phase I temporary Hatchery water supply for an eight-month period.</td>
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<td>Tribal Interests</td>
<td>There would be no impacts on Indian sacred sites, Indian Trust Assets (ITAs), or traditionally and culturally important hunting or plant gathering areas. No adverse impacts to access to the Wenatshapam Fishery are anticipated. Fishing activities could be temporarily impacted during construction from noise disturbance and reduced fishing area from pump screen boxes in the spillway pool. Temporary Hatchery water supply diesel-powered pumping activities at the spillway pool may occur during the same time as scaffolding repair, ceremonial, and fishing activities but would not impact the ability of the Tribes to perform these functions. Improved fish passage, reduced potential for fish entrainment, and increased Hatchery production reliability would benefit the Tribal fishery.</td>
<td>Impacts would be the same as described under Alternative B. There would be slightly less disturbance to vegetation that could support culturally important plants; however, vegetation in the Analysis Area has not been identified as culturally important to date.</td>
<td>There would be no impacts on Indian sacred sites, ITAs, and traditionally and culturally important hunting or plant gathering areas, as described under Alternative B. Temporary impacts on the Tribal fishery would be the same as described under Alternative B, but the impacts would be experienced over a longer total time period compared with Alternative B, as Phase I construction-related impacts would extend over four years, as compared with two years under Alternative B. Diesel-powered pumping from the spillway pool would occur over a period of eight months during Phase I of construction and could result in temporary noise or displacement impacts to Tribal fishers.</td>
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Chapter 1. Purpose of and Need for Action

1.1 Introduction

The Bureau of Reclamation (Reclamation) has prepared this Environmental Impact Statement (EIS) for the Leavenworth National Fish Hatchery (hereafter, LNFH or Hatchery) Surface Water Intake Fish Screens and Fish Passage (SWISP) Project (Map 1-1 in Appendix A provides a general overview of the Project Area). In this EIS, Reclamation evaluated the impacts of the SWISP Project on the natural and human environment. Reclamation used knowledge gained from previous environmental analyses and public scoping to inform the geographic scope and level of analysis for the SWISP Project EIS. The U.S. Fish and Wildlife Service (USFWS) through its role as owner and operator of the LNFH has assisted with the preparation of this EIS and served as a cooperating agency throughout the process. The U.S. Army Corps of Engineers (USACE) and the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation) also served as cooperating agencies on the Project (see Section 1.5).

This EIS complies with the National Environmental Policy Act of 1969, as amended (NEPA; 42 United States Code [USC], Section 4321 et seq.), the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR], Parts 1500-1508, as updated July 16, 2020), the U.S. Department of the Interior's NEPA Regulations (43 CFR, Part 46), and other relevant federal and state laws and regulations.

The SWISP Project EIS followed the approach to the NEPA process as previously mandated by Executive Order (EO) 13807: Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects (August 15, 2017). Executive Order 13807 established the definition of a Major Infrastructure Project, and notably defined it as an infrastructure project for which multiple authorizations by federal agencies would be required. Section 5(b)(ii) of EO 13807 introduced and defined the term “One Federal Decision” (OFD) as a process that required the federal lead agency, cooperating, and participating agencies to document all individual agency decisions in a single Record of Decision (ROD). The SWISP Project qualified as a Major Infrastructure Project under EO 13807 subject to OFD based on the cooperating agency status of the USFWS and USACE, and their required authorizations. The USFWS has a decision to be made, as described in Section 1.4, and will be signing the ROD for the SWISP Project along with Reclamation.

Reclamation and USFWS propose to rehabilitate, replace, and modernize the LNFH surface water intake and delivery system on Icicle Creek near Leavenworth, Washington by building new...

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4 Reclamation designed the SWISP Project with an expected service life of 50 years.
5 CEQ's Updated Regulations Implementing the Procedural Provision of NEPA, effective September 14, 2020, were applied to this EIS.
headworks, installing National Marine Fisheries Service\(^6\) (NMFS)-compliant fish screens, constructing a creek-width roughened channel\(^7\), and replacing and lining the surface water conveyance pipeline to the Hatchery. Additional details and description of the proposed action can be found in Chapter 2, Proposed Action and Alternatives.

### 1.2 Project Background

The LNFH was designed and constructed in the late 1930s as mitigation for the impacts to anadromous fish resulting from the construction and operation of Grand Coulee Dam. The Hatchery, which is owned and operated by USFWS and funded by Reclamation and Bonneville Power Administration, currently raises and releases 1.2 million\(^8\) Spring Chinook Salmon smolts annually into Icicle Creek.

The LNFH, which is one of the three hatcheries comprising the Leavenworth Fisheries Complex (LFC), is funded and operated under an Interagency Acquisition Agreement (IAA; #R18PG00084) between Reclamation and USFWS. Under the IAA, Reclamation and USFWS collaborate to review and approve annual budgets for LNFH operations and identify rehabilitation and replacement work for facilities. USFWS in turn operates and maintains LNFH facilities to ensure fish production goals are met.

Under the IAA, USFWS operates LNFH to produce fish in accordance with the 2018-2027 U.S. v. Oregon Management Agreement (Agreement Parties 2018). In addition, USFWS monitors and evaluates fish production in accordance with standard USFWS practices and as required by applicable regulatory documents, including Endangered Species Act (ESA) biological opinions relating to operations and maintenance (O&M) of LNFH and LFC facilities. Fish production, monitoring, and evaluation activities are coordinated with state, federal, Tribal, and other partners and entities as appropriate. The most important venues for this coordination are the committees established as part of the U.S. v. Oregon Management Agreement and the Hatchery committees established to mitigate the effects of Public Utility District-owned dams in the mid-Columbia River. Implementation of the SWISP Project does not propose changes to the U.S. v. Oregon Management Agreement or Hatchery fish production.

The LNFH’s primary point of diversion and water delivery system on Icicle Creek is nearly 80 years old and is reaching or exceeding its expected service life. Rehabilitation, replacement, and modernization of the LNFH surface water intake and delivery system was evaluated in the Icicle Creek Restoration Project Final EIS (USFWS 2002) and the Icicle Creek Water Resource Management Strategy (Icicle Strategy) Final Programmatic EIS prepared by the Washington State Department of Ecology (Ecology) and Chelan County (hereafter, Icicle Strategy; Chelan County and Ecology 2019). The existing intake facility does not comply with current NMFS screening criteria for anadromous

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\(^6\) This agency is also known as NOAA Fisheries.

\(^7\) This is a roughened channel spanning the width of Icicle Creek.

\(^8\) This level is less than the U.S. v. Oregon management levels which were adjusted to accommodate water quality, fish health, Hatchery infrastructure issues, and ESA straying concerns. The goal of the U.S. v. Oregon parties is a return to the higher historic production levels once these outstanding issues have been resolved.
1. Purpose of and Need for Action (Project Background)

Salmonids (NMFS 2011), can impede fish passage during low flow conditions, and can entrain⁹ fish species listed under the ESA, potentially constituting take¹⁰. Current flows at the fish ladder/sediment sluice do not meet NMFS guidelines for fish attraction. The NMFS Biological Opinion on LNFH operations (NMFS 2017a) requires Reclamation and the USFWS to have in place and operating by May 2023 a surface water intake and delivery system that complies with NMFS current screening and fish passage criteria for anadromous fish passage facilities.

Safety, water conservation, sediment management, and maintaining and prolonging a dependable surface water intake and delivery system are also LNFH priorities to address as part of the aging infrastructure. Improving employee safety when operating and maintaining the intake and delivery facilities is of great concern to the LNFH. During winter months, employees encounter snow, ice, and cold water at the intake and gatehouse, and, at times, a condition known as frazil ice¹¹. During these conditions, the water delivery system must be observed 24 hours a day to ensure adequate surface water delivery to the Hatchery. Ice buildup may reduce the amount of water that can be safely diverted to the LNFH, requiring employees to use blow torches, picks, and other methods to remove ice and frazil ice accumulation from the intake structures. Employees also experience safety risks in the existing gatehouse related to potentially hazardous materials (lead paint), fine rack maintenance, and sediment removal.

Water conservation in the Icicle Creek watershed is important to the area’s many water users. The Project is designed to improve the Hatchery’s ability to support future water conservation goals. Specifically, the dual intake apertures and fish screens (see Figure A-1, Figure A-2, and Figure A-3 in Appendix A) would allow greater control of water quantities diverted from Icicle Creek over a range of flows, while maintaining NMFS current screening and fish passage criteria for anadromous salmonids. Improving LNFH’s ability to conserve water is an essential step in modernizing the Hatchery’s production facilities and meeting conservation objectives of local stakeholders (i.e., the Icicle Work Group¹²).

Decreasing the time, effort, and funding of maintenance activities associated with sediment management in and around the existing facilities has been a chronic challenge (USFWS 2020a). Tons of sediment have moved through the system and led to wear on the intake facilities and excessive wear on the conveyance pipeline. Although the original wood stave conveyance pipeline was replaced in the 1960s, the poor condition of the concrete conveyance pipeline is a serious matter and its ability to continue the reliable delivery of water to the Hatchery is a priority for LNFH managers. Transported sediments would continue to degrade the existing conveyance pipeline if left alone.

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⁹ Entrainment means the entrapment of fish into a watercourse diversion that has no screen or into high velocity water along the face of an improperly designed screen (WAC 220-660-030).
¹⁰ Take as defined under the ESA means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”
¹¹ Frazil ice is a collection of loose ice crystals that form in supercooled turbulent water that float, are suspended in the water column, or attach to the low-head diversion dam and intake structures.
¹² The Icicle Work Group is made up of a broad coalition of stakeholders representing local, state, and federal agencies, Tribes, irrigation and agriculture interests, and environmental organizations. The purpose of the Icicle Work Group is to develop a comprehensive water resource management strategy for the Icicle Watershed that will achieve multiple instream and out-of-stream benefits through investment in conservation, storage restoration and reoperation, water marketing, habitat, and fish passage projects.
Failure of the delivery system would jeopardize the ability for LNFH to meet its fish production obligations.

The intake facility is the point of diversion for both the Hatchery and the Cascade Orchard Irrigation Company (COIC) water rights from Icicle Creek. The COIC water right is for 12 cubic feet per second (cfs) and the water is transported via the conveyance pipeline to the bifurcation point (Map 2-1 in Appendix A), approximately 1,200 feet east of the intake facility. COIC is finalizing plans to relocate its point of diversion on Icicle Creek downstream of the Hatchery. Once the new point of diversion is constructed, COIC would no longer divert water at the current intake location. As of March 2021, COIC was in the final design phase of their relocation project and had begun the permitting process for a new point of diversion on Icicle Creek. COIC plans to begin construction in the summer of 2021 and complete the project prior to the irrigation season in the spring of 2022.

If COIC has not completed their relocation as planned, USFWS will provide COIC with four to seven cfs of surface water at the existing bifurcation beginning in May 2022 and throughout the 2022 irrigation season as necessary. Although COIC has a water right for 12 cfs, their current system can only accommodate approximately seven cfs before diverted water begins overflowing the banks of their open ditch delivery system (COIC 2021). Based on historical combined diversion records for LNFH and COIC (Table 2-4 in USFWS 2004), groundwater production inputs (Table 3-4 in USFWS 2016), and water budget estimate savings resulting from implementation of the LNFH circular tank pilot study (MJA 2020), USFWS will be able to provide COIC four to seven cfs of surface water from May to September 2022 without affecting LNFH or Tribal fish production. Starting in July 2022, the four to seven cfs of surface water provided to COIC would be a portion of the Hatchery’s 40 cfs provided by the temporary gravity bypass pipeline. During construction, the Hatchery would continue to meet its current obligation to raise 1.2 million Spring Chinook Salmon smolts and provide second pass water to meet Yakama Nation’s Coho Salmon production needs.

1.3 Purpose of and Need for Action

The need for the proposed action is to comply with the NMFS 2017 Biological Opinion (NMFS 2017a) and current screening and fish passage criteria for anadromous fish passage facilities, improve employee safety when operating and maintaining the intake and delivery structures, and increase reliability and longevity of the water delivery system.

The purpose of the SWISP Project is to minimize take of ESA-listed fish species, provide fish passage that complies with current regulatory criteria, and ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek.

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14 Water that has been first utilized for LNFH Spring Chinook Salmon production then passed through the raceways used by the Yakama Nation Coho Salmon program before exiting the facility.
1.4 Decisions to be Made

This EIS complies with the NEPA by supporting federal decisions related to the SWISP Project. It provides necessary information for approving, modifying, or denying a proposal. Based on the analysis in this EIS, Reclamation will make the following decisions:

- Whether or not to rehabilitate, replace, and modernize the LNFH surface water intake facilities on Icicle Creek.
- Whether or not to rehabilitate, replace, and modernize the 1.1-mile surface water conveyance pipeline from the intake facilities on Icicle Creek to the LNFH fish production facilities.

The USFWS will also be signing the ROD for the SWISP Project and will make the following decision:

- Whether to support the construction of the proposed project by continuing the IAA and operation of the proposed facilities once constructed.

The USFWS decision will be based on consistency with ESA biological opinions relating to O&M of LNFH and LFC facilities and the Federal Columbia River Power System. In addition, the USFWS decision will be based on whether USFWS concurs with Reclamation that the preferred alternative meets all current and applicable requirements under the ESA and Clean Water Act (CWA), provides a safe and reliable surface water intake and delivery system, and will sufficiently support Hatchery production, specifically the federal government’s legal obligations under the U.S. v. Oregon Management Agreement (Agreement Parties 2018).

As a major infrastructure project (water resources sector) under Section 3(e) of EO 13807, the SWISP Project is identified and tracked on the Federal Infrastructure Permitting Dashboard\(^{15}\). The Permitting Dashboard is an online tool for agencies, project developers, and the interested public to track the federal government's environmental review and authorization process. The public is encouraged to access the Permitting Dashboard to track the status of the SWISP Project. Additional federal decisions will be made as part of permitting and consultation processes, including those required under the CWA and Section 7 of the ESA. State jurisdiction decisions would be made as part of permitting processes as discussed in Section 2.4.2 (see Permitting discussion).

1.5 Lead, Cooperating, and Participating Agencies

Reclamation is the lead agency in charge of preparing this EIS. The USFWS and USACE agreed to be cooperating agencies under OFD (EO 13807). The USFWS would sign the ROD, while the USACE would not sign the ROD but instead would issue a permit under Section 404 of the CWA. The Yakama Nation, through its special interest in the Wenatchee Basin and Icicle Creek dating back to time immemorial and specifically reserved fishing rights in Article X of the Yakama Treaty

1. Purpose of and Need for Action (Lead, Cooperating, and Participating Agencies)

of 1855, also assisted with preparation of the EIS and served as a cooperating agency. After discussions on executing a Memorandum of Understanding, Reclamation recognized the Yakama Nation as a cooperating agency on February 2, 2021.

The Confederated Tribes of the Colville Reservation (Colville Tribes) is also engaged as a participating agency, as are other federal, state, and local agencies. Cooperating and participating agencies and interested parties are listed in Section 4.2.1, Cooperating and Participating Agencies, and Section 4.2.2, Interested Parties, respectively. Additional details on consultation and coordination activities associated with the SWISP Project EIS are provided in Section 4.2, Consultation and Coordination.

1.6 Public Involvement

Public involvement is a legally required component of the NEPA process. It ensures public disclosure of the effects of major federal actions and alternatives, as well as the opportunity to provide input on agency decision-making. Public involvement requirements under the NEPA are codified in 40 CFR 1506.6.

On April 24, 2020, Reclamation published the Notice of Intent (NOI) to prepare an EIS in the Federal Register for the SWISP Project, announcing the beginning of a public scoping period to solicit public comments and to identify issues. Reclamation solicited comments from cooperating and participating agencies, Tribes, other interested parties, and the public through various meetings, including a web-based virtual public meeting (VPM) room that was available 24 hours a day during the public scoping period. The public scoping period ended on May 26, 2020. The description and outcomes of the scoping process are summarized in a Scoping Report (Reclamation 2020a), which was published on Reclamation’s SWISP Project website16 in June 2020. Additional details on collaboration and outreach activities are provided in Section 4.2, Consultation and Coordination, and Section 4.3, Public Collaboration and Outreach.

The Draft EIS was made available for public review for 45 days, from November 20, 2020 through January 4, 2021. Similar to the scoping period, Reclamation made a VPM website available online starting November 20, 2020. The VPM website was available for the full duration of the public comment period 24 hours a day. The VPM website was set up using the content and format that Reclamation would have used for in-person open house public meetings. Additionally, Reclamation held two Question and Answer/Public Comment video teleconferences on December 8 and 10, 2020 that provided the public additional opportunities to participate in the Draft EIS public comment process. A brief overview of the Project was presented, and subject matter experts from Reclamation and the USFWS were available to answer questions about the Project. Attendees also had the opportunity to record their comments during the final segment of the video teleconference. Interested parties were able to submit public comments via the VPM website, the Question and Answer/Public Comment video teleconferences, email, and U.S. mail. Reclamation reviewed submissions and recorded all substantive comments. The Public Comment and Response Report in

16 The SWISP Project website can be accessed at: https://www.usbr.gov/pn/programs/leavenworth/swisp/index.html.
Appendix E includes responses to all substantive comments submitted during the public comment period.

1.7 Issues Addressed in this EIS

During public scoping, Reclamation categorized substantive comments received into 35 issue categories. The following summaries highlight a few of the issues identified during public scoping and addressed in this EIS. The full list of summaries is available in the SWISP Project Scoping Report (Reclamation 2020a):

- Fisheries and Aquatic Ecosystems—Commenters stated concerns about impacts on ESA-listed fish and riparian habitat. Commenters requested that the EIS evaluate the functions and values of riparian habitat and disclose impacts in terms of expected changes in the resource function. Commenters stated that Reclamation should minimize ecosystem damage and reduce any detrimental materials from entering Icicle Creek during construction and restore temporarily disturbed areas.

- Water Quality—Commenters stated that the proposed construction in Icicle Creek must not exceed the State Water Quality Standards for Surface Waters (Washington Administrative Code (WAC) 173-201A), nor exceed the Aquatic Life turbidity criteria found in WAC 173-201A-200(1)(c). The EIS should describe any relevant total maximum daily load (TMDL) allocations for Icicle Creek, describe the effects on sediment loading and transport in Icicle Creek, and describe how Best Management Practices (BMPs), mitigation measures, and monitoring would ensure adequate protection of water quality.

- Tribal Interests—Commenters expressed concern that the traditional and accustomed uses and activities of the Yakama Nation and Colville Tribes, specifically Tribal fishery activities in Icicle Creek, may be impacted by the Project, and that Reclamation should request Government-to-Government Consultation with these federally-recognized Tribes to ensure Tribal Treaty and federally protected harvest rights are maintained.

1.8 Changes to the Final EIS

In response to public, Tribal, and agency comments on the Draft EIS, several additions were made to the chapters and appendices in the Final EIS. No changes to the action alternatives were required because of comments received on the Draft EIS. The responses to comments in the Public Comment and Response Report (Appendix E) note when and where text has been changed in the EIS based on a specific comment. A summary of changes is as follows:

- Updated project cost information (provided on the EIS cover)
- Additional text added in Chapter 1 about cooperating agencies (Section 1.5)
- Updated and reader-friendly figures and tables added to help depict construction phases and activities (see Table 2-1, Table 2-2, Figure 2-1, and Figure 2-2 in Chapter 2)
- A new table added to Chapter 2 (Table 2-4) that provides acreages of temporary and permanent disturbance by alternative
1. Purpose of and Need for Action (Changes to the Final EIS)

- Additional baseline data and supporting analysis added in Chapter 3 for some of the resource sections
- Updated Chapter 4 to reflect updates to consultation and coordination activities with federal, state, Tribal, and local entities
- New figures included in Appendix A to provide additional detail on Project design
- Updates and revisions to BMPs and potential contractor plan submittals in Appendix B
- Addition of an updated Draft Phase III Riparian Revegetation Plan (Appendix D)
- A Public Comment and Response Report (Appendix E) that shows all substantive comments received on the Draft EIS and how each comment was addressed

1.9 Document Organization

The document is organized as follows:

- **Chapter 1**: Purpose of and Need for Action, introduces the Project and the purpose of and need for action. The chapter also discusses Project background and decisions to be made, lists the lead, cooperating, and participating agencies, and summarizes public involvement and issues addressed in this EIS.
- **Chapter 2**: Proposed Action and Alternatives, provides information on how Reclamation developed the Project alternatives, and includes a description of each alternative being carried forward for analysis. Alternatives and elements considered but eliminated from further consideration are also identified. Chapter 2 concludes with a summary of anticipated impacts on natural and human resources from the Project alternatives.
- **Chapter 3**: Affected Environment and Environmental Consequences, characterizes the existing environment, particularly for the natural and human resources most affected by the alternatives carried forward for analysis. The chapter also identifies the impacts that would occur to the resources as a result of Project construction, and O&M.
- **Chapter 4**: Consultation and Coordination, presents a list of the agencies, Tribes, and other interested or affected individuals and groups that were contacted during EIS development. It also contains a summary of the public involvement process for this EIS and discusses the consultation and coordination activities that were undertaken with cooperating agencies. A list of Reclamation and consultant staff who prepared this EIS is included.
- **Chapter 5**: References, lists the documents and other sources used to prepare this EIS.
- **Chapter 6**: Glossary, contains definitions of terms found in this EIS.

Appendices are supplemental documents supporting the descriptions and analyses in this EIS.
Chapter 2. Proposed Action and Alternatives

2.1 Introduction

This chapter describes the process Reclamation used to identify a reasonable range of alternatives for analysis in the SWISP Project EIS. In summary, Reclamation developed criteria to screen alternatives and Project components and elements against these criteria. The major Project components are intake and fish screens, fish passage, sediment management, conveyance pipeline, temporary Hatchery water supply, and access and staging. Each component has technical and operational requirements; generally, there are different techniques to meet these requirements. These different techniques are termed elements.

The No Action alternative and three action alternatives are described in detail in this chapter (see Section 2.4, Description of the Alternatives). A summary of the alternatives and component elements considered but eliminated from detailed study is provided (see Section 2.5, Alternatives and Alternative Elements Considered but Eliminated from Detailed Study). A summary comparison of the differences and common impacts between the alternatives is also provided (see Section 2.6, Summary Comparison of Impacts).

2.2 Alternatives Development Process

The alternative development process incorporated a number of guiding principles as provided by relevant laws and guidance, including the CEQ’s Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1500–1508, as updated July 16, 2020 and effective September 14, 2020), U.S. Department of the Interior’s NEPA Regulations (43 CFR Part 46), and Reclamation’s NEPA Handbook (Reclamation 2012). These regulations require agencies to:

- Explore all reasonable alternatives that meet the purpose of and need for the proposed action and, for alternatives that were eliminated from detailed study, briefly discuss the reasons for elimination.
- Include the alternative of no action.
- Identify the agency’s preferred alternative or alternatives, if one or more exists, in the Draft EIS and identify such alternative in the Final EIS (40 CFR 1502.14[d]; 43 CFR 46.425(b)).

Reclamation also followed the Principles and Requirements for Federal Investments in Water Resources (CEQ 2013), which lay out broad principles to guide water investments. The principles specify that investments in federal water resources shall reflect national priorities, encourage economic development, and protect the environment by: (1) seeking to maximize sustainable economic development; (2) seeking to avoid the unwise use of floodplains and flood-prone areas.
and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

Interdisciplinary collaboration was a critical step in the alternative development process. Agencies should seek to achieve agreement from diverse interests on the goals, purposes, and needs for agency plans and activities as well as the methods anticipated to carry out those plans and activities (43 CFR 46.110(a)). The SWISP Project alternative development process involved collaboration with stakeholders, including cooperating and participating agencies, as well as engineering and conceptual design analyses (Reclamation 2020b). During the scoping period from April 2020 through May 2020, Reclamation asked for public and agency input on the scope of the analysis and for alternatives to be considered. Reclamation analyzed the scoping comments it received and published a Scoping Report in June 2020 (Reclamation 2020a). Those comments related to alternatives were carried forward into alternatives development.

2.3 Alternatives Screening

The SWISP Project EIS alternative development process involved external cooperating and participating agency collaboration and internal engineering and feasibility analysis (Reclamation 2020b). From April 2020 to July 2020, Reclamation coordinated with cooperating and participating agencies to refine a list of reasonable alternatives and a comprehensive suite of Project elements and screened each element to determine which would be carried forward for combination into complete alternatives and detailed analysis. The screening process is detailed in the SWISP Project Alternatives Compilation Report (Reclamation 2020c).

The SWISP Project consists of six components:

1. Intake and Fish Screens
2. Fish Passage
3. Sediment Management
4. Conveyance Pipeline
5. Temporary Hatchery Water Supply
6. Access and Staging

There are different ways these components can be implemented, which are called Project elements. Part of the alternative development process included identification of the different elements available for each component. For example, to address the temporary Hatchery water supply (a component) needed during construction, Reclamation assessed the following elements: a gravity-fed surface water bypass at the existing intake facilities, pumping from additional groundwater wells, or pumping surface water from the spillway pool to meet this need.

Screening criteria were used to evaluate each alternative’s and element’s ability to satisfy the purpose of and need for the Project, its technological and economic practicability and feasibility, and its likelihood to comply with applicable legal requirements, including specifically the CWA and
Section 7 of the ESA. Alternatives and elements that failed to satisfy these criteria were eliminated from detailed consideration, except for Alternative D. Alternative D includes a Phase I construction schedule that would not meet the deadlines in the NMFS Biological Opinion (NMFS 2017a). Nevertheless, Reclamation chose to include this alternative because it presents important tradeoffs in resource impacts that will help inform the agency decision-maker. The remaining elements that were not eliminated were considered for combination into complete alternatives. Alternatives, components and elements identified and considered in the *Leavenworth National Fish Hatchery Surface Water Supply Value Engineering (VE) Study* (Reclamation and USFWS 2012), *SWISP Project VE Study* (Reclamation 2020a) and the *USFWS Leavenworth National Fish Hatchery Water Supply System Rehabilitation Final Environmental Assessment* (USFWS 2003) were also screened.

### 2.4 Description of the Alternatives

The four alternatives analyzed in the EIS are described in the following sections. Key differences between Alternatives B, C, and D are provided later in the document in Table 2-3. A summary comparison of impacts from all alternatives is provided in Section 2.6, Summary Comparison of Impacts.

#### 2.4.1 Alternative A – No Action

The No Action alternative represents continuation of current O&M of the LNFH surface water intake and delivery system on Icicle Creek and provides a basis for comparison to the action alternatives. The existing intake and delivery system, constructed in 1939 and 1940, would remain in its current degraded condition and would likely continue to deteriorate. All existing features listed and summarized below and depicted in Map 2-1 and Map 2-2 in Appendix A, would remain in place, and would not be modified, improved, or rehabilitated under this alternative.

- Low-head diversion dam
- Intake channel
- Intake trashrack structure
- Access road
- Fish ladder/sediment sluice
- Gatehouse
- Outlet channel
- Conveyance pipeline
- Sand settling basin
- Inside and outside screen chambers

The diversion dam would continue to divert water from Icicle Creek to the intake channel, through an unscreened diversion. An unscreened diversion allows fish, including ESA-listed fish, to enter the water delivery system. The start of the intake system would remain at the intake trashrack structure. The excavated intake channel above the intake trashrack structure and concrete intake channel below would continue to convey water through gravity flow to the gatehouse. The channel would remain unscreened. The intake trashrack structure at the entrance to the concrete intake channel would remain in operation. The trashrack’s 6-inch bar spacing would continue to prevent large...
debris from entering the concrete intake channel. The intake access road would not be modified or extended and would continue to provide access to the stairs leading to the intake trashrack structure. Collectively, the existing footprint of the intake access road, intake channel and intake trashrack structure, and gatehouse, including the existing stairs to the gatehouse from Icicle Creek Road, cover approximately 0.06 acres (Reclamation GIS 2020; see Table 2-4). The existing fish ladder/sediment sluice would not be modified to alter flow or enhance fish passage.

The existing gatehouse serves to transition surface water from the open intake channel to the enclosed conveyance pipeline. It houses a fine rack with 1.5-inch bar spacing and an overflow spill and sediment sluicing section separated by a bulkhead. The fine rack limits the size of objects that enter the pipeline. A gate valve can be opened to flush sediment; however, it does not function reliably. The gatehouse would remain in place, and the outlet channel would continue to direct bypassed water and sluice material (sediment) from the gatehouse back to Icicle Creek.

The aging 31- to 33-inch diameter buried concrete pipeline would continue to convey water up to 42 cfs from the gatehouse to the Hatchery. No sections would be lined or replaced; however, the USFWS would, independent of the SWISP Project, install a flowmeter as part of the ongoing O&M at LNFH. Sediment from Icicle Creek would continue to be transported to the Hatchery. Before water enters the Hatchery’s rearing units it is either routed into the sand settling basin (normal operation) or directly to the inside or outside screen chamber. The sand settling basin would continue to trap sediment and minimize the amount of remaining sediment from entering fish production facilities. Sediment and entrained fish, including ESA-listed fish species, would continue to be periodically removed from the sand settling basin in accordance with existing biological opinions (USFWS 2011; NMFS 2017a). ESA-listed fish that are removed from the sand settling basin are counted and reported as take to NMFS or USFWS, as required in their respective biological opinions. From the sand settling basin, water can be directed to either the inside or outside screen chamber before entering the Hatchery’s rearing units. The screens in the inside and outside screen chambers are composed of vertical static screen panels that filter fish and debris from the Hatchery’s water supply. The screen chambers do not meet NMFS current screening criteria (NMFS 2011)\(^\text{17}\). Screens must be manually cleaned, and entrained fish must be captured, removed, counted, and returned to Icicle Creek. LNFH reports the number and species of ESA-listed fish entrained in the intake and delivery system in their annual take report to NMFS and USFWS.

Hatchery O&M would remain subject to both the National Pollution Discharge Elimination System (NPDES) permit from U.S. Environmental Protection Agency (EPA) and O&M consultations under ESA Section 7 with NMFS and USFWS (USFWS 2011; NMFS 2017a). Extraordinary maintenance would continue to be handled on a case-by-case basis as determined to be necessary by the Hatchery. ESA Section 7 consultation has been reinitiated with the USFWS for O&M of the Hatchery.

\(^{17}\) The existing inside and outside screen chambers meet NMFS standards for fish screening (NMFS 1997), but not current criteria (NMFS 2011). Even if the screen chambers were upgraded to NMFS current criteria, take would still occur. This is because take occurs at the point of entrainment, at the existing intake facilities on Icicle Creek. The screen chambers are at the distal end of the conveyance pipeline, approximately 6,300 feet from the existing intake facilities on Icicle Creek.
As described in Section 1.2, the COIC is expected to relocate its point of diversion on Icicle Creek downstream of the Hatchery. Once the new point of diversion is constructed, COIC would no longer divert water at the current intake location.

2.4.2 Alternative B – Proposed Action
Reclamation proposes to rehabilitate the LNFH surface water intake and delivery system on Icicle Creek by building new headworks\(^\text{18}\), installing NMFS-compliant fish screens, constructing a creek-width roughened channel, and replacing and lining the surface water conveyance pipeline to the Hatchery. In addition, the current access road would be modified and extended to provide better entry to an expanded Intake Operations and Maintenance Area (IO&MA). A conceptual drawing and a technical site plan overview of the proposed intake facilities are included as Figure A-1 and Figure A-2 in Appendix A. Map 2-3 and Map 2-4 in Appendix A depict activities proposed under Alternative B. The proposed construction timeline is depicted in Figure 2-1 and Table 2-1.

Alternative B would result in approximately 9.19 acres of surface disturbance (Reclamation GIS 2020; see Table 2-4). Of this, approximately 8.57 acres would have temporary disturbance and would be restored to pre-construction conditions. Approximately 0.62 acres would be within the footprint of permanent Project components and would not be restored to pre-construction conditions. Table 2-4 summarizes acres of temporary and permanent disturbance by alternative.

**Intake and Fish Screens and Fish Passage**
Construction of the headworks and roughened channel would incorporate the existing low-head diversion dam and intake channel. The roughened channel would incorporate a portion of the fish ladder/sediment sluice; the unincorporated portion would be removed. Two self-cleaning, cylindrical screens would be installed at the diversion headworks to comply with NMFS fish screening criteria, provide redundancy in case of screen maintenance, and facilitate the Hatchery’s ability to meet future water conservation goals (Figure A-3 in Appendix A). A floating log boom trash\(^\text{19}\) protection feature would be installed upstream of the screens. A low-flow boulder weir fishway would be integrated into the roughened channel to provide NMFS-compliant fish passage during typical low flows, and a portion of the roughened channel would be extended upstream of the diversion dam to facilitate fish passage overall and at higher flows in particular (Figure A-4 in Appendix A). The intake trashrack structure would be completely removed, and a new pipeline would be placed in the intake channel to connect the headworks to the conveyance pipeline. The intake channel would be filled to cover the pipeline and create the IO&MA to enable Hatchery personnel to safely and efficiently access, operate, and maintain the intake facilities. The existing stairway from the access road to the intake channel would be removed as this area would become part of the IO&MA. Figure A-5 in Appendix A provides a technical overview of the elements of the existing intake facilities that would be removed.

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\(^{18}\) Headworks means any dam, weir, barrage, or reservoir and all works appurtenant thereto, used for or in connection with the storage, control, conveyance, or distribution of water. For the SWISP Project, the headworks includes the combined intake structure elements, such as the intake structure, NMFS-compliant fish screens, gates, and retaining walls.

\(^{19}\) In this context, trash refers to primarily natural debris such as leaves, tree limbs, and logs.
2. Proposed Action and Alternatives (Description of the Alternatives)

**Sediment Management**
Elements to manage sediment accumulated at the intake include a ramp on the upstream side of the roughened channel to help mobilize sediment over the feature, a vertical access pipe incorporated into the IO&MA behind the screens to enable a submersible pump to draw in screened water and force it through a hose and nozzle to mobilize sediment through propulsion, and a series of pipes, valves, and outlet channel at the pipeline intake and sediment management area (PISMA) to flush sediment through the intake pipeline back to Icicle Creek (as needed). Components of the PISMA would be placed at the former gatehouse location. **Figure A-3 and Figure A-6 in Appendix A** show technical drawings for the vertical access pipe location, and PISMA and sluiceway pipe, respectively.

**Conveyance Pipeline**
Under Alternative B, approximately 2,180 feet of the conveyance pipeline would be replaced using cut and cover trenching on USFWS property and approximately 4,000 feet of conveyance pipeline would be lined with cure-in-place pipe (CIPP) on private parcels (**Map 2-3 in Appendix A**). Several temporary access points (contractor use areas [CUAs]) along the existing conveyance pipeline alignment would be installed to provide ingress and egress for CIPP lining on private lands. Excavation of approximately 40 cubic yards of native material would be needed to access the conveyance pipeline at each of the CUAs. After pipeline lining, access points would either be refilled with the excavated, native material, or with controlled low-strength material (CLSM), a self-consolidating, cementing material, obtained from a local source. These areas would be restored to pre-construction conditions following lining activities. **Figure A-7 in Appendix A** shows the site plans for the CUAs on USFWS property (CUA 1 and CUA 5). **Figure A-8 in Appendix A** shows the site plans for the CUAs on private property (CUA 2, CUA 3, CUA 4). **Figure A-9 in Appendix A** provides an overview of the temporary access route for CUA 1 and CUA 2, and **Figure A-10 in Appendix A** shows the temporary access routes for CUA 3 and CUA 4. CUA 5 would be accessed from Cyo Road; therefore, no temporary access route is necessary (**Figure A-7 in Appendix A**).

The uppermost segment of the existing concrete cylinder pipeline on USFWS property would be removed and replaced with 520 feet of new 42-inch high-density polyethylene pipe in the same location. The 1,660 feet of the lower segment of pipeline on USFWS property would be constructed parallel to the existing concrete cylinder pipeline (**Figure A-11 in Appendix A**). Excavation of up to approximately 15,700 cubic yards of native material would be needed to dig a trench for the new conveyance pipeline on USFWS property. After placement of the new pipeline, fill would be needed to cover the new pipeline. Fill would either be excavated native material, or a combination of CLSM (to bed and embed the new pipeline) and excavated native material (to cover the new pipeline).

Hot air blowers may be positioned at each CUA to completely dry out the existing pipeline prior to lining with CIPP. Uncured CIPP lining material, an inert fiberglass cloth impregnated with a styrene-free resin or epoxy, would be placed into the existing pipeline using cold water pressure, and hot water would then be pumped into the CIPP lining to cure the resin or epoxy. Water for these processes would be hauled to the site in a water tank truck; water would not be withdrawn from Icicle Creek. Water would be circulated in a closed loop; none would be discharged to the site or Icicle Creek. After curing is complete, water would be pumped from the pipe into a water tank truck.
and hauled from the site for appropriate treatment or disposal. The bifurcation point, near CUA 2, (Map 2-1 in Appendix A) would remain in place and would not be modified.

The current control valve system at the sand settling basin on USFWS property would be replaced with a new control valve vault to allow safe pipe filling operations (Map 2-3 in Appendix A). Excavation of approximately 350 cubic yards of native material would also be needed to install the control valve vault on USFWS property. As above, following construction of the new control valve vault, excavated areas would either be refilled with the excavated, native material, or fill would be CLSM. After control valve connections are made, this segment of the existing pipeline would be decommissioned and abandoned-in-place. All rehabilitation, replacement, and modernization of the LNFH intake and delivery facilities would conclude at the control valve system; the sand settling basin and inside and outside screen chambers would remain unaltered. The USFWS would, independent of the SWISP Project, install a flowmeter as part of ongoing LNFH O&M.

**Temporary Hatchery Water Supply**

During Phase I construction (see Construction for a description of construction phases), Hatchery water would primarily be supplied by a temporary diversion and gravity-fed bypass pipeline (Map 2-4 in Appendix A). A 40 cfs water supply to LNFH would be maintained during Phase I construction\(^{20}\). Temporary pumping from the spillway pool (Map 2-3 in Appendix A) would supply water while the gravity-fed bypass pipeline and outlet are installed and connected to the existing conveyance pipeline approximately 200 to 300 feet below the intake construction area. Temporary pumping would occur over approximately 10 days in total: approximately six days during the initial gravity-bypass outlet tie-in to the conveyance pipeline, and approximately four days during the new intake pipeline tie-in to the conveyance pipeline after the completion of the new intake structure (Figure 2-1). It is likely that multiple diesel-powered pumps would be needed to supply this temporary water supply. These pumps would remain onsite during Phase I construction and could be mobilized if needed to provide temporary Hatchery water. Several temporary pumping options for screen locations at the spillway pool and pipeline alignments to the sand settling basin would be examined prior to installation. The construction contractor would coordinate with Reclamation, USFWS, and the Tribes regarding the location of the temporary Hatchery water supply pumps, pump screen boxes in the spillway pool, and temporary pipeline alignment prior to pumping to ensure access and implementation of the Tribal fishery would not be impeded (Figure A-12 and Figure A-13 in Appendix A).

A 20 cfs water supply to LNFH would be maintained during Phase II construction between April 17 to May 13, with provisions for emergency extension up to May 20 (Figure 2-1). This would be needed when pipeline replacement, lining with CIPP, and pipeline interconnections were underway, and would occur through pumping with diesel-powered pumps from the spillway pool adjacent to LNFH (Map 2-3, Figure A-12, and Figure A-13 in Appendix A). To avoid Tribal fishery, recreation, and LNFH staff access issues, the alignment of the temporary pipeline would allow unimpeded vehicular access over the spillway bridge.

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\(^{20}\) During Phase I construction, the LNFH has agreed to a 40 cfs temporary Hatchery water supply, which is different than the LNFH’s full surface water right of 42 cfs.
Access and Staging

Construction workers and trucks hauling construction equipment or materials would access the SWISP Project from East Leavenworth Road and Icicle Road. The name of Icicle Road changes to Icicle Creek Road south of the point where East Leavenworth Road and Icicle Road intersect north of the LNFH. Staging and storage sites for construction equipment and materials, and construction staff administration and vehicle parking would be located at various places on LNFH grounds (see Map 2-3 in Appendix A). Trucks hauling construction equipment and containing construction materials would be required to turn around approximately 1.25 miles southwest of the intake access road, at the U.S. Department of Agriculture, Forest Service (Forest Service) and Alpine Lakes Wilderness Area kiosk on Icicle Creek Road. Construction access to the conveyance pipeline would use existing roads, temporary access routes, and the pipeline right-of-way (ROW) (see Map 2-3, Map 2-4, Figure A-9, and Figure A-10 in Appendix A).

Construction

Construction of the SWISP Project would occur in three phases. Phase I would include construction of the intake access road and rehabilitation of the intake structures and facilities (e.g., NMFS-compliant fish screens and fish passage). Phase II would include replacement and lining of the conveyance pipeline. There would likely be temporal overlap between parts of Phase I and Phase II construction. For instance, in July 2022, it is likely that construction of the proposed intake facilities may overlap with pipeline replacement on the Hatchery grounds (see Appendix C for additional assumptions). Phase III would be implemented by the USFWS and would include revegetation of upland and riparian areas that are proposed to be disturbed within the intake construction area (see Map 2-4 in Appendix A, and Appendix D, Draft Phase III Riparian Revegetation Plan). The proposed construction phase timeline is depicted in Figure 2-1; the timing shown is subject to the contractor construction schedule submittal, but the in-water work window would remain fixed (i.e., July 1 to November 15). The colored bars depict the months that construction activities are expected to occur during each phase. The construction activities proposed under each phase are summarized in Table 2-1.

Figure 2-1. Construction Phase Timeline, Alternatives B and C

<table>
<thead>
<tr>
<th>Year</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>7 a.m.-10 p.m.</td>
<td>WWW 24 hours/day</td>
<td>WWW 24 hours/day</td>
</tr>
<tr>
<td>Q3</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
<tr>
<td>Q4</td>
<td>7 a.m.-10 p.m.</td>
<td>20 cfs</td>
<td>20 cfs</td>
</tr>
<tr>
<td>Phase I/I/II</td>
<td>20 cfs</td>
<td>20 cfs</td>
<td>20 cfs</td>
</tr>
<tr>
<td>Phase III</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
</tbody>
</table>

Notes:
Q1 = January, February, and March. Q2 = April, May, and June. Q3 = July, August, and September. Q4 = October, November, and December.

1 Activities in Q1/Q2 2022 would be site clearing and grubbing and intake access road construction. This activity would have workday hours as described in footnote 2. Phase I in-water work window (WWWW; July 1 to November 15) is shown in blue shading. This activity, plus cleanup and demobilization in late November, would occur up to 24 hours per day, six days per week, and up to seven days per week, with additional noise reduction measures from 7:00 p.m. to 7:00 a.m. The 24-hour workday schedule is depicted in stipple shading.
2 CIPP lining conveyance pipeline on private parcels. Phase II construction activities would occur during workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days per week. Reclamation analyzed a 7:00 a.m. to
10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040; this therefore represents the most conservative level of impacts. However, the Project specifications require workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s Contracting Officer’s Representative (COR) approval.

3 Temporary Hatchery water supply pumping from spillway pool. Pumping would be 24 hours per day, seven days per week. Pumping rates are indicated.

4 Replacing conveyance pipeline on USFWS lands as applicable by alternative. Construction workday hours would be the same as described in footnote 2.

5 Phase III revegetation workday hours would be the same as described in footnote 2. Phase III revegetation could take place in 2023, 2024, or both, depending on construction progress.

Table 2-1. Construction Activities by Phase, Alternatives B and C

<table>
<thead>
<tr>
<th>Construction Phase</th>
<th>Activity</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I1</td>
<td>Construction of intake access road</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Demolition of existing intake trashrack structure, existing gatehouse,</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>and fish ladder/sediment sluice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Installation of temporary cofferdams2</td>
<td>X</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Construction of headworks, including the intake structure, retaining</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>walls, and vertical access pipe for sediment management tools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Placement of new intake pipeline</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Construction of IO&amp;MA over the headworks, retaining walls, and intake</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>pipeline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Placement of guiderails, hydraulic equipment, NMFS-compliant fish screens,</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>slide gates, covered control panel, and safety guardrails around the IO&amp;MA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction of the PISMA at former gatehouse location</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation of the outlet channel</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Supplying LNFH with a temporary water supply of 40 cfs using a temporary</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>above-ground, gravity-fed bypass pipeline connected to the conveyance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pipeline or pumping from the spillway pool when necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction of roughened channel, including upstream sediment ramp and</td>
<td>—</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>low-flow boulder weir fishway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-construction seeding of disturbed areas that do not have a surface</td>
<td>—</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>treatment (e.g., gravel or concrete) with an upland or riparian seed mix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>as appropriate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Phase</td>
<td>Activity</td>
<td>2022</td>
<td>2023</td>
<td>2024</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Phase II&lt;sup&gt;3&lt;/sup&gt;</td>
<td>CIPP pre-installation video inspection and remote survey of existing pipeline dimensions</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Replacing conveyance pipeline segments on USFWS property&lt;sup&gt;4&lt;/sup&gt; as applicable by alternative</td>
<td>X</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Constructing new control valve vault and system on USFWS property</td>
<td>X</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Utilizing existing roads and temporary access routes to gain access to CUAs, as coordinated with private landowners&lt;sup&gt;5&lt;/sup&gt;</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CIPP lining conveyance pipeline from CUAs&lt;sup&gt;5&lt;/sup&gt;</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Temporarily pumping Hatchery water out of the spillway pool during pipeline replacement, lining with CIPP, and pipeline interconnections&lt;sup&gt;6&lt;/sup&gt;</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Post-construction seeding of disturbed upland areas</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Phase III&lt;sup&gt;7&lt;/sup&gt;</td>
<td>Planting of riparian tree cuttings in the riparian zone within the Phase I construction area</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Planting of containerized upland shrubs and trees in uplands within the Phase I construction area</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Notes:

<sup>1</sup>Some or all of Phase I construction activities would occur up to 24 hours per day, six days per week, and up to seven days per week. Phase I construction would occur over two construction seasons primarily within the in-water work window of July 1 to November 15 each year. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to November 15 would be an exception to the general and approved in-water work window.

<sup>2</sup>Temporary cofferdams would likely consist of geo-bags, or non-woven geotextile bags (also known as supersacks). These are large bags made of synthetic materials, such as polyester, polypropylene, or polyethylene, which are filled with heavy material, fastened shut, and used to create a watertight enclosure pumped dry to permit construction work below the waterline. If geo-bags are used for the temporary cofferdams or gravity bypass pipeline supports, the fill material must be clean, round river rock ("stream mix"). See Figure A-14 in Appendix A for the temporary cofferdam sequencing.

<sup>3</sup>Phase II construction activities would occur during workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days per week. Reclamation analyzed a 7:00 a.m. to 10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040; this therefore represents the most conservative level of impacts. However, the Project specifications require workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s COR approval. Phase II construction activities do not include any in-water work. The majority of pipeline lining construction would occur over three construction seasons during a four- to five-week period between April and May. Pipeline replacement construction would occur year-round where practicable.

<sup>4</sup>This task could occur from May 2022 to April 2023 and would not require temporary pumping except during tie-in activities coordinated with CIPP lining temporary pumping.

<sup>5</sup>Construction activities at most CUAs would take one construction season but could go to two seasons if necessary. No improvements are needed to existing roads and access routes. A hypothetical yet likely scenario for activities at each CUA is as follows: less than one day to prepare (clear and grub) CUA; less than one day to develop CUA access (if necessary); one day to excavate shaft for pipeline access; less than four days to dry conveyance pipeline using hot air blower; less than one day to sawcut pipeline and prepare for CIPP lining; four days to install, cure, and test CIPP lining; one day to install end seal; one day to reseal pipe cutout; less than one day to backfill access shaft; less than one day to restore and seed CUA. The hypothetical scenario would result in construction or construction associated activities for approximately 16 days on site conducting activities over the course of a four- to five-week period at each CUA. Construction activities at CUAs will be staggered but occur concurrently.
6Pumping would take place between April 17 and May 13 during the Phase II construction period, with provisions for emergency extension up to May 20 during the Phase II construction period.

7Phase III planting activities would occur during the same workday hours as Phase II. Phase III planting activities do not include any in-water work. Phase III planting could take place in 2023, 2024, or both, depending on construction progress.

For Phase I, Reclamation analyzed a 24-hour workday to complete construction in the timeliest manner to meet the requirements of the 2017 NMFS Biological Opinion (NMFS 2017a). Phase I construction specifications require additional noise reduction measures from 7:00 p.m. to 7:00 a.m. (Appendix B). In addition, the in-water work window would extend from July 1 to November 15 each year. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to November 15 would be an exception to the general and approved in-water work window. For Phase II, Reclamation analyzed a 7:00 a.m. to 10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040 to represent the most conservative level of impacts due to workday length. However, Phase II specifications will require workday hours of 7:00 a.m. to 7:00 p.m., five days per week, and approval by Reclamation’s COR to extend work hours from 7:00 p.m. to 10:00 p.m. or to six days per week on a case-by-case basis.

**Temporary Cofferdams**

Temporary cofferdams would be installed prior to in-water demolition and construction in Icicle Creek. Three temporary cofferdam arrangements are proposed over the two in-water work window seasons, as shown in Figure A-14 in Appendix A. Cofferdam A installation would begin in early July 2022, at the beginning of the in-water work window. It would be removed no later than November 15, 2022. Cofferdam A would facilitate partial demolition of the low-head diversion dam and fish ladder/sediment sluice (Figure A-5 in Appendix A) and construction and installation of the intake headworks and fish screens (Figure A-3 in Appendix A). Once Cofferdam A has been removed, the intake facilities would undergo testing to ensure operation of the fish screens, which would occur by November 15, 2022. Cofferdam B and C would be installed in sequence during the second in-water work window in 2023. They would be removed no later than November 15, 2023. Cofferdam B would facilitate construction of the northern half of the creek-width roughened channel, low-flow boulder weir fishway (Figure A-4 in Appendix A), boulder removal (Figure A-5 in Appendix A), and Cofferdam C construction. Cofferdam C would facilitate construction of the southern half of the creek-width roughened channel (Figure A-4 in Appendix A). Once Cofferdam C has been removed, the intake facilities would undergo final testing and commissioning to ensure proper operation and compliance with NMFS current screening and fish passage criteria for anadromous fish passage facilities (NMFS 2011); final testing and commissioning would occur by November 15, 2023.

During cofferdam installation and removal no wet crossings or heavy equipment use would occur in Icicle Creek live water. A land-based, long-reach excavator or crane would be used for constructing and removing the cofferdams, either from outside of the Icicle Creek ordinary high water mark (OHWM), or from within a temporarily dewatered work area isolated from Icicle Creek by another cofferdam. Temporary cofferdams would likely consist of geo-bags filled with stream mix (clean, round river rock), stacked side-by-side and one atop another to achieve necessary dimensions. Once placed, cofferdams would be wrapped with low-density polyethylene plastic sheeting or a similar
material, eliminating interstitial spaces between the geo-bags to minimize impingement or entrapment of fish and reduce or prevent leakage. Cofferdam design is estimated to be approximately 12 feet wide at the base with a tapered width as it rises to approximately nine feet.

Though other types of temporary cofferdam technology are available, Reclamation assumes the construction contractor would use geo-bag temporary cofferdams and therefore, this type of cofferdam is analyzed in this EIS. Geo-bags were chosen because they are the most potentially impactful type of temporary cofferdam allowed by the Project specification. Any other acceptable type of temporary cofferdam would likely have less impact than geo-bag cofferdams. The Project specification prohibits the use of pile driven and earthen cofferdams.

Best Management Practices
Reclamation would implement practices to protect water quality and other resources and promote soil conservation during Project construction and O&M activities. While these measures are often called BMPs, they are conservation measures used to reduce Project impacts on resources and resource uses, including, but not limited to, fisheries and aquatic resources, Tribal interests, public health and safety, and recreation. BMPs can be a ‘thing’ installed on-the-ground (e.g., silt fence, ground cover vegetation) or a ‘process’ used to plan and conduct an activity (e.g., marking stream buffers). The list of BMPs used to complete the resource analyses is included in Appendix B.

Permitting
Because Alternative B would include work within Icicle Creek, several federal and state regulatory permit approvals would be required before construction begins. Reclamation would obtain all required regulatory permits prior to construction implementation. Reclamation would use the Washington State Joint Aquatic Resources Permit Application (JARPA) form to apply for applicable permits. Permits that would be obtained include:

- USACE Section 404 Nationwide Permits and CWA Section 401 Water Quality Certification
- Washington State Department of Fish and Wildlife (WDFW) Hydraulic Project Approval (HPA)

Alternative B would also include the use of Icicle Creek Road on National Forest System lands, between the Snow Lakes Trailhead and the Forest Service and Alpine Lakes Wilderness Area kiosk. As a result, the construction contractor would secure the required road use approval from the Forest Service, most likely under a road use permit. The kiosk is approximately 1.25 miles southwest of the intake facilities (Map 1-1 in Appendix A).

Operations and Maintenance
O&M activities would periodically occur on an as-needed basis as determined by Hatchery staff, including daily visual inspections of the proposed intake facilities. Periodic maintenance of the fish screens would be facilitated by construction of the proposed IO&MA, while O&M of the conveyance pipeline would be facilitated by the PISMA and the new control valve system at the sand settling basin.
Hatchery O&M is subject to both the NPDES permit from the EPA and O&M consultations under ESA Section 7 with NMFS and USFWS (USFWS 2011; NMFS 2017a). Extraordinary maintenance would continue to be handled on a case-by-case basis as determined to be necessary by the Hatchery.

### 2.4.3 Alternative C – Preferred Alternative

Under Alternative C, Reclamation would rehabilitate the LNFH surface water intake and delivery system on Icicle Creek as described under Alternative B. However, during Phase II under Alternative C, Reclamation would line the entire upper segment (520 feet) of the conveyance pipeline on USFWS property with CIPP instead of replacing it, as described under Alternative B (Map 2-5 and Map 2-6 in Appendix A). Under Alternative C, the length of the conveyance pipeline, from the PISMA to CUA 5 (4,520 feet including the upper segment on USFWS property), would be lined with CIPP. All pipeline segments lined with CIPP on private parcels and replaced on the Hatchery grounds proper would be the same as described under Alternative B (see Map 2-5 in Appendix A). As a result of lining the upper pipeline segment on USFWS property, there would be approximately 1.17 fewer acres of surface disturbance than for Alternative B. Further, fewer mature trees in the Icicle Creek riparian zone would be removed. Phase III revegetation efforts would be the same as described under Alternative B. A conceptual drawing and a technical site plan overview of the proposed intake facilities are included as Figure A-1 and Figure A-2 in Appendix A. The proposed construction phase timeline would be the same as Alternative B and is depicted in Figure 2-1. The construction activities proposed under each phase are summarized in Table 2-1.

Alternative C would result in approximately 8.02 acres of surface disturbance (Reclamation GIS 2020). Of this, approximately 7.40 acres would have temporary disturbance and would be restored to pre-construction conditions. Approximately 0.62 acres would be within the footprint of permanent Project components and would not be restored to pre-construction conditions. Table 2-4 summarizes acres of temporary and permanent disturbance by alternative.

A 20 cfs water supply to LNFH would be maintained during Phase II construction between April 17 and May 13, with provisions for emergency extension up to May 20 as described under Alternative B. Temporary pumping from the spillway pool with diesel-powered pumps would be needed during CIPP lining of the conveyance pipeline and when pipeline interconnections were underway. Hatchery O&M is subject to both the NPDES permit from the EPA and O&M consultations under ESA Section 7 with NMFS and USFWS (USFWS 2011; NMFS 2017a). Extraordinary maintenance would continue to be handled on a case-by-case basis as determined to be necessary by the Hatchery.

### 2.4.4 Alternative D

Under Alternative D, Reclamation would rehabilitate the LNFH surface water intake and delivery system on Icicle Creek as described under Alternative B but with the following differences. Phase I construction activities would be the same as Alternative B but would be limited to workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days per week (with Reclamation’s COR approval). In addition, the in-water work window would be limited to July 1 to October 31 each year. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to October 31 would be an exception to the general and
approved in-water work window. Alternative D was developed to minimize the effects resulting from the 24 hours per day construction workday under Alternatives B and C and reduce the overlap of cofferdam use with a period of greater high-flow risk. Phase II construction activities and schedule would be the same as described under Alternative B. Phase III revegetation efforts would be the same as described under Alternative B, except they would occur a year later (2025). The proposed construction phase timeline is depicted in Figure 2-2. The construction activities proposed under each phase are summarized in Table 2-2.

**Figure 2-2. Construction Phase Timeline, Alternative D**

<table>
<thead>
<tr>
<th>Phase</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
<tr>
<td>Q2</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
<tr>
<td>Q3</td>
<td>20 cfs</td>
<td>40 cfs</td>
<td>40 cfs</td>
<td>20 cfs</td>
</tr>
<tr>
<td>Q4</td>
<td>20 cfs</td>
<td>40 cfs</td>
<td>40 cfs</td>
<td>20 cfs</td>
</tr>
<tr>
<td>Q1</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
<tr>
<td>Q2</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
<tr>
<td>Q3</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
<tr>
<td>Q4</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
<td>7 a.m.-10 p.m.</td>
</tr>
</tbody>
</table>

Notes:

1. Activities in Q1/Q2 2022 would be site clearing and grubbing and intake access road construction. Phase I in-water work window (IWWW; July 1 to October 31) is shown in blue shading. These activities would have workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days per week. Reclamation analyzed a 7:00 a.m. to 10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040; this therefore represents the most conservative level of impacts. However, the Project specification requires workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s COR approval.

2. CIPP lining conveyance pipeline on private parcels. Construction workday hours would be the same as described in footnote 1.

3. Temporary Hatchery water supply pumping from spillway pool. Pumping would be 24 hours per day, seven days per week. Pumping rates are indicated. From November 1, 2022 to June 30, 2023, the Hatchery’s surface water would be supplied by pumping from the spillway pool. The pumps would operate 24 hours per day for the eight-month period.

4. Replacing conveyance pipelines on USFWS lands. Construction workday hours would be the same as described in footnote 1.

5. Phase III revegetation workday hours would be the same as described in footnote 1. Phase III revegetation could take place in 2024, 2025, or both, depending on construction progress.
### Table 2-2. Construction Activities by Phase, Alternative D

<table>
<thead>
<tr>
<th>Construction Phase</th>
<th>Activity</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I1</td>
<td>Construction of intake access road</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Demolition of existing intake trashrack structure, existing gatehouse, and fish ladder/sediment sluice</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Installation of temporary cofferdams²</td>
<td>X X</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Construction of headworks, including the intake structure, retaining walls, and vertical access pipe for sediment management tools</td>
<td>X X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Placement of new intake pipeline</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Construction of IO&amp;MA over the headworks, retaining walls, and intake pipeline</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Placement of guiderails, hydraulic equipment, NMFS-compliant fish screens, slide gates, covered control panel, and safety guardrails around the IO&amp;MA</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Construction of the PISMA at former gatehouse location</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation of the outlet channel</td>
<td>—</td>
<td>X</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Suppling LNFH with a temporary water supply of 40 cfs using a temporary above-ground, gravity-fed bypass pipeline connected to the conveyance pipeline or pumping from the spillway pool when necessary</td>
<td>X X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Construction of roughened channel, including upstream sediment ramp and low-flow boulder weir fishway</td>
<td>—</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Post-construction seeding of disturbed areas that do not have a surface treatment (e.g., gravel or concrete) with an upland or riparian seed mix, as appropriate</td>
<td>—</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Phase II3</td>
<td>CIPP pre-installation video inspection and remote survey of existing pipeline dimensions</td>
<td>X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Replacing conveyance pipeline segments on USFWS property⁴</td>
<td>X X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Constructing new control valve vault and system on USFWS property</td>
<td>X X</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Utilizing existing roads and temporary access routes to gain access to CUAs, as coordinated with private landowners⁵</td>
<td>—</td>
<td>X</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>CIPP lining conveyance pipeline from CUAs⁵</td>
<td>—</td>
<td>X</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Temporarily pumping Hatchery water out of the spillway pool during pipeline replacement, lining with CIPP, and pipeline interconnections⁶</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Post-construction seeding of disturbed upland areas</td>
<td>—</td>
<td>X</td>
<td>X</td>
<td>—</td>
</tr>
</tbody>
</table>
2. Proposed Action and Alternatives (Description of the Alternatives)

<table>
<thead>
<tr>
<th>Construction Phase</th>
<th>Activity</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase III</td>
<td>Planting of riparian tree cuttings in the riparian zone within the Phase I construction area</td>
<td>—</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Planting of containerized upland shrubs and trees in uplands within the Phase I construction area</td>
<td>—</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Notes:

1Phase I construction activities would occur during workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days per week. Reclamation analyzed a 7:00 a.m. to 10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040; this therefore represents the most conservative level of impacts. However, the Project specifications require workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s COR approval. Phase I construction would occur over four construction seasons primarily within the in-water work window of July 1 to October 31 each year. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to October 31 would be an exception to the general and approved in-water work window.

2If geo-bags are used for the temporary cofferdams or gravity bypass pipeline supports, the fill material must be clean, round river rock ("stream mix"). See Figure A-14 in Appendix A for the temporary cofferdam sequencing.

3Phase II construction activities would have the same workday hours as in footnote 1. Phase II construction activities do not include any in-water work. The majority of pipeline lining construction would occur over three construction seasons during a four- to five-week period between April and May. Pipeline replacement construction would occur year-round where practicable.

4This task could occur from May 2022 to April 2023 and would not require temporary pumping except during tie-in activities coordinated with CIPP lining temporary pumping.

5Construction activities at most CUAs would take one construction season but could go to two seasons if necessary. No improvements are needed to existing roads and access routes. A hypothetical yet likely scenario for activities at each CUA is as follows: less than one day to prepare (clear and grub) CUA; less than one day to develop CUA access (if necessary); one day to excavate shaft for pipeline access; less than four days to dry conveyance pipeline using hot air blower; less than one day to sawcut pipeline and prepare for CIPP lining; four days to install, cure, and test CIPP lining; one day to install end seal; one day to reseal pipe cutout; less than one day to backfill access shaft; less than one day to restore and seed CUA. The hypothetical scenario would result in construction or construction associated activities for approximately 16 days on site conducting activities over the course of a four- to five-week period at each CUA. Construction activities at CUAs will be staggered but occur concurrently.

6Pumping would take place between April 17 and May 13 during the Phase II construction period, with provisions for emergency extension up to May 20 during the Phase II construction period.

7Phase III revegetation activities would occur during the same workday hours as Phase II. Phase III revegetation activities do not include any in-water work. Phase III planting could take place in 2024, 2025, or both, depending on construction progress.

The components and elements of the surface water intake facilities and construction activities would be the same as described for Alternative B during Phase I; however, because construction would be limited to workday hours of 7:00 a.m. to 10:00 p.m. and the in-water work window would be two weeks shorter than under Alternative B, construction of Phase I under Alternative D would require four years (i.e., four in-water work windows from 2022 to 2025) to complete. The sequence of Phase I construction activities would be very similar to those listed for Alternative B but would extend through two additional in-water work windows during two additional years (2024 and 2025). Initial mobilization, construction of the intake access road, temporary Hatchery water supply during the in-water work window, access and staging, BMPs, permitting, and O&M would be unchanged from Alternative B. Details of the Phase I construction schedule for intake and fish passage and
temporary Hatchery water supply components for Alternative D are provided in the following paragraphs.

During the first in-water work window in 2022, preparation for and installation of temporary cofferdams and the gravity bypass pipeline and gravity bypass outlet (Map 2-4 in Appendix A), complete demolition of the intake trashrack structure and gatehouse, partial demolition of the fish ladder/sediment sluice, and construction of the PISMA and outlet channel, would be the same as Alternative B. However, because of the shorter workdays and shorter in-water work window, construction of the intake structure would be limited to excavation, preparation and construction of the concrete slab foundation, and partial construction of the intake headworks. At the end of the 2022 in-water work window, the intake structure would be approximately 35 percent completed. Although the full extent of the intake headworks foundation would be in place, the area of the partially constructed intake headworks would be inundated between the 2022 and 2023 in-water work windows after cofferdam removal. Demobilization of construction equipment in 2022 would leave the constructed elements of the intake structure in this condition until July 2023 when remobilization occurs.

From November 1, 2022 to June 30, 2023, the Hatchery’s surface water would be supplied by pumping from the spillway pool on Icicle Creek adjacent to LNFH (Map 2-3 in Appendix A). Two high capacity diesel-powered pumps\(^{21}\) would provide 40 cfs of water to the Hatchery during this period. An operational third pump would be on site as a backup. The pumps would operate 24 hours per day for the eight-month period; as a result, they would require 24 hour per day, seven day per week monitoring by the construction contractor.

During the second in-water work window in 2023, preparation for and installation of cofferdams and the gravity bypass pipeline and gravity bypass outlet again would occur as described under Alternative B. The remaining 65 percent of construction of the intake structure components and elements would be completed before cofferdam removal. By the end of the 2023 in-water work window, NMFS-compliant fish screens would be in place and fully operational, and the temporary gravity bypass pipeline and gravity bypass outlet would be removed. In addition, the transition to the new intake structure would be completed by connecting intake facilities to the conveyance pipeline to deliver the LNFH surface water supply by October 31, 2023. Because the intake structure would be fully operational at the end of this in-water work window, there would be no need to supply temporary water to the Hatchery during the remainder of Phase I construction.

During the third in-water work window in 2024, mobilization similar to previous Phase I in-water work window construction seasons would be required before construction of the low-flow boulder weir fishway and the left bank portion of the roughened channel could occur. Construction of the low-flow boulder weir fishway and the left bank portion of the roughened channel would include placement of cofferdams, dewatering of the construction area, regrading of the stream channel bottom, construction of the low-flow boulder weir fishway and the left bank portion of the roughened channel and finally, removal of the cofferdam.

\(^{21}\) Pumps are assumed to be high-lift, 16-inch, trailer-mounted with 150 horsepower diesel engines.
During the fourth in-water work window in 2025, mobilization similar to previous Phase I in-water work window construction seasons would be required before construction on the remaining portion (right bank) of the roughened channel could occur. Construction of the remaining portion of the roughened channel would include placement of cofferdams, dewatering of the construction area, regrading of the stream channel bottom, construction of the roughened channel and finally, removal of the cofferdam. Once the entire roughened channel is complete and all cofferdams have been removed, the intake facilities would undergo final testing and commissioning to ensure proper operation and compliance with NMFS current screening and fish passage criteria for anadromous fish passage facilities (NMFS 2011), which would occur by October 31, 2025.

The amount of temporary and permanent surface disturbance under Alternative D would be the same as described under Alternative B (see Table 2-4).

### 2.4.5 Comparison of Action Alternatives

Table 2-3 compares the key differences between the three action alternatives. Alternatives B and C would provide a reliable source of water to meet the purpose and need and would increase the likelihood of operational fish screens before May 2023 and full compliance as required in the 2017 NMFS Biological Opinion (NMFS 2017a) shortly after May 2023. Alternative D would also provide a reliable source of water to the LNFH but would not assume completion of these Biological Opinion requirements until October 2025. Alternative D is included to provide a range of action alternatives for analysis and to demonstrate the tradeoffs in resource impacts and Project schedule to better inform the decision makers and the interested public per the NEPA process.
### Table 2-3. Comparison of Key Differences between Action Alternatives

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I Construction Schedule</td>
<td>Up to 24 hours per day, up to seven days per week</td>
<td>Same as Alternative B</td>
<td>7:00 a.m. to 10:00 p.m. workday, up to six days per week</td>
</tr>
<tr>
<td>Phase II Construction Schedule</td>
<td>7:00 a.m. to 10:00 p.m. workday, up to six days per week¹</td>
<td>Same as Alternative B</td>
<td>Same as Alternative B</td>
</tr>
<tr>
<td>In-water work window Season Dates (including installation and complete removal of cofferdams)²</td>
<td>July 1 to November 15</td>
<td>Same as Alternative B</td>
<td>July 1 to October 31</td>
</tr>
<tr>
<td>Phase I In-water work window Construction Seasons</td>
<td>2</td>
<td>Same as Alternative B</td>
<td>4</td>
</tr>
<tr>
<td>Fish Screens Operational (Date)</td>
<td>November 2022</td>
<td>Same as Alternative B</td>
<td>October 2023</td>
</tr>
<tr>
<td>Intake Facilities compliant with regulatory criteria³ (Date)</td>
<td>November 2023</td>
<td>Same as Alternative B</td>
<td>October 2025</td>
</tr>
<tr>
<td>Conveyance pipeline replaced (feet)</td>
<td>2,180</td>
<td></td>
<td>Same as Alternative B</td>
</tr>
<tr>
<td>Conveyance pipeline CIPP-lined (feet)</td>
<td>4,000 (includes segments on private parcels only)</td>
<td>4,520 (includes segments on private parcels and the upper segment on USFWS property)</td>
<td>Same as Alternative B</td>
</tr>
</tbody>
</table>
### Table 2-3: Comparison of Key Differences Between Action Alternatives

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total of approximately 10 days in 2022 (estimated seven and three days in July and November, respectively); 24 hours per day, seven days per week</td>
<td>Same as Alternative B</td>
<td>Total of approximately eight months and 10 days in 2022 and 2023 (seven days in July 2022, eight months from November 1, 2022 to June 30, 2023, and three days in October 2023; 24 hours per day, seven days per week)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temporary Hatchery Water Supply Needed During Phase II Construction via Pumping</th>
<th>April 17 – May 20, 2022&lt;sup&gt;4&lt;/sup&gt; (five weeks)</th>
<th>April 17 – May 20, 2022&lt;sup&gt;4&lt;/sup&gt; (five weeks)</th>
<th>April 17 – May 20, 2022&lt;sup&gt;4&lt;/sup&gt; (five weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 17 – May 20, 2023&lt;sup&gt;4&lt;/sup&gt; (five weeks)</td>
<td>April 17 – May 20, 2023&lt;sup&gt;4,5&lt;/sup&gt; (five weeks)</td>
<td>April 17 – May 20, 2023&lt;sup&gt;4,5&lt;/sup&gt; (five weeks)</td>
</tr>
<tr>
<td></td>
<td>April – May 20, 2024&lt;sup&gt;4&lt;/sup&gt; (five weeks)</td>
<td>April 17 – May 20, 2023&lt;sup&gt;4,5&lt;/sup&gt; (five weeks)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup>Reclamation analyzed a 7:00 a.m. to 10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040; this therefore represents the most conservative level of impacts. However, the Project specifications require workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s COR approval.

<sup>2</sup>July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to November 15 (Alternatives B and C) or October 31 (Alternative D) would be an exception to the general and approved in-water work window.

<sup>3</sup>Compliance with NMFS current screening and fish passage criteria for anadromous fish passage facilities (NMFS 2011) is achieved with full build-out and operation of the screened intake structure, low-flow boulder weir fishway, and roughened channel.

<sup>4</sup>Pumping would take place between April 17 and May 13 during the Phase II construction period, with provisions for emergency extension up to May 20 during the Phase II construction period. Reclamation used the April 17 to May 20 timeframe for analysis in the EIS as a conservative representation of what impacts could be possible.

<sup>5</sup>The temporary Hatchery water supply needed during Phase I construction via pumping would take place November 1, 2022 to June 30, 2023, which covers the April 17 to May 20 period in 2023.
2. Proposed Action and Alternatives (Alternatives and Alternative Elements Considered but Eliminated from Detailed Study)

2.5 Alternatives and Alternative Elements Considered but Eliminated from Detailed Study

Federal agencies are required to explore and evaluate all reasonable alternatives and to discuss the reasons for eliminating any alternatives not analyzed in detail (40 CFR, Subpart 1502.14).

Through the alternatives screening process, Reclamation, with input from the USFWS as a cooperating agency, eliminated several stand-alone alternatives and alternative elements because they did not meet the purpose of and need for action (see Section 1.3), or because they would not meet the technical, socioeconomic, or regulatory screening criteria as outlined in the Alternatives Compilation Report (Reclamation 2020c).

To determine which alternatives and alternative elements would meet the purpose of and need for action, and the technical, socioeconomic, and/or regulatory screening criteria, Reclamation engaged in collaborative discussions with agency specialists and Project cooperators and considered their input. Reclamation and cooperating agencies also reviewed past NEPA and other documentation related to the LNFH water delivery system for this information.

The stand-alone alternatives eliminated from detailed study are described below, along with the rationale for elimination. Further, alternative elements eliminated from detailed study are listed below by Project component, along with the rationale for their elimination. Additional discussion of the alternative development process can be found in the Alternatives Compilation Report (Reclamation 2020c).

2.5.1 Alternatives Considered but Eliminated from Detailed Study

*New Hatchery Location*

Reclamation considered an option to relocate the LNFH outside of the Icicle Creek sub-basin. However, this alternative is outside of the scope of the Project. This alternative would also not meet the purpose of and need for action, and would not meet other screening criteria, as described below.

The USFWS previously analyzed five alternatives to relocate LNFH production to geographically separate locations, including: moving Spring Chinook Salmon production to a new hatchery location in the Wenatchee River basin upstream of the Icicle Creek confluence; to a new hatchery location in the Wenatchee River basin downstream of the Icicle Creek confluence; to a facility on the mainstem Columbia River; or to facilities on the Entiat, Methow, or Okanogan Rivers. Also analyzed was an option to maintain Spring Chinook Salmon incubation and over-winter acclimation at the LNFH, but to move juvenile rearing to a geographically separate site (USFWS 2016).

Relocating fish production to geographically separate locations would require extensive consultation with NMFS, and re-negotiation of *U.S. v. Oregon* Management Agreement (Agreement Parties 2018) harvest targets with Tribes and other parties, decreasing the likelihood of timely Project completion under the 2017 NMFS Biological Opinion (NMFS 2017a). Hatchery relocation would also require additional ESA consultation (NMFS and USFWS) with likely new and additive impacts to ESA.
listed Upper Columbia River Spring Chinook Salmon and Steelhead, and Bull Trout residing in some of the alternative site locations. In addition, relocating production would entail substantial costs for planning, design, environmental compliance, and construction of any new facilities. Based on known costs at that time of recently constructed hatcheries, total Project construction costs would be approximately $35 to 40 million (USFWS 2016), plus there would be undetermined additional expenses to undergo consultation and re-negotiations.

The five alternatives, which considered more than a dozen specific geographic sites, were initially evaluated based on screening factors including potential land issues, water supply quality and quantity, effects on harvest (U.S. v. Oregon Management Agreement [Agreement Parties 2018]) and Grand Coulee Dam mitigation obligations, policy and legal considerations (such as Tribal access to usual and accustomed fishing areas), biological risks and benefits, and fishery health and disease risk. After a review of the initial screening analysis, none of the five alternatives were viable enough to justify advanced screening (USFWS 2016) because of:

- Difficulty in obtaining funding for the project cost of a new $50 to $75 million hatchery facility,
- Difficulty obtaining adequate new water rights and supplies that also meet water quality criteria at a reasonable cost,
- The risks of hatchery fish straying and spawning with wild fish, which is a major concern to USFWS, NMFS, and regional fisheries managers, and may increase take of threatened and endangered fish species, and
- The risks of negative impacts on Tribal usual and accustomed fishing areas locally and throughout the Columbia River generally.

To summarize, relocating fish production to geographically separate locations would not meet the purpose of and need for action because it would decrease the likelihood of timely Project completion as required in the 2017 NMFS Biological Opinion (NMFS 2017a), and may increase take of threatened and endangered fish species. Further, this alternative would not minimize costs, and ultimately is outside of the scope of the Project. For these reasons, Reclamation eliminated this alternative from detailed study.

**New Gravity-fed Surface Water Intake Location Alternatives**

**Decommission Existing Intake and Build New Intake at Structure 2 or Structure 5**

Reclamation considered the options of constructing a new surface water intake located on Icicle Creek at Structure 2 or at Structure 5. A new gravity pipe under the Hatchery channel would move water from the new intake to a new sand settling basin and fish screening facility on the west bank of the channel (for the Structure 2 option) or the east bank of the channel (for the Structure 5 option).
option). Screened water from the new sand settling basin would then be pumped to supply LNFH’s full surface water rights from Icicle Creek on a permanent basis. This option would be developed rather than replacing the existing surface water intake on Icicle Creek and replacing and/or rehabilitating the existing conveyance pipeline; these components would be decommissioned following construction of the new water supply infrastructure. These proposals were previously considered and dismissed as part the USFWS’ Hatchery Water Supply System Rehabilitation Final Environmental Assessment (EA) (see Alternatives E and F; USFWS 2003). These options were dismissed at that time because the USFWS determined that relying on pumps to supply the Hatchery’s intake water did not provide a reliable water supply for the Hatchery. This was because a pumped water supply would create a dependence on electrical power to supply LNFH’s full water rights. Any power loss would require an emergency backup system to power the pumps, and any system failure would result in the need for alternative water sources, decreasing the overall reliability of water delivery. Reclamation revisited this alternative element and determined that the USFWS determination from 2003 is still valid. This option would not meet the purpose and need to ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights. This option would also require extensive modification at and below the Icicle Creek OHWM, as well as riparian vegetation removal in the Icicle Creek riparian zone, which would increase permitting complexity, decreasing the likelihood of timely Project completion as required in the 2017 NMFS Biological Opinion (NMFS 2017a). Decreased water reliability could jeopardize the ability of LNFH to maintain fish production to meet Tribal obligations under the U.S. v. Oregon Management Agreement (Agreement Parties 2018). Further, adjacent private landowner acceptability is anticipated to be low due to the anticipated O&M noise associated with pumping and pump maintenance. The pumps that would be used to provide the Hatchery’s intake water as part of this alternative would be operating 24 hours per day for the expected service life of the project. For these reasons, Reclamation eliminated these options from detailed study.

**Surface Water Pumping Alternatives**

**Construct a Downstream Pump Station** Reclamation considered building a downstream pump station at one of several potential locations on Icicle Creek to supply LNFH’s full surface water rights from Icicle Creek on a permanent basis. Reclamation would construct the pump station instead of replacing the existing surface water intake on Icicle Creek and replacing and/or rehabilitating the existing conveyance pipeline; these components would be decommissioned following pump station construction. However, Reclamation eliminated this option from detailed study because a pumped water supply would not provide a reliable water supply for the Hatchery. This is because a pumped water supply would create a dependence on electrical power to supply LNFH’s full water rights. Any power loss would require an emergency backup system to power the pumps, and any system failure would result in the need for alternative water sources, decreasing the overall reliability of water delivery. Decreased water reliability could jeopardize the ability of LNFH to maintain fish production to meet Tribal obligations under the U.S. v. Oregon Management Agreement (Agreement Parties 2018). Further, by moving the surface water intake to locations downstream of the Hatchery, there would be a concern for Hatchery production and fish health. Under this scenario, the pumping station intake would be downstream of both Hatchery outfalls. Should pathogens or other contaminants be present in the Hatchery, they may be recaptured at the new pump station intake and be redistributed to the Hatchery, increasing the difficulty of
maintaining LNFH production to meet production obligations. Reclamation (2010) previously considered building a pump station on Icicle Creek near Structure 2 (see Map 1-1 in Appendix A). While this location would not be subject to potential fish health or production issues described above, adjacent private landowner acceptability was very low due to the anticipated O&M noise of pumping, and the project was not pursued further. Reclamation revisited this alternative element and determined that landowner acceptability would remain very low.

**Groundwater Pumping Alternatives**

**Decommission Existing Surface Water Intake and Pump from Existing Groundwater Wells and New Groundwater Infiltration Gallery**  Reclamation considered decommissioning the existing intake facilities on Icicle Creek and using existing groundwater wells and a newly constructed infiltration gallery\(^\text{24}\) system to supply LNFH with water on a permanent basis. This alternative was previously considered and dismissed as part the USFWS’ Hatchery Water Supply System Rehabilitation Final E.A (see Alternative D, USFWS 2003). This option was dismissed at that time because the USFWS determined that a pumped groundwater supply did not provide a reliable water supply for the Hatchery. This was because a pumped groundwater supply would create a dependence on electrical power to supply LNFH’s full water rights. Any power loss would require an emergency backup system to power the pumps, and any system failure would result in the need for alternative water sources, decreasing the overall reliability of water delivery. Decreased water reliability could jeopardize the ability of LNFH to maintain fish production to meet Tribal obligations under the *U.S. v. Oregon* Management Agreement (Agreement Parties 2018). There were also concerns regarding the overall reliability and feasibility of an infiltration gallery in terms of total available groundwater output and ability to supply LNFH’s full water rights, long-term reliability given site-specific subsurface conditions, and the required extensive network of gallery piping. Installing gallery piping would require extensive excavation and vegetation removal in the Icicle Creek riparian zone, which would greatly increase permitting complexity. Reclamation determined that the rationale above, as developed in 2003, remains valid. Since this option would not provide a reliable source of water to meet the purpose and need, and would decrease the likelihood of timely Project completion as required in the 2017 NMFS Biological Opinion (NMFS 2017a) due to increased permitting complexity, Reclamation eliminated this option from detailed study.

**Replace the Surface Water Intake with Pumping from Existing and New Groundwater Production Wells**  Reclamation considered replacing the existing intake facilities on Icicle Creek with additional drilled groundwater wells on the LNFH property. Water pumped from new and existing groundwater wells would be used for Hatchery production on a permanent basis. However, as described above, a pumped groundwater supply would be inherently less reliable than a gravity water supply and pumping from groundwater wells only would not ensure delivery of the LNFH’s full water rights in terms of total available groundwater output. This would be the case even if additional groundwater wells were developed. As a result, this option would not meet the purpose and need to ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights. Pumping groundwater would only provide eight to 15 cfs which would require fish production levels to be reduced and would not allow the LNFH to maintain fish production to meet Tribal obligations.

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\(^\text{24}\) For the purposes of this proposal, an infiltration gallery is a horizontal system of open-jointed or perforated pipes, which is installed below the water table. It passively collects groundwater.
2. Proposed Action and Alternatives (Alternatives and Alternative Elements Considered but Eliminated from Detailed Study)

under the *U.S. v. Oregon* Management Agreement (Agreement Parties 2018). For the reasons described above, Reclamation eliminated this option from detailed study.

**Replace the Surface Water Intake with Injection and Production Wells**  Reclamation received a request during the public scoping period (Reclamation 2020c), to evaluate Project alternatives that would improve water conservation and management through O&M activities. Consistent with this request, Reclamation considered replacing the surface water intake with a system of drilled injection and existing groundwater production wells on the LNFH property. Water used during LNFH production would be injected into the groundwater aquifer via new injection wells instead of being discharged into Icicle Creek. LNFH would then pump from existing groundwater wells, using the augmented groundwater aquifer to support production on a permanent basis. As described above, a pumped water supply would be inherently less reliable than a gravity water supply and would not meet the purpose and need to ensure safe, efficient, and reliable delivery of LNFH’s full water rights. Further, developing injection wells could require regulatory approvals from state or federal agencies, increasing permitting complexity and decreasing the likelihood of timely Project completion as required in the 2017 NMFS Biological Opinion (NMFS 2017a). This is because injecting production water, as opposed to returning it to Icicle Creek, may cause Ecology to change LNFH’s water use designation from nonconsumptive use to consumptive use25, and because injected water would need to meet State drinking water standards. Further, monitoring indicates that the groundwater beneath the LNFH has a higher level of naturally occurring phosphorous than Icicle Creek (USFWS 2016). Because phosphorus is also produced during Hatchery production, injecting water used for Hatchery production into the groundwater aquifer may cause total phosphorus in the groundwater to increase over time, eventually raising levels in pumped groundwater beyond those required for production. Over time, this may preclude the LNFH from maintaining fish production to meet obligations. Finally, this option would not negate the need for periodic supplemental surface water intake from Icicle Creek because injecting and re-using groundwater for production would result in eventual loss of water from the re-use system. It would not be feasible to build a re-use system that is 100 percent efficient. For these reasons, Reclamation eliminated this option from detailed study.

**Construction Work Schedule Alternative**

**Phase I Construction 6:00 a.m. – 8:00 p.m. Workday Hours Schedule/16-month In-water Work Window**  Reclamation considered an alternative that would use a 6:00 a.m. to 8:00 p.m. workday and 16-month in-water work window schedule to construct Phase I, the proposed intake facilities. A workday schedule would include construction between the hours of 6:00 a.m. to 8:00 p.m., Monday through Saturday. However, this alternative was eliminated from detailed study because it would not meet the purpose of and need for action. It would not ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek, avoid and/or minimize impacts on threatened and endangered fish species, nor ensure timely Project completion per the 2017 NMFS Biological Opinion (NMFS 2017a). Further, this alternative would not maintain fish production to meet Tribal obligations (*U.S. v. Oregon* Management Agreement [Agreement Parties

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25 Nonconsumptive use means a type of water use where either there is no diversion from a water source, or where there is no diminishment of the amount or quality of the water source. Consumptive use means use of water that diminishes the volume or quality of the water source (WAC 173-518-030).
Under this alternative, temporary cofferdams would be used to isolate the in-water work area and facilitate the temporary gravity-fed bypass pipeline in Icicle Creek, as described under Alternative B. However, instead of being removed from Icicle Creek by November 15 of each year, cofferdams would be left in Icicle Creek on a continuous basis from approximately July 2022 to October 2023. Additionally, as noted under Alternative B, it is most likely that the construction contractor would use geo-bag cofferdams to isolate the in-water work area, as the bedrock geology of the intake construction area would not allow for the use of mechanically driven piles to construct and anchor the cofferdams. Geo-bag cofferdams are intended to be used in situations with relatively steady, average to below-average flows, and not in high-flow or flashy-flow situations, such as runoff resulting from spring snowmelt, rain-on-snow events, or heavy or prolonged precipitation events. This is because the bags are kept in place by their own weight and are not anchored into bedrock. Geo-bag cofferdams would not be suitable for use in Icicle Creek during heavy or prolonged precipitation or rain-on-snow events that typically occur between November and April, or during typical flows resulting from spring runoff in May and June. The possibility of flash-flooding events in Icicle Creek is not speculative; analysis of long-term flow data indicate a 50 percent probability that mean daily flow rates can more than double during fall flash-flow events (from 109 cfs to 274 cfs), and increase by an order of magnitude during certain spring runoff events (from 109 cfs to 1,641 cfs; Reclamation 2020d). Both typical and unpredictable high-flow events would have the potential to dislodge or destroy geo-bag cofferdams.

This alternative would not meet the purpose and need to ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights. Cofferdam failure during high flows, particularly failure of the geo-bags facilitating the gravity-fed bypass pipeline, could jeopardize the temporary Hatchery water supply during Phase I of construction. Disrupted surface water supply may require the Hatchery water supply to be supplemented with groundwater pumping. However, as discussed above in Replace the Surface Water Intake with Pumping from Existing and New Groundwater Production Wells, pumping groundwater would only provide eight to 15 cfs which would require fish production levels to be reduced, which would not allow the LNFH to maintain fish production to meet obligations (U.S. v. Oregon Management Agreement [Agreement Parties 2018]). Depending on the severity of the disruption, an entire fish cohort could be lost.

This alternative also would not meet the purpose and need to avoid and/or minimize impacts on threatened and endangered fish species. Because cofferdams would be left in Icicle Creek year-round from approximately July 2022 to October 2023, they may interfere with or disrupt ESA-listed fish migration, movement, foraging, spawning, or other behavior. Further, cofferdam failure during high flows could release tons of rock into Icicle Creek, and a plume of accumulated sediment. Depending on the volume and type of material released, there could be long-term changes to the Icicle Creek streambed, primarily by increasing the proportion of sands, gravels, and fine sediments. Released materials could reduce ESA-listed fish habitat quantity or quality by burying or degrading suitable

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26 A fish cohort is a group of fish of the same species that are born during the same year.
spawning substrate in Icicle Creek. Depending on the timing of cofferdam failure, released materials could bury ESA-listed fish species redds or eggs, which would be considered take under the ESA. As described for the action alternatives, the potential for detrimental impacts in the case of cofferdam failure would be reduced by using stream mix in temporary cofferdams.

This alternative would not meet the purpose and need to ensure timely Project completion as required by the 2017 NMFS Biological Opinion (NMFS 2017a). Timely Project completion could not be ensured primarily because leaving the cofferdams in Icicle Creek on a continuous basis would increase permitting complexity. This would come about for several reasons. First, Reclamation anticipates obtaining regulatory approvals for the SWISP Project under several programmatic agreements, such as USACE Section 404 Nationwide Permits (see the Permitting discussion in Section 2.4.2), and the programmatic biological opinion from the NMFS for fish passage and restoration (NMFS 2017b; see Section 4.2.6). In contrast to Alternative B, continuous cofferdam placement in Icicle Creek would be unlikely to be compatible with these programmatic permitting agreements.

This alternative would not provide TMDL and Water Quality Standard-compliant management. Cofferdam failure during high flows could release tons of rock into Icicle Creek, and a plume of accumulated sediment. In the short-term, this would increase turbidity within and downstream of the intake construction area. Icicle Creek is sensitive to any addition of nutrients, especially phosphorus. Although phosphorus levels are relatively low, they are consistently too high to meet state water quality standards for the potential of hydrogen (pH). If released materials contributed phosphorus to the system, water quality could be degraded in violation of pH and phosphorus TMDLs established for Icicle Creek. Further, cofferdam failure that could occur during heavy or prolonged precipitation or rain-on-snow events between November and April, or during typical flows resulting from spring runoff in May and June, could expose uncured concrete to water in Icicle Creek. Concrete is highly alkaline (pH 12.5). If concrete were cast less than four days before cofferdam failure, the leaching of alkali from the uncured concrete would likely result in increases to both the pH and phosphorus levels in Icicle Creek, which could also lead to a violation of the pH and phosphorus TMDLs.

This alternative would have low private landowner and/or recreationist disturbance acceptability. This is because construction under this alternative would affect private landowners and/or recreationists for a relatively long period compared with Alternative B. Instead of construction at the intake construction area being done between July 1 and November 15 over two seasons, it would occur year-round from July 2022 to October 2023, meaning that construction-related disturbances would extend for an additional 7.5 months, compared with Alternative B. The additional construction-related disturbance to private landowners and recreationalists, including noise, traffic delays, and temporary loss of recreationist parking along Icicle Creek Road, would likely be unacceptable to these groups. For the reasons detailed above, Reclamation eliminated this alternative from detailed study.
2. Proposed Action and Alternatives (Alternatives and Alternative Elements Considered but Eliminated from Detailed Study)

2.5.2 Component Elements Considered but Eliminated from Detailed Study

**Intake and Fish Screens Component**
The intake and fish screens component includes all types of, and potential placements of, NMFS-compliant (NMFS 2011) screens that could be utilized to keep fish out of the surface water intake system while facilitating the delivery of LNFH’s full surface water rights.

**Alternative Fish Screen Locations and Technology**  Reclamation considered using several different types of fish screens in various locations as part of the intake and fish screens component: an in-channel fish screen, an indoor fish screen in the existing gatehouse, and a screen at the existing sand settling basin.

Reclamation considered placing an in-channel fish screen in the existing excavated intake channel, between the low-head diversion dam (see Map 2-2 in Appendix A) and the Icicle Creek left bank. Given physical site constraints, Reclamation modeling indicates that using an in-channel fish screen would not allow for sufficient sweeping velocities (NMFS 2011) to be attained, which would increase the potential for threatened and endangered fish to be impinged on the screen. More water would need to be diverted from Icicle Creek to reach sufficient sweeping velocities when using an in-channel fish screen, which would detrimentally affect threatened and endangered fish habitat in Icicle Creek, particularly during times of low flow. Further, an in-channel fish screen would not be in Icicle Creek, but rather would be in the excavated intake channel, physically outside of the main Icicle Creek channel. Given its location away from Icicle Creek, threatened and endangered fish would be entrained in the surface water intake before being screened and ultimately returned to Icicle Creek through a fish bypass. This entrainment would also be considered take of threatened and endangered fish species. For these reasons, this option would not meet the Project’s purpose and need to avoid and/or minimize impacts on threatened and endangered fish species.

Reclamation considered using an indoor fish screen located within the existing gatehouse (see Map 2-2 in Appendix A). Under this option, threatened and endangered fish would be entrained in the surface water intake system for a greater distance and longer time before being screened and returned to Icicle Creek through a fish bypass, compared to an in-channel fish screen. This would result in increased take and would not meet the purpose and need to avoid and/or minimize impacts on threatened and endangered fish species. Further, this option would not be technologically or economically feasible or practicable, given the increased staffing requirements, electrical costs, and complexity of de-icing solutions that would be required.

Reclamation considered rehabilitating the existing intake facilities on Icicle Creek, and screening fish at the existing sand settling basin (see Map 2-1 in Appendix A). Under this option, fish screening would still occur but would take place at the existing sand settling basin at the distal end of the conveyance pipeline, approximately 6,300 feet from the surface water intake on Icicle Creek. Since screening would occur over a mile from the point of diversion, threatened and endangered fish

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27 The terms left bank and right bank refer to the perspective of an observer looking downstream.
28 As described in the Alternatives Compilation Report (Reclamation 2020c), technological and economic feasibility and practicability criteria are based on the need for efficient and acceptable project design and construction.
would be entrained in the surface water intake system for a greater distance and longer time before being screened and returned back to Icicle Creek through a fish bypass, increasing the amount of take compared with other screen options. This alternative was previously considered and eliminated as part the USFWS’ Hatchery Water Supply System Rehabilitation Final EA (see USFWS 2003, Alternative C). The USFWS determined that screening at this location would not meet the purpose and need of protecting the fishery resource in Icicle Creek. Reclamation revisited this alternative element and determined that the USFWS determination from 2003 is still valid. Therefore, this option was eliminated from detailed study because it would not meet the purpose of and need for the action.

**Alternative Intake Locations** In response to comments received during the public scoping period (Reclamation 2020a), Reclamation considered moving the intake component elements outside of the Icicle Creek riparian zone, and into the footprints of the existing intake access road and Icicle Creek Road. Also, in response to comments received, Reclamation considered restoring the existing surface water intake and outlet channel to a continuous side channel habitat area to enhance juvenile fish rearing and/or passage and migration habitat using a combination of natural stream features and bioengineered structures. Moving infrastructure outside of the riparian zone and restoring the existing surface water intake and outlet channels would require moving the surface water intake farther away from Icicle Creek and using an in-channel fish screen. As described above in *Alternative Fish Screen Locations and Technology*, take of threatened and endangered fish species would be increased using this screen option. Further, constructing a continuous side channel habitat area in this location would require large amounts of ground disturbance and associated riparian vegetation removal due to the steep topography. This would increase permitting complexity, decreasing the likelihood of timely Project completion as required in the 2017 NMFS Biological Opinion (NMFS 2017a). In addition, due to its short length, small overall size, and steep gradient, there is little opportunity for meaningful juvenile fish rearing habitat restoration in the existing surface water intake and outlet channel area. Finally, based on geological and physical constraints such as steep slopes, shallow soils, and granite bedrock at the intake site, this option would not be technologically or economically feasible or practicable, because of the increased costs and complexity of construction. For these reasons, Reclamation eliminated this option from detailed study.

**Trash Protection Features** Reclamation considered installing a pipe-style trash protection feature directly in front of the screens. Reclamation eliminated this element from detailed study because it was determined not necessary to meet the Project purpose and need, since Alternative B would include a floating log boom trash protection feature upstream of the screens. Alternative B also includes a self-cleaning cylindrical screen that would be submerged at a depth that, under most stream flow scenarios, would be unaffected by floating debris.

**Alternative Intake Access Road Configurations** In response to comments received during the public scoping period (Reclamation 2020a), Reclamation considered reconfiguring the existing intake access road using a semicircular design to provide improved sight lines to Icicle Creek Road during intake site ingress and egress. However, Reclamation determined that such a design would require a large amount of excavation and vegetation removal in the Icicle Creek riparian zone to meet road
2. Proposed Action and Alternatives (Alternatives and Alternative Elements Considered but Eliminated from Detailed Study)

engineering standards, which may increase permitting complexity. This would decrease the likelihood of timely Project completion as required in the 2017 NMFS Biological Opinion (NMFS 2017a). Also, given geological and physical constraints in the surface water intake area (see Alternative Intake Locations above), this option would not be technologically or economically feasible or practicable because of the increased costs and complexity of construction. For these reasons, the option to construct a semicircular intake access road design was eliminated from detailed study.

**Fish Passage Component**

**Modify the Existing Fish Ladder** Reclamation considered incorporating the existing fish ladder/sediment sluice and low-head diversion dam (see Map 2-2 in Appendix A) into a new NMFS-compliant fishway (Reclamation 2020b). Under this proposal, the existing fish ladder/sediment sluice would be reconstructed using a standard, scalable fish passage design, such as a vertical slot fishway30. This option was eliminated from detailed study for several reasons. First, a new fishway incorporating the existing fish ladder/sediment sluice may not be used by upstream-migrating fish because it may not adequately attract them during upstream migration. This is because the existing fish ladder/sediment sluice outlet, which would become the new fishway entrance providing attraction flow for upstream-migrating fish, is sub-optimally located outside of the stream thalweg31 and likely primary upstream migration paths. Under most observed flow scenarios these paths are roughly at mid-channel or near the Icicle Creek right bank (Anglin et al. 2013). Therefore, there is a low probability that this option would meet current fish passage criteria for anadromous fish passage facilities (NMFS 2011) and satisfy the purpose of and need for the action. Further, this option would require an in-channel fish screen, which as described in Alternative Fish Screen Locations and Technology above, would increase potential for take of threatened and endangered fish. Also, in contrast to the proposed fish passage option, this option is not widely supported by the regulating agencies and would present a challenge for permitting and Project completion within the timeframe required in the 2017 NMFS Biological Opinion (NMFS 2017a).

**Creek-Width Roughened Channel with Low-Flow Channel Alignments** Reclamation considered two fish passage options that would incorporate a shorter creek-width roughened channel than the one proposed. The two creek-width roughened channel options would have a low-flow channel toward the right bank or left bank of Icicle Creek, respectively. The Icicle Creek thalweg is not oriented towards the right bank (Anglin et al. 2013); therefore, positioning the roughened channel only on that side of the creek would not provide optimal fish passage. While a shorter creek-width roughened channel on the left bank would satisfy the regulatory criterion of minimizing in-water construction, Reclamation modeling indicates that this option would increase the difficulty in meeting the current fish passage criteria for anadromous fish passage facilities (NMFS 2011), including but not limited to, length of fishway, channel slope, and water depth and velocity. These options would decrease fish passage effectiveness overall, and at higher flows in particular. Therefore, Reclamation determined these options would not meet the purpose of and need for the action and eliminated them from detailed study.

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30 This type of fishway consists of a series of pools with baffled vertical slots between them.

31 A line defining the lowest points along the length of a river or stream bed; the deepest part of a river or stream channel.
Conveyance Pipeline Component

Reclamation considered several options for replacing and/or rehabilitating the conveyance pipeline. They include:

- Lining the entire conveyance pipeline with CIPP,
- Excavating and replacing the two most deteriorated sections and lining the remaining sections with CIPP,
- Excavating and replacing the entire conveyance pipeline, and
- Excavating and replacing the two most deteriorated conveyance pipeline sections only.

Reclamation considered lining the entire conveyance pipeline with CIPP to minimize impacts on the Icicle Creek riparian zone between the PISMA and private lands. Reclamation steady-state modeling indicates that lining the entire length of the conveyance pipeline with CIPP, while maintaining LNFH’s full surface water rights of 42 cfs, is not a technically viable option because it would not ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek. This is due to the relatively small diameter of the conveyance pipeline, combined with the changes happening both upstream with the fish intake and screens and downstream with the new control valves, lining the full pipeline results in a hydraulic high point roughly mid-way along the pipeline, on private lands. To overcome the hydraulic high point to deliver 42 cfs of water, both sections of pipe on USFWS property would need to be replaced with larger diameter pipes, which would necessitate excavation and replacement. This option would not meet the purpose of and need for action. Therefore, Reclamation eliminated this option from detailed study.

Reclamation considered excavating and replacing only the two most deteriorated conveyance pipeline sections and rehabilitating the remainder of the conveyance pipeline by lining it with CIPP. The two most deteriorated conveyance pipeline sections are on USFWS property lands near the sand settling basin, and on private lands near the bifurcation point where the Hatchery’s surface water supply is split from COIC’s surface water supply (Reclamation 2020b; see Map 2-1 in Appendix A). As described above, steady-state modeling indicates that maintaining delivery of 42 cfs of water could not be accomplished without increasing the pipeline diameter in the section of pipeline on USFWS property. Therefore, excavating and replacing only the two most deteriorated sections and lining the remaining length of the conveyance pipeline with CIPP is not a technically viable option. This option would not meet the purpose of and need for action because it would not ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek. Therefore, Reclamation eliminated this option from detailed study.

Reclamation considered excavating and replacing the entire conveyance pipeline, from the surface water intake to the LNFH production facilities, on both USFWS property and private lands. Reclamation has previously discussed this option with the private landowners, and they were not receptive to it (Reclamation 2020b). This option was revisited during the design process, and landowner acceptability remains low; however, they were receptive to other alternatives that would have less impact on their businesses. This option would have low private landowner acceptability.

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32 Personal communication between Kylie Pelzer, Civil Engineer, Reclamation, and David Child, Project Manager, Leavenworth Fisheries Complex, Reclamation. Subject: LNFH Phase II - CIPP and FY Budgets, June 23, 2020.
which could present a challenge for Project completion within the timeframe required in the 2017 NMFS Biological Opinion (NMFS 2017a). Since timely Project completion is part of the Project purpose and need, Reclamation eliminated this option from detailed study.

Reclamation also considered excavating and replacing only the two most deteriorated conveyance pipeline sections (Reclamation 2020b), which are on USFWS property near the sand settling basin, and on private lands near the bifurcation point. The remainder of the conveyance pipeline would not be rehabilitated or replaced. While this option would replace the two most deteriorated sections, observations indicate that the entire conveyance pipeline is in poor condition. Continuing to operate the pipeline in poor condition would decrease the likelihood of continued safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek, and therefore would not meet the purpose of and need for action. For these reasons, Reclamation eliminated this option from detailed study.

**Temporary Hatchery Water Supply Component**

Reclamation considered several options to supply the LNFH with a temporary water supply of 40 cfs during Project construction. A temporary water supply is needed for the LNFH to continue production during Project construction. The temporary water supply source for the Hatchery would vary based on the construction phase.

**Temporary Pumping from Existing Groundwater Wells Only**  Reclamation considered pumping water from existing groundwater wells on the LNFH property to provide the temporary Hatchery water supply of 40 cfs during construction on the conveyance pipeline. However, the existing groundwater wells do not have sufficient availability to ensure delivery of the temporary Hatchery water supply of 40 cfs. As a result, pumping water from existing groundwater wells would only provide eight to 15 cfs during construction on the conveyance pipeline which would require Hatchery production levels to be reduced. Further, a pumped water supply would create a dependence on electrical power to deliver LNFH’s temporary water supply. Any power loss would require an emergency backup system to power the pumps, and any system failure would result in the need for alternative water sources, decreasing the overall reliability of temporary water delivery. This option would not allow the LNFH to maintain fish production to meet Tribal obligations in the U.S. v. Oregon Management Agreement (Agreement Parties 2018) and would not provide a reliable source of water; therefore, Reclamation eliminated this option from detailed study.

**Develop additional groundwater wells to pump additional groundwater**  Reclamation considered developing additional groundwater wells on the LNFH property to pump additional groundwater to provide the temporary water supply of 40 cfs to the Hatchery during construction of the conveyance pipeline. Developing additional groundwater wells would require regulatory approvals from the State, increasing permitting complexity and decreasing the likelihood of timely Project completion as required in the 2017 NMFS Biological Opinion (NMFS 2017a), which is part of the Project purpose and need. Further, as discussed under **Temporary Pumping from Existing Groundwater Wells Only**, pumping from groundwater wells only would not ensure delivery of the temporary Hatchery water supply of 40 cfs. This would be the case even if additional groundwater wells were developed. As a result, pumping water from groundwater wells only during construction on the conveyance pipeline would require Hatchery production levels to be reduced. This option
would also create a dependence on electrical power to deliver LNFH’s temporary Hatchery water supply, decreasing the overall reliability of temporary water delivery. This option would decrease the likelihood of timely Project completion, would not allow the LNFH to maintain fish production to meet Tribal obligations in the \textit{U.S. v. Oregon} Management Agreement (Agreement Parties 2018), and would not provide a reliable source of water. For these reasons, Reclamation eliminated this option from detailed study.

**Temporary Full-time Pumping from Spillway Pool Only** Reclamation considered full-time pumping of surface water from the spillway pool to provide the temporary Hatchery water supply of 40 cfs during construction of the surface water intake. Pumping would be done from the spillway pool only; a gravity bypass would not be used. However, it is not feasible to ensure delivery of the temporary Hatchery water supply of 40 cfs by pumping from the spillway pool only. This is because sustained pumping of this volume of water would present a high risk of equipment failure. Inability to ensure delivery of the temporary Hatchery water supply of 40 cfs would likely require Hatchery production levels to be reduced. Further, there would be a concern for Hatchery production and fish health under this scenario. This is because the surface water intake would be near the Hatchery outfall. Should pathogens or other contaminants be present in the Hatchery, they may be recaptured at the pumping intake and be redistributed to the Hatchery, increasing the difficulty of maintaining LNFH production. For these reasons, full-time pumping from the spillway pool only during construction on the surface water intake would not ensure LNFH’s ability to maintain fish production to meet Tribal obligations. Further, the capital costs and operational costs of needed equipment for full-time pumping would be significantly higher than other temporary Hatchery water supply options. For these reasons, Reclamation eliminated this option from detailed study.

**Access and Staging Component**

**Construction vehicle turnaround locations** Reclamation considered several locations for a temporary construction truck turnaround location. Trucks hauling construction equipment would need to access the intake construction area using the eastbound lane of Icicle Creek Road. To safely accomplish this, they would need to turn around at a location west (upstream) of the intake site. Options for a turnaround location on Icicle Creek Road are limited given the steep topography of the Icicle Creek canyon.

Reclamation considered establishing a temporary truck turnaround at the Forest Service Snow Lakes Trailhead parking area, approximately one mile west of the intake site. The Snow Lakes Trailhead is a main access point to the Alpine Lakes Wilderness Area, an extremely popular recreational destination on the Okanogan-Wenatchee National Forest. Establishing a truck turnaround at the trailhead would significantly disrupt recreationist access to the trail and wilderness area by temporarily decreasing parking capacity at this location. This option would have low recreationist acceptability due to decreased parking capacity. Further, discussions with the Forest Service indicate they are not supportive of using this location as a truck turnaround. Therefore, Reclamation eliminated this option from detailed study.

Reclamation also considered establishing a temporary truck turnaround on private lands west of the intake site. However, Reclamation anticipates that this option would have low private landowner acceptability which would lead to difficulties of finding an accepting landowner and increases in the
time and expense of securing temporary access to their lands. For these reasons, this option would present a challenge for Project completion within the timeframe required in the 2017 NMFS Biological Opinion (NMFS 2017a), which is part of the Project’s purpose and need. Therefore, Reclamation eliminated this option from detailed study.

2.6 Summary Comparison of Impacts

Table 2-4 shows the amount of temporary (construction-related) and permanent disturbance under each alternative. Table 2-5 briefly describes the impacts on resources and resource uses under each alternative, including Alternative A – No Action. For further analysis of the impacts under each alternative, see Chapter 3, Affected Environment and Environmental Consequences, and the SWISP Project Resource Reports (available on the Project website at https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html).

Table 2-4. Acres of Temporary and Permanent Disturbance by Alternative

<table>
<thead>
<tr>
<th>Construction Phase</th>
<th>Disturbance Type and Amount (acres)</th>
<th>Alternative A – No Action</th>
<th>Alternative B – Proposed Action and Alternative D</th>
<th>Alternative C – Preferred Alternative</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Temporary, above OHWM</td>
<td>N/A</td>
<td>0.39</td>
<td>0.39</td>
</tr>
<tr>
<td>Phase I</td>
<td>Temporary, below OHWM</td>
<td>N/A</td>
<td>0.19</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>Permanent, above OHWM</td>
<td>0.04³</td>
<td>0.15⁵</td>
<td>0.15⁵</td>
</tr>
<tr>
<td></td>
<td>Permanent, below OHWM</td>
<td>0.02⁴</td>
<td>0.47⁵</td>
<td>0.47⁵</td>
</tr>
<tr>
<td></td>
<td>Total Phase I</td>
<td>0.06⁴</td>
<td>1.20</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>Temporary</td>
<td>N/A</td>
<td>7.99</td>
<td>6.82</td>
</tr>
<tr>
<td>Phase II</td>
<td>Permanent</td>
<td>N/A</td>
<td>&lt;0.01⁸</td>
<td>&lt;0.01⁸</td>
</tr>
<tr>
<td></td>
<td>Total Phase II</td>
<td>N/A</td>
<td>7.99</td>
<td>6.82</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.06⁴</td>
<td>9.19</td>
<td>8.02</td>
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Source: Reclamation GIS 2020

Notes:
1 Disturbance acres are approximate and used as the basis for analysis in Chapter 3. The precise amount of disturbance is subject to contractor means and methods of construction.
2 Includes temporary construction grading associated with the intake access road, gatehouse demolition, PISMA, and portions of the IO&M above the Icicle Creek OHWM. Not inclusive of permanent disturbance above the OHWM.
3 Includes temporary cofferdam installation and construction grading associated with the creek-width roughened channel and low-flow boulder weir fishway and portions of the IO&M below the Icicle Creek OHWM. Not inclusive of permanent disturbance below the OHWM.
4 There is no new disturbance associated with Alternative A – No Action. The footprint of existing facilities is given as permanent disturbance to provide a basis of comparison with the action alternatives (i.e., Alternatives B, C, and D).
5 Includes area of intake access road, PISMA, and portions of the IO&M above the Icicle Creek OHWM.
6 Includes area of creek-width roughened channel and low-flow boulder weir fishway (0.35 acres) and portions of the IO&M (0.12 acres) below the Icicle Creek OHWM.
7 All Phase II construction is above the Icicle Creek OHWM.
8 Includes area of CUA and control valve vault manholes.
## 2. Proposed Action and Alternatives (Table 2-5: Summary Comparison of Resource Impacts)

### Table 2-5. Summary Comparison of Resource Impacts

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<tr>
<td><strong>Air Quality and Climate</strong></td>
<td>Fugitive dust, air pollutant, and greenhouse gas emissions related to O&amp;M would continue. These include emissions from vehicles and equipment, dust from travel on unpaved access roads, and emissions from periodic sediment removal operations.</td>
<td>Construction would generate temporary and localized fugitive dust, greenhouse gas emissions, and other air pollutants, which would be minimized using standard dust control and other BMPs. Contribution to global greenhouse gas emissions are expected to be well below 25,000 metric tons of carbon dioxide equivalents per year, which is the greenhouse gas reporting requirement threshold under 40 CFR 98. The types of emissions from O&amp;M would be similar but reduced compared with Alternative A because less maintenance would be needed.</td>
<td>Impacts from construction would be similar to Alternative B, but emissions would be slightly reduced because there would be less construction activity associated with the shorter length of conveyance pipeline being replaced. Contribution to global greenhouse gas emissions would be well below the greenhouse gas reporting requirement threshold under 40 CFR 98 of 25,000 metric tons of carbon dioxide equivalents per year. Emissions associated with O&amp;M of the LNFH would be the same as described under Alternative B.</td>
<td>Impacts from construction would be similar to Alternative B, but emissions would be greater because of the increased Phase I construction timeline and the need for additional diesel-powered pumping for the temporary Hatchery water supply. Contribution to global greenhouse gas emissions would be well below the greenhouse gas reporting requirement threshold under 40 CFR 98 of 25,000 metric tons of carbon dioxide equivalents per year. Emissions associated with O&amp;M of the LNFH would be the same as described under Alternative B.</td>
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<td><strong>Geology and Soils</strong></td>
<td>There would be no new impacts to geology or soils from construction. Sediment from upstream sources would continue to be diverted from Icicle Creek into the Hatchery, and it</td>
<td>Construction would result in localized effects from ground disturbance and movement of geologic materials. BMPs to minimize surface disturbance, control erosion, and reclaim</td>
<td>Impacts would be similar to Alternative B, but slightly reduced because there would be less construction activity associated with the shorter length of</td>
<td>Impacts would be the same as described under Alternative B.</td>
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<tr>
<td>Geology and Soils</td>
<td>would periodically be removed and stored on-site.</td>
<td>temporarily disturbed areas would reduce impacts.</td>
<td>conveyance pipeline being replaced.</td>
<td>(see above)</td>
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<td>(continued)</td>
<td></td>
<td>Permanent facilities would result in the irretrievable commitment of soil resources in limited areas.</td>
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<tr>
<td>Water Resources</td>
<td>Sediment would continue to be diverted from Icicle Creek, removing its contribution to stream geomorphology and stream conditions. There would be no change in compliance with water quality standards (for temperature, dissolved oxygen, pH, and turbidity) outlined in Chapter 173-201A of the WAC.</td>
<td>Intake rehabilitation would greatly reduce sediment diversion, allowing it to remain in the creek and contribute to stream conditions. Surface disturbances from construction within the 100-year floodplain would occur. Surface disturbances and equipment use in and adjacent to Icicle Creek could result in contaminants (e.g., soil, lubricants, fuel, etc.) entering the creek and affecting water quality. There would be two weeks of cofferdam use during November, a month when prolonged precipitation or rain-on-snow events could overtop, dislodge, or destroy the cofferdam. Cofferdam failure during high flows could release tons of rock into Icicle Creek and a</td>
<td>Impacts would be similar to Alternative B, but slightly reduced because less conveyance pipeline would be replaced, and fewer shade-producing trees would be removed. As a result, effects from increased water temperature and lowered dissolved oxygen would be reduced.</td>
<td>Impacts would be similar to those described under Alternative B, except Alternative D would involve additional seasons of cofferdam use (four construction seasons instead of two). This would increase surface disturbances and equipment use in and adjacent to Icicle Creek that could result in contaminants (e.g., soil, lubricants, fuel, etc.) entering the creek and affecting water quality. Additionally, cofferdam use would end on October 31 each year, avoiding cofferdam use during November when prolonged precipitation or rain-on-snow events could overtop, dislodge, or destroy the cofferdam.</td>
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2. Proposed Action and Alternatives (Table 2-5: Summary Comparison of Resource Impacts)
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<tr>
<td><strong>Water Resources</strong></td>
<td>(see above)</td>
<td>plume of accumulated sediment. Shade-producing trees would be removed, allowing an increase in water temperature and a lowering of dissolved oxygen. BMPs and permit conditions would reduce impacts.</td>
<td>(see above)</td>
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<tr>
<td><strong>Biological Resources</strong></td>
<td>Alternative A would not comply with current NMFS fish screening and passage criteria. Existing intake facilities do not comply with current NMFS criteria for anadromous salmonids, and result in take of ESA-listed fish. Existing intake facilities impact fish passage and aquatic habitat quantity, quality, and connectivity. The 2017 NMFS Biological Opinion covering LNFH operations requires the LNFH comply with current criteria by May 2023. Lead-based materials are present at existing Hatchery infrastructure; these may enter the environment causing exposure to aquatic species. There would be no</td>
<td>Alternative B would comply with current NMFS fish screening and passage criteria for anadromous salmonids and would reduce take of ESA-listed fish compared with current conditions. Construction would temporarily affect ESA-listed fish, critical habitat, and essential fish habitat (EFH), but BMPs (Appendix B) and conservation measures developed during ESA Section 7 consultation with the USFWS, and in the NMFS 2017 FPRP III programmatic Biological Opinion (NMFS 2017b), would reduce effects. Fish passage and aquatic habitat quantity, quality, and connectivity would be improved post Project</td>
<td>Alternative C would comply with current NMFS fish screening and passage criteria for anadromous salmonids and would reduce take of ESA-listed fish compared with current conditions. Impacts on fish and aquatic habitat and vegetation would be similar to Alternative B, but slightly reduced because less conveyance pipeline would be replaced, and fewer shade-producing trees would be removed. Effects on terrestrial wildlife species would be the same as described under Alternative B.</td>
<td>Alternative D would comply with current NMFS fish screening and passage criteria for anadromous salmonids and would reduce take of ESA-listed fish compared with current conditions. The types of impacts on fish and aquatic habitat would be similar to Alternative B, but the time frame over which they occur would differ. This may increase impacts to fish and aquatic habitat because, although the daily and seasonal timeframe would be shorter, the total time needed to complete the Project would be longer. There would also be additional impacts from Phase I construction temporary Hatchery water supply pumping for a longer</td>
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*SWISP Project Final Environmental Impact Statement*
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<tr>
<td><strong>Biological Resources</strong></td>
<td>impacts on vegetation or terrestrial wildlife species.</td>
<td>implementation. Lead-containing materials on Hatchery infrastructure would be removed and disposed of in accordance with CFRs and associated safety regulations. Effects on vegetation would be minor and effects on terrestrial wildlife species would be minor or negligible.</td>
<td>(see above)</td>
<td>period, inundation of the partially constructed intake headworks after cofferdam removal, and cofferdam installation and removal efforts before and after each additional in water work window. The fish species affected may differ relative to Alternative B due to the two-week shorter in-water work window and the workday hours of 7:00 a.m. to 10:00 p.m. Effects on vegetation and terrestrial wildlife species would be the same as described under Alternative B.</td>
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<td>(continued)</td>
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<tr>
<td><strong>Cultural Resources</strong></td>
<td>Continued deterioration of the existing intake facilities and conveyance pipeline may unavoidably adversely affect the overall integrity of the LNFH Historic District. There would be no adverse effect on historic properties, archaeological sites eligible for listing in the NRHP, or Native American TCPs per the no adverse effect determination by the Washington State Department of Archaeology and Historic Preservation (Washington State DAHP) on March 12, 2020. An inadvertent discovery plan would be followed, and</td>
<td>There would be no adverse effect on historic properties, archaeological sites eligible for listing in the NRHP, or Native American TCPs per the no adverse effect determination by the Washington State Department of Archaeology and Historic Preservation (Washington State DAHP) on March 12, 2020. An inadvertent discovery plan would be followed, and</td>
<td>Impacts would be the same as described under Alternative B.</td>
<td>Impacts would be the same as described under Alternative B.</td>
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<tr>
<td><strong>Cultural Resources</strong> <strong>(continued)</strong></td>
<td>(see above)                                                                                                                                                                                                                                                                                  Professional archaeological monitoring would occur during Phase II pipeline replacement activities on USFWS property.                                                                                                                                                               (see above)</td>
<td>(see above)</td>
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<tr>
<td><strong>Land Use, Utilities, and Service Systems</strong></td>
<td>There would be no changes to existing intake facilities. The existing easement containing the underground conveyance pipeline would remain in effect. There would be no change in the current land uses, zoning, landownership, entitlements, or existing utilities aside from routine maintenance or future improvements.</td>
<td>Existing intake facilities and the conveyance pipeline would be modified, replaced, rehabilitated, and new intake elements would be constructed. Effects on land use would be unchanged. There would be no change in the current land uses, zoning, landownership, or entitlements. Relocation of at least one power pole and minor upgrades to the overhead electrical infrastructure could result in a temporary lapse in electrical supply to area users.</td>
<td>Impacts would be the same as described under Alternative B.</td>
<td>Impacts would be the same as described under Alternative B.</td>
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<tr>
<td><strong>Noise and Vibration</strong></td>
<td>There would be no new construction activity that would affect ambient sound levels. Sensitive noise receptors would continue to experience community and traffic noise, including peak season noise levels in exceedance of environmental designation</td>
<td>Equipment and vehicle use associated with construction would raise ambient noise levels for sensitive receptors and increase vibration. Expected loudest noise levels would be generated by a pneumatic tool (Phase I construction) and hot air blower (Phase II)</td>
<td>Impacts would be similar to those described under Alternative B. However, under Alternative C, starting at the PISMA, the conveyance pipeline would be lined with CIPP to the USFWS parcel boundary, which could result in a slight increase in the duration of</td>
<td>There would be no Phase I construction work from 10:00 p.m. to 7:00 a.m. under Alternative D, which would reduce daily noise impacts as compared with Alternative B. However, the overall duration of Phase I construction noise impacts would be experienced over four years</td>
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## 2. Proposed Action and Alternatives (Table 2-5: Summary Comparison of Resource Impacts)

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<tr>
<td><strong>Noise and Vibration (continued)</strong></td>
<td>for noise abatement (EDNA) Class A levels. There would continue to be noise and occasional vibration associated with current O&amp;M of existing intake facilities and the conveyance pipeline.</td>
<td>Increases in ambient noise levels could occur for up to 24 hours per day, and up to seven days per week during construction. Noise BMPs would reduce effects.</td>
<td>Noise from use of the hot air blower. Additionally, Alternative C would require fewer truck trips to access the intake construction area, resulting in less construction noise for sensitive receptors along Icicle Road/Icicle Creek Road.</td>
<td>Under Alternative D, as compared to two under Alternative B. Additionally, the two diesel-powered pumps associated with the temporary Hatchery water supply for Phase I construction would operate 24 hours per day and seven days per week for a period of eight months, as opposed to approximately 10 days under Alternative B.</td>
</tr>
<tr>
<td><strong>Transportation and Traffic</strong></td>
<td>There would be no change in the Level of Service (LOS), and drivers would not experience increase or decrease in delays or frustrations. Routine or extraordinary maintenance could impact traffic; the timing and extent of potential impacts would depend on the nature, extent, and timing of maintenance.</td>
<td>Heavy vehicle traffic using Icicle Road and Icicle Creek Road and the turnaround at the Forest Service and Alpine Lakes Wilderness kiosk would temporarily reduce the LOS in these areas. Prohibiting parking at the turnaround would reduce access. Impacts could be greatest during weekends and in summer when traffic volumes and demands for access are highest. Traffic control BMPs would reduce effects.</td>
<td>Temporary reductions in LOS would be less than those described under Alternative B because there would be fewer heavy equipment vehicle trips accessing the intake construction area. Impacts on access would be the same as described under Alternative B.</td>
<td>Temporary reductions in LOS would be similar to those described under Alternative B during daytime hours. Overall daily impacts to traffic and transportation would be reduced under Alternative D as compared with Alternative B, as construction activities after 10:00 p.m. would not occur. However, these impacts would be experienced over a total of four construction seasons under Alternative D, instead of two seasons under Alternative B.</td>
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<tr>
<td>Recreation</td>
<td>There would be no construction-related changes to recreational opportunities, conditions, or access. More frequent maintenance may temporarily impact recreational conditions or access.</td>
<td>Temporary impacts to recreational conditions and access would occur during construction, which may temporarily depress recreational visitation rates by approximately eight percent. Long-term benefits to recreational fishing would result from enhanced fish passage and aquatic ecosystem productivity. Noise from Phase II construction on private lands along the conveyance pipeline alignment could be audible to visitors and guests utilizing indoor and outdoor private recreational facilities. Light from Phase I nighttime construction could potentially affect visitors and guests at recreation facilities, but impacts are anticipated to be minor.</td>
<td>Impacts on recreational opportunities, conditions, and access would be similar to those described under Alternative B, but impact intensity would be reduced because there would be less excavation of the conveyance pipeline and associated truck traffic and delays.</td>
<td>There would be less of a decline in annual recreation visits at the Snow Lake Trailhead (six percent) as compared to Alternative B due to a shorter in-water work window. However, overall impacts to recreationists would be experienced over a longer period compared with Alternative B as Phase I construction-related disturbances, including noise, traffic delays, and temporary loss of recreationist parking along Icicle Creek Road and at the Snow Lakes Trailhead would extend for an additional two years, including during the peak recreation season for two additional seasons, compared with Alternative B. Impacts from Phase II construction would be the same as those described under Alternative B.</td>
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## 2. Proposed Action and Alternatives (Table 2-5: Summary Comparison of Resource Impacts)

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<td><strong>Visual Resources</strong></td>
<td>Visual quality would remain unchanged and there would be no additional impacts to the viewshed. O&amp;M activities would continue to be largely naturally screened from view to the casual observer.</td>
<td>Temporary impacts would occur from construction-related activities such as use of heavy machinery and warning signs, which would sharply contrast with the natural lines, form, and color within the existing viewshed, and construction noise, light, and level of the activity would draw the attention of the casual observer. Impacts from vegetation removal would diminish over time as planted and seeded vegetation matured. Impacts from O&amp;M would be the same as Alternative A or slightly less due to an expected reduction in frequency of O&amp;M activities.</td>
<td>Impacts would be similar to those described under Alternative B but would be reduced because there would be less construction-related activity due to lining a greater length of the conveyance pipeline. Disturbance in the Icicle Creek riparian zone would be reduced, reducing visual impacts to the characteristic landscape.</td>
<td>Impacts would be similar to those described under Alternative B, however overall impacts to visual resources would be experienced over a longer period compared with Alternative B as Phase I construction-related impacts would extend over four years, as compared with two years under Alternative B.</td>
</tr>
<tr>
<td><strong>Socioeconomics and Environmental Justice</strong></td>
<td>Existing recreational opportunities, including recreational fishing in Icicle Creek and related values and spending, could be affected by decreased fish production due to degraded facilities. Ongoing impacts on fish passage from LNFH operations would continue, and LNFH fish production,</td>
<td>Temporary recreational access constraints and delays would reduce recreational visits and related values and spending. Similarly, there would be temporary economic impacts in terms of value of lost time for motorists due to delays during constriction. There would</td>
<td>Impacts on socioeconomics would be similar to those described under Alternative B, but intensity of impacts would be reduced given that the degree of economic impacts from traffic disturbances would be reduced. Impacts on environmental justice would be the same as Alternative B.</td>
<td>Impacts on socioeconomics would be the same as described under Alternative B, but the impacts would be experienced over a longer period compared with Alternative B, as Phase I construction-related impacts would extend over four years, as compared with two years under Alternative B. Impacts</td>
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### 2. Proposed Action and Alternatives (Table 2-5: Summary Comparison of Resource Impacts)

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<td><strong>Socioeconomics and Environmental Justice (continued)</strong></td>
<td>Tribal fish programs, and the quality of the Tribal fishery could be jeopardized in the future due to continued degradation of existing facilities. There would not be disproportionate environmental effects on low-income, minority and Tribal populations.</td>
<td>not be disproportionate environmental effects on low-income, minority or Tribal populations.</td>
<td><em>(see above)</em></td>
<td>on environmental justice would be the same as Alternative B.</td>
</tr>
<tr>
<td><strong>Hazardous Materials and Public Health and Safety</strong></td>
<td>Lead-based materials are present at existing Hatchery infrastructure, these may enter the environment causing exposure to LNFH workers and aquatic species. Unsafe work conditions for LNFH workers, particularly during frazil ice events, would continue.</td>
<td>Lead-based materials on Hatchery infrastructure would be removed in accordance with CFRs and associated safety regulations. Construction activities occurring from 10:00 p.m. to 7:00 a.m. could temporarily increase the risk of vehicle accidents, and the associated construction noise and light from during this period may temporarily affect nearby residents and guests. Long-term work conditions would be improved, which would decrease risk of worker injury.</td>
<td>Impacts would be the same as described under Alternative B.</td>
<td>Impacts due to hazardous materials would be the same as described under Alternative B. The two additional Phase I construction seasons would continue the risk of impacts to public health and safety described under Alternative B for an additional two years. Because Phase I construction work would not take place past 10:00 p.m. under Alternative D, the risk of vehicular accidents and noise impacts to sensitive receptors near the intake structure from 10:00 p.m. to 7:00 a.m. would be reduced as compared with Alternative B. Noise levels would exceed the nighttime...</td>
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<td>Hazardous Materials and Public Health and Safety (continued)</td>
<td>(see above)</td>
<td>(see above)</td>
<td>(see above)</td>
<td>Class A EDNA of 45 decibels A-weighted (dBA) or less for several residences off East Leavenworth Road and Cemetery Road near the spillway pool resulting from diesel-powered pumping for the Phase I temporary Hatchery water supply for an eight-month period.</td>
</tr>
<tr>
<td>Tribal Interests</td>
<td>There would be no impacts on Indian sacred sites, Indian Trust Assets (ITAs), or traditionally and culturally important hunting or plant gathering areas because these interests are not present in the Analysis Area. There would be no changes in access to or activities at the Wenatchapam Fishery. Ongoing impacts on fish passage from LNFH operations would continue, and LNFH fish production, Tribal fish programs, and the quality of the Tribal fishery could be jeopardized in the future due to</td>
<td>There would be no impacts on Indian sacred sites, ITAs, and traditionally and culturally important hunting or plant gathering areas, as described under Alternative A. No adverse impacts to access to the Wenatchapam Fishery are anticipated. Fishing activities could be temporarily impacted during construction from noise disturbance and reduced fishing area from pump screen boxes in the spillway pool. Temporary Hatchery water supply pumping activities at the spillway pool may occur during the same time as scaffolding repair, ceremonial,</td>
<td>Impacts would be the same as described under Alternative B. There would be slightly less disturbance to vegetation that could support culturally important plants; however, vegetation in the Analysis Area has not been identified as culturally important to date.</td>
<td>There would be no impacts on Indian sacred sites, ITAs, and traditionally and culturally important hunting or plant gathering areas, as described under Alternative B. Temporary impacts on the Tribal fishery would be the same as described under Alternative B, but the impacts would be experienced over a longer period compared with Alternative B, as Phase I construction-related impacts would extend over four years, as compared with two years under Alternative B. Diesel-powered pumping from the spillway pool would occur over a period of eight months</td>
</tr>
<tr>
<td>--------------------------------------</td>
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<td>-------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tribal Interests (continued)</td>
<td>continued degradation of existing facilities.</td>
<td>and fishing activities but would not impact the ability of the Tribes to perform these functions. Improved fish passage, reduced potential for fish entrainment, and increased Hatchery production reliability would benefit the Tribal fishery.</td>
<td>(see above)</td>
<td>during Phase I of construction and could result in temporary noise or displacement impacts to Tribal fishers.</td>
</tr>
</tbody>
</table>
2.7 Federal Lead Agency Preferred Alternative

Under NEPA, the “preferred alternative” is a preliminary indication of the lead agency’s preference of action among the proposed action and alternatives. The lead agency may select a preferred alternative for a variety of reasons, including the agency’s priorities and environmental considerations discussed in the Draft EIS. In accordance with the NEPA implementing regulations (40 CFR 1502.14[d] and 43 CFR 46.425(a)), Reclamation has identified Alternative C as the preferred alternative. In addition to ensuring safe, efficient, and reliable delivery of the Hatchery’s full surface water right through construction of the new intake facilities, Alternative C best meets the purpose and need for the Project by reducing take with the installation of NMFS-compliant fish screens and providing passage for ESA-listed fish species and complying with 2017 NMFS Biological Opinion requirements in the timeliest manner. Alternative C would also have the fewest impacts to vegetation in the riparian corridor by limiting ground disturbance through more CIPP lining of the conveyance pipeline. In addition, the USFWS and USACE have concurred with Reclamation’s selection of Alternative C as the preferred alternative (see Section 1.1 and Section 1.5 for additional details).

While Reclamation has identified a preferred alternative in this Final EIS, actual selection of an alternative for implementation will not occur until the ROD. The decision on the alternative to implement will consider public comments and the full analysis presented in Chapter 3.
Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

This chapter summarizes the current environmental resources and resource uses that could be affected by the No Action alternative and the action alternatives carried forward for detailed analysis, as described in Chapter 2. Potential impacts are described in terms of duration, intensity, and context.

For the purposes of this analysis, impact duration is defined as follows:

- Temporary: impacts that would only occur during construction.
- Short-term: impacts that would be less than three years in duration.
- Long-term: impacts that would be three years or greater in duration.

For the purposes of this analysis, impact intensity is defined as follows:

- Negligible: changes would not be detectable or measurable. The resource topic would be essentially unchanged or unaltered.
- Minor: changes would be detectable, localized, and/or measurable and would have a slight change or alteration to the resource.
- Moderate or major: changes would be measurably to clearly or readily detectable, and/or have an appreciable to severe effect on the resource or resource use. The resource or resource use would be notably to substantially changed or altered. Project activities could change the indicator over a small to large area and/or from a moderate to large degree.

For the purposes of this analysis, impact type is defined as follows:

- Adverse: impacts that would have a detrimental effect to a resource.
- Beneficial: impacts that would have a positive effect to a resource.

Context is the setting within which an impact is analyzed:

- Local: within and immediately adjacent to the Project Area.
- Regional: the area outside of the Project Area but within Chelan County.

The 2020 amendment for updating CEQ’s Procedural Provisions of NEPA (40 CFR parts 1502.15) states that "The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration, including the reasonably
foreseeable environmental trends and planned actions in the area(s).” Reclamation has considered impacts that are reasonably foreseeable and have a reasonably close causal relationship to the action alternatives (per 40 CFR Section 1508.1(g)) associated with the projects and plans listed below; impacts are discussed under the Environmental Consequences headings below for applicable resources.

- **The Icicle Creek Boulder Field Fish Habitat Improvement Project** (Trout Unlimited 2020a) includes four separate elements: 1) fish passage improvement at river mile (RM) 5.6 (also known as the boulder field), 2) relocate and replace the City of Leavenworth water supply pipeline and fish screen, 3) replace and relocate the Icicle/Peshastin Irrigation District’s fish screens, and 4) improve fish passage at the Icicle/Peshastin Irrigation District and City of Leavenworth diversion dam. The project will provide access to dozens of miles of tributary habitat for anadromous fishes and connect Upper Icicle Creek with the Wenatchee River Watershed. Construction began in 2019 and is anticipated to be complete in 2022.

- **The Recovery Plan for Upper Columbia River Spring Chinook Salmon and Steelhead** (UCSRB 2007) describes ongoing and proposed actions to reduce known threats to listed species in the Wenatchee River; there were no plans or initiatives to recover listed species in Icicle Creek from state, Tribal, and local government entities at the time of plan development (NMFS 2017).

- **The Bull Trout Recovery Plan** (USFWS 2015) identifies recovery actions and recommendations for Icicle Creek.

- **Chelan County and Ecology’s programmatic EIS for the Icicle Workgroup Water Resource Management Strategy** (Icicle Strategy) which consists of proposals and planning level decisions that address concerns identified in the Icicle Workgroup Guiding Principles, including such items as improving instream flow, improving LNFH sustainability, protecting treaty/non-treaty harvest, and enhancing Icicle Creek habitat (Chelan County and Ecology 2019).

### 3.2 Resource Topics Analyzed

Table 3-1 identifies the presence or absence of resources or resource uses in the Project Area and the rationale for those that warrant detailed analysis in the EIS. All resources went through an analysis of alternatives; these analyses are included in the SWISP Project EIS Resource Reports, which are available on the Project website at: [https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html](https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html).

The potential for the No Action alternative and action alternatives to affect resources or resource uses are also documented in Table 3-1. Resources or resource uses that may be affected by the alternatives more than a negligible or minor amount or are required to be addressed in NEPA by U.S. Department of the Interior regulations or Reclamation policy are further described in the EIS as noted in Table 3-1.
Table 3-1. Determination and Rationale for Detailed Analysis by Resource Topic

<table>
<thead>
<tr>
<th>Resource Topic</th>
<th>Determination and Rationale for Detailed Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Quality and Climate</strong></td>
<td><strong>Air Quality</strong></td>
</tr>
<tr>
<td>LNFH is in an area that is in attainment for all national and state ambient air quality standards. Five-year air quality trends in Chelan County show that the air quality most days is good. These conditions are not expected to change under the No Action alternative.</td>
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<tr>
<td>Construction activities under the action alternatives would generate fugitive dust during surface-disturbing activities and from travel on unpaved portions of access roads and staging areas. Emissions would be localized to the area surrounding any given construction activity and would cease when construction ends, and any temporary disturbance areas are revegetated, or water is returned to previously dewatered areas. Most activities would occur on already disturbed areas, limiting the creation of new areas of disturbance. Fugitive dust impacts would be minimized using standard dust control measures.</td>
<td></td>
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<tr>
<td>Construction activities under the action alternatives would also generate a temporary, unavoidable adverse source of criteria air pollutants and small amounts of hazardous air pollutants through the combustion of fuel in commute vehicles, trucks, construction equipment, and diesel-powered pumps and generators. BMPs would be implemented to minimize combustion-related emissions, including from traffic congestion.</td>
<td></td>
</tr>
<tr>
<td>Emissions associated with O&amp;M would be less than under current conditions because the frequency and intensity of maintenance activities would be reduced.</td>
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<tr>
<td><strong>Climate</strong></td>
<td></td>
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<tr>
<td>Greenhouse gas emissions are expected to continue along current trends under the No Action alternative. The action alternatives would result in temporary emissions of greenhouse gases through the combustion of fuels and would release minor amounts of carbon in soils and vegetation during surface-disturbing activities. These would contribute to global greenhouse gas levels but would be below 25,000 metric tons of carbon dioxide equivalents per year. BMPs that reduce combustion-related criteria pollutant emissions would also reduce greenhouse gas emissions.</td>
<td></td>
</tr>
<tr>
<td>Historical trends and future climate projections show increased warming and shifts in the seasonality of precipitation. The movement of the Wenatchee River Watershed and the Icicle Creek Subbasin from a snow-dominant watershed to a rain/snowmelt transient watershed would result in less snowpack, earlier runoff, and more precipitation falling as rain, affecting the timing and volume of flows entering Icicle Creek. Projected climate-induced hydrological changes are generally not anticipated to affect Hatchery operations, as water needs would continue to be met through a combination of surface water and groundwater inputs, as well as storage from Nada and Snow Lakes. However, the timing of groundwater inputs and storage water use may be affected based on instream flow and temperature conditions that differ from those found historically.</td>
<td></td>
</tr>
</tbody>
</table>
### Resource Topic | Determination and Rationale for Detailed Analysis
--- | ---
**Air Quality and Climate** *(continued)* | Under the action alternatives, LNFH would continue to divert instream waters from Icicle Creek and draw on groundwater resources to support Hatchery operations. Rehabilitating the LNFH surface water intake and delivery system would not affect water usage requirements or rates compared with current conditions; the authorized diversion rate from Icicle Creek or groundwater or storage water rights would be the same as under current conditions. Because there would be no changes in diversions from Icicle Creek, the action alternatives would not impact the hydrological conditions of Icicle Creek and therefore not enhance any climate-induced hydrological changes. Because temporary, unavoidable adverse impacts would be minimized by BMPs and because there would be no long-term impacts on air or climate, these resources are not discussed further. Detailed analysis in this EIS is not warranted.

**Geology and Soils** | Under the No Action alternative, there would be no new impacts to geology or soils and there would be no change to existing conditions. Under the action alternatives, the construction of Project components, temporary access routes, storage and work areas, and the cut and cover replacement of sections of conveyance pipeline would result in localized, unavoidable adverse effects on geologic material and soils. BMPs such as minimizing surface disturbance, erosion controls, and reclamation of temporarily disturbed areas would reduce the intensity of impacts; however, the construction of permanent facilities would result in the irretrievable commitment of soil resources (0.62 acres) and impacts on geology would include the movement of geologic materials. Because impacts would be routine, the action alternatives would have minor adverse impacts on soils and geology, and these resources are not discussed further. Detailed analysis in this EIS is not warranted.

**Water Resources** | See detailed analysis in Section 3.3, Water Resources.

**Biological Resources** | **Vegetation, including Special Status Species**

Vegetation in the Project Area is departed from historic, natural conditions and does not provide high ecosystem value. The majority of vegetation in the Project Area is characterized by early seral disturbed communities or is developed and landscaped in the urban areas of the City of Leavenworth. There are no wetlands in the Project Area. These conditions are not expected to change under the No Action alternative.

Under the action alternatives, Project design and BMPs would avoid vegetation modification to the extent feasible, reduce potential spread of nonnative, invasive and noxious weed species, and rehabilitate temporarily disturbed vegetation after construction. Reclamation would require seeding of temporarily disturbed areas during Phase I and II of construction and would implement the Phase III Riparian Revegetation Plan (*Appendix D*) that would include replanting of upland and riparian vegetation at the intake construction area. This would help reestablish pre-construction vegetation conditions in most temporarily disturbed areas and improve native species and structural diversity of upland and riparian vegetation in the Icicle Creek riparian zone near the intake construction area. The action alternatives would
3. Affected Environment and Environmental Consequences (Table 3-1. Determination and Rationale for Detailed Analysis by Resource Topic)

<table>
<thead>
<tr>
<th>Resource Topic</th>
<th>Determination and Rationale for Detailed Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Resources (continued)</td>
<td>result in negligible unavoidable adverse effects on vegetation outside of the Icicle Creek riparian zone and within the riparian zone (0.15 acres of permanent disturbance above the Icicle Creek OHWM) and would ultimately result in long-term benefits to vegetation in the Icicle Creek riparian zone. There are no occurrences of ESA-listed or other special status plants and there is low potential for these species to occur due to the low quality of the habitat in the Analysis Area. As such, this resource is not discussed further. Detailed analysis in this EIS is not warranted.</td>
</tr>
</tbody>
</table>

**Fisheries, including Special Status Species and Aquatic Ecosystems**

See detailed analysis in Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems.

**Terrestrial Wildlife, including Special Status Species**

Wildlife diversity is related to the structure and composition of vegetation communities. As vegetation communities in the Analysis Area are departed from natural conditions and fragmented by development, most of the Analysis Area provides lower-quality wildlife habitat and supports limited wildlife diversity and populations. Existing urban development and human-related disturbances limit wildlife use to those species adapted to disturbance. These conditions are not expected to change under the No Action alternative.

Most terrestrial wildlife species are mobile and would avoid temporary construction impacts so potential for injury or mortality is not expected. Project BMPs to remove vegetation outside the breeding bird season or avoid nesting birds through pre-construction surveys would minimize impacts to migratory birds to negligible levels. Wildlife habitat that is potentially disturbed during construction would be rehabilitated to pre-construction conditions through seeding or improved through Phase III upland and riparian plantings at the intake construction area.

The action alternatives may affect, but are not likely to adversely affect, the endangered gray wolf (*Canis lupus*), as described in the SWISP Project EIS Biological Resources Report and SWISP Project Biological Assessment (Reclamation 2020e). Gray wolves are not known to occupy the Analysis Area, and this area does not contain high quality, continuous habitat for wolf breeding or hunting, but sightings of transitory individual wolves have been reported in the vicinity. There is a possibility that an individual wolf could move through the Analysis Area and be affected by the action alternatives, though any effects are expected to be negligible. Other ESA-listed and special status terrestrial wildlife species have low potential to occur in the Analysis Area and would be able to avoid temporary construction activities. BMPs would reduce impacts to nesting birds, mule deer, black bears, and mountain goats during sensitive periods.

The action alternatives would provide long-term beneficial effects to terrestrial wildlife in the Icicle Creek riparian zone, and negligible adverse impacts to terrestrial wildlife, including special status species, in other portions of the Project Area. As such, this resource is not discussed further. Detailed analysis in this EIS is not warranted.
### Cultural Resources

The LNFH Historic District is the only recorded historic aboveground/architectural property within the Area of Potential Effects (APE). There are four noncontributing resources associated with the LNFH in the APE associated with the LNFH water supply. They are outside of the Historic District, however, and are noncontributing due to a lack of historic integrity.

There are four archaeological sites within 1 mile of the APE, but none within it. One site has been determined eligible for listing in the National Register of Historic Places (NRHP), while another site has been determined not eligible for listing, and two sites have not been formally evaluated. There are no Traditional Cultural Properties (TCPs) within 1 mile of the APE. There are no local or county historic registers that list historic properties within or in the vicinity of the APE.

Under the No Action alternative, the continued deterioration of the existing intake facilities and conveyance pipeline may adversely affect buildings or structures within the LNFH Historic District, resulting in a greater risk to historic properties than the action alternatives. There would be no effect on documented archaeological resources eligible for listing in the NRHP or documented Native American TCPs.

As lead agency for Section 106 consultation, the USFWS determined, and the Washington State DAHP concurred, that Alternative B would have no adverse effect on historic properties, archaeological sites eligible for listing in the NRHP or Native American TCPs. This concurrence was made with the stipulation for professional archaeological monitoring and an inadvertent discovery plan. Stipulations for an inadvertent discovery plan and archaeological monitoring are included in **Appendix B**. Effects would be the same under Alternatives C and D. As such, this resource is not discussed further. Detailed analysis in this EIS is not warranted.

### Land Use, Utilities, and Service Systems

There would be no change in the current land uses, zoning, landownership, or entitlements under any alternatives. Under the No Action alternative, no new impacts to land use, utilities, and service systems would occur. Under the action alternatives, Reclamation would obtain a temporary easement or use authorization to accommodate construction activity outside the existing pipeline easement. The easement or authorization would temporarily preclude other activities from taking place in that area. Once construction is completed, the temporary easement or authorization would cease and the existing or temporary easements would be returned to pre-Project or better conditions, including reseeding any disturbed areas of vegetation. The relocation of electrical infrastructure at the intake construction area could temporarily disrupt electrical service. Other utility infrastructure would be avoided during construction with no impacts on those utilities. As such, these resources are not discussed further. Detailed analysis in this EIS is not warranted.

### Noise and Vibration

See detailed analysis in **Section 3.5**, Noise and Vibration.

### Transportation and Traffic

See detailed analysis in **Section 3.6**, Transportation and Traffic.
## Resource Topic | Determination and Rationale for Detailed Analysis
--- | ---
Recreation | See detailed analysis in Section 3.7, Recreation.
Visual Resources | Under the No Action alternative, no new impacts to visual resources would occur and there would be no change to existing conditions. Development of the action alternatives would temporarily impact visual resources in the Analysis Area, mainly due to construction-related activities. These impacts would generally be weak in intensity, based on the relative time span, the location and size of staging areas, and the amount of associated activity. Generally, these unavoidable adverse impacts would be temporary and would end once construction is complete. Additionally, various design features and BMPs would help reduce the visual contrast of the proposed Project elements within the existing viewshed and would have beneficial and long-term effects for the casual observer. Alternative C would result in slightly less impacts on visual resources, given that the pipeline would be lined as opposed to replaced, reducing disturbance on surrounding riparian areas. All action alternatives would have negligible short-term adverse and long-term beneficial impacts on visual resources. As such, this resource is not discussed further. Detailed analysis in this EIS is not warranted.
Socioeconomics and Environmental Justice | Socioeconomics

Under the No Action alternative, no new impacts to socioeconomics would occur and there would be no change to existing conditions from O&M activities. Existing recreational opportunities, including recreational fishing in Icicle Creek and related values and spending, could be affected by decreased fish production due to degraded facilities. Development of Alternative B would result in job contributions representing a 2.4 percent increase in the Chelan County construction workforce and a 0.1 percent increase in total workforce in the county. This relatively small, short-term increase in construction labor would not contribute notably to regional employment and income. No measurable increase in employment or income is expected to occur from normal ongoing O&M of the Hatchery once the proposed improvements to the surface water intake and delivery system are complete. Temporary recreational access constraints and delays on Icicle Creek Road would result in a reduction in recreational visits and a corresponding estimated economic value reduction of $412,000 annually over the Project construction timeframe. When compared to the No Action alternative, this represents 0.2 percent of the total economic value of recreation benefit in the Analysis Area. Similarly, the estimated total cost in terms of value of lost time for motorists due to Alternative B would total approximately $22,484 over the total duration of the Project construction period.

Under Alternative C, the nature and type of temporary impacts would be the same as described under Alternative B, but the intensity of impacts would be reduced given that the degree of economic impacts from traffic disturbance would be reduced. Under Alternative D, the nature and type of temporary impacts would be experienced over a longer period as compared with Alternative B. For these reasons, this resource is not discussed further. Detailed analysis in this EIS is not warranted.

Environmental Justice | See detailed analysis in Section 3.8, Environmental Justice.
3. Affected Environment and Environmental Consequences (Table 3-1. Determination and Rationale for Detailed Analysis by Resource Topic)

<table>
<thead>
<tr>
<th>Resource Topic</th>
<th>Determination and Rationale for Detailed Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous Materials and Public Health and Safety</td>
<td>Hazardous Materials</td>
</tr>
<tr>
<td></td>
<td>Lead-based materials were detected at existing Hatchery infrastructure in the Analysis Area. Under the No Action alternative, there would be unavoidable adverse impacts as Hatchery employees would continue to be exposed to lead-based materials from the gatehouse and intake access pad. Hazardous materials such as used oil, diesel fuel, and solvent-based paints may be used in construction under the action alternatives. All hazardous materials used during construction under the action alternatives would either be recycled or disposed of at an appropriately permitted treatment or disposal facility. Lead-based materials on Hatchery infrastructure would be removed in accordance with CFRs and safety regulations. BMPs would help to reduce to negligible levels or eliminate impacts related to hazardous materials. For these reasons, this resource is not discussed further. Detailed analysis in this EIS is not warranted.</td>
</tr>
<tr>
<td>Public Health and Safety</td>
<td>See detailed analysis in Section 3.9, Public Health and Safety.</td>
</tr>
<tr>
<td>Tribal Interests</td>
<td>See detailed analysis in Section 3.10, Tribal Interests.</td>
</tr>
</tbody>
</table>


3.3 Water Resources

3.3.1 Analysis Area
For water resources (stream geomorphology and water quality), the Analysis Area is where proposed Project activities would occur along the Icicle Creek corridor. It stretches from the hydraulic drop approximately 230 feet upstream from the LNFH intake facilities to RM 2.3 at the Ecology compliance point on Icicle Creek, downstream from the LNFH, and includes the Hatchery Channel and the Historical Channel (Map 3-1 in Appendix A).

3.3.2 Affected Environment
The nearly 80-year-old LNFH surface water intake and delivery system is rapidly deteriorating and is reaching the end of its expected service life, creating excessive operation and maintenance problems for the LNFH. The current diversion system on Icicle Creek, at RM 4.5, consists of a concrete rubble dam and modified intake. Upgrades have been retrofitted into the existing older system; for example, the original wood stave conveyance pipeline was replaced in the 1960s. Operation of the system is complicated by large accumulations of silt and sediment during spring runoff. In addition, during harsh winter conditions, intake water can be cut off or reduced due to massive frazil and anchor ice accumulation on the existing intake racks. Ice may also form upstream and/or downstream of the intake racks. The removal of this ice is required to maintain proper water supply to the LNFH (Reclamation 2020b).
The current diversion system is in a confined canyon and channel width is limited. A rapid\textsuperscript{33} exists about 1,000 feet upstream of the diversion pool\textsuperscript{34} that creates a natural break in the extent of the backwater pool. Immediately downstream of the existing low-head diversion dam, a natural boulder drop of about 2 to 3 feet is present with a deep 3-foot scour hole formed from the hydraulic drop\textsuperscript{35} over the boulders. The channel profile consists of numerous runs\textsuperscript{36} and riffles\textsuperscript{37} with occasional shallow pools. The channel bed consists of large boulders and bedrock armor with sand, gravel, and cobble deposits. The hydrology and sediment characteristics of Icicle Creek are described in further detail in \textit{Surface Water Intake Screening and Fish Passage 2D Hydraulic Modeling} and incorporated by reference (Reclamation 2020d).

The largest portion of the incoming sediment load to the diversion structure is estimated to be sand to fine gravel, with a small portion being larger gravels and cobbles. The channel bed is visibly composed of large cobbles and boulders in rapids, with sand and gravels present in pools and on sediment bars and low floodplain. Channel margins often contain pockets of fine sediment (silt and clay) and fine sand deposited in between the exposed boulders (Reclamation 2020d).

As described in the \textit{Icicle Strategy} (Chelan County and Ecology 2019), designated uses for various locations in Icicle Creek are aquatic life uses, recreational uses, water supply uses, and miscellaneous uses. Potential sources of water quality degradation include flow diversion, stormwater runoff from adjacent roads and developed areas, point-source discharges from water treatment plants and other facilities, non-point-source pollutants from septic systems, and recreational uses. Water quality parameters affected by pollutants from these sources include temperature, dissolved oxygen, pH, turbidity, nutrients, fecal coliform bacteria, and concentrations of various pollutants, including heavy metals and organic compounds (Chelan County and Ecology 2019).

Chapter 173-201A WAC contains water quality standards for surface waters of the state of Washington. Waters whose designated uses (listed in WAC Sections 173-201A-200, 173-201A-600, and 173-201A-602) that are impaired by pollutants are placed in the polluted water category (Category 5) of the water quality assessment (Ecology 2020a). The 303(d) list contains waters in the polluted water category. TMDLs or other approved water quality improvement projects are required for waterbodies with Category 5 impairments (Ecology 2020b). A TMDL is a numerical value that represents the highest amount of a pollutant a surface water body can receive and still meet the standards (Ecology 2020c).

Sections 303(d) and 305(b) of the CWA require states to identify and characterize waters that do not meet, or are not expected to meet, applicable water quality standards. The Washington State water quality standards applicable to Icicle Creek are as follows (Reclamation and USFWS 2018):

---

\textsuperscript{33} A section of a river or creek where the water moves very fast, often over rocks.

\textsuperscript{34} A body of water of varying depth that shares the characteristics of slow-moving water. Pools often form behind dams or after the vertical force of water falling over logs or rocks carves out a deep spot in the stream.

\textsuperscript{35} A term used to describe a rapid change that occurs in the depth of channel water. A hydraulic drop occurs when the depth goes from a high stage to a lower stage.

\textsuperscript{36} Deep fast water and little to no turbulence.

\textsuperscript{37} Shallow, turbulent water running over rocks.
3. Affected Environment and Environmental Consequences (Water Resources)

- Temperature: 55 degrees Fahrenheit (13 degrees Celsius) from August 15 to July 15 and 61 degrees Fahrenheit (16 degrees Celsius) from July 15 to August 1538.
- Turbidity: To protect core summer salmonid habitat, the maximum turbidity shall not exceed 5 nephelometric turbidity units (NTUs) over background when the background is 50 NTUs or less; or a 10 percent increase in turbidity when the background turbidity is more than the 50 NTUs.
- Ecology completed a TMDL for the Wenatchee River watershed, including Icicle Creek, for dissolved oxygen and pH, which was approved by the EPA on August 25, 2009:
  - Phosphorus: The TMDL allocates 5.7 micrograms per liter (maximum daily total phosphorus concentration) and 0.52 kilograms per day of total phosphorus maximum daily mass loading during the critical periods of March through May and July through October to the LNFH. Construction activities may need a separate NPDES permit than what the LNFH operates under. If needed, this would be obtained by the construction contractor.
  - Dissolved oxygen: To protect core summer salmonid habitat, the 1-day minimum dissolved oxygen criterion is 9.5 milligrams per liter and should not fall below this concentration frequency more than once every 10 years on average.
  - pH: pH shall be within the range of 6.5 to 8.5 standard units, with a human-caused variation within the above range of less than 0.2 units.

3.3.3 Environmental Consequences

Actions associated with the alternatives are described in Chapter 2 of the EIS. Also, proposed Project features are described in Surface Water Intake Screening and Fish Passage 2D Hydraulic Modeling and incorporated by reference (Reclamation 2020d).

Indicators and Assumptions

The indicators for identifying impacts on water resources relative to the baseline conditions are the following:

- Changes to stream geomorphology
- Increase or decrease to water quality standards (for temperature, dissolved oxygen, pH, and turbidity) outlined in Chapter 173-201A WAC
- Compliance with the TMDL at Ecology monitoring point at RM 2.3

The following analysis assumption was used in the water resources analysis:

- An application for a water right is not needed for this Project, nor will there be a change in the point of diversion, and no water rights held for the LNFH or its neighbors will be impacted by any action under the alternatives.

Additional Project assumptions used in the analysis are described in Appendix C, SWISP Project EIS Analysis Assumptions.

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38 Natural water temperatures for Icicle Creek often exceed the limits set in the TMDL.
3. Affected Environment and Environmental Consequences (Water Resources)

**Alternative A – No Action Alternative**

Under Alternative A, there would be no new proposed projects that would affect stream geomorphology or water quality. There would continue to be surface disturbances for O&M within the 100-year floodplain and Icicle Creek affecting approximately 0.02 acres under Alternative A (Reclamation GIS 2020; see Table 2-4; this is a subset of acres of permanent disturbance in the Phase I construction area). During cold weather, ice accumulation at the intake and subsequent alterations in water flow would continue, which would continue to affect stream geomorphology, such as through sedimentation. Throughout the year, sedimentation affects the intake and conveyance structures, which can reduce effective water delivery. Accumulation of sediment in the intake channel and associated O&M needs would continue. Sediment would continue to be removed from the creek, thereby removing it from its contribution to stream geomorphology and stream conditions. When needed, the outlet channel would continue to direct bypassed water and sluice material (sediment) from the gatehouse back to Icicle Creek. Because ongoing operations would continue with existing conditions, there would be no change in compliance with water quality standards (for temperature, dissolved oxygen, pH, and turbidity) outlined in Chapter 173-201A WAC.

**Alternative B – Proposed Action**

Surface disturbances within the 100-year floodplain and Icicle Creek would affect 0.78 acres under Alternative B (Reclamation GIS 2020; see Table 2-4; this is a subset of acres of temporary disturbance in the Phase I construction area), an increase of 0.76 acres compared with Alternative A because of construction activities. Approximately 0.51 acres would be permanent disturbance because of new infrastructure in the 100-year floodplain and Icicle Creek. None of the new infrastructure would be of a configuration or height that would alter water flow during a 100-year flood in such a manner as to threaten downstream conditions.

Temporary in-stream impacts would occur during the use of cofferdams (see the Temporary Cofferdam heading in Section 2.4.2, Alternative B – Proposed Action and Figure A-14 in Appendix A). Appendix B, Environmental Commitments and Best Management Practices, contains BMPs that would be implemented to minimize impacts on stream geomorphology during construction.

Preparation of the streambed, and placement and removal of the cofferdams would mobilize sediments on the Icicle Creek streambed. This could increase turbidity in and downstream of the work area during and shortly after cofferdam placement or removal. This impact would be minimized because cofferdams would be placed and removed by land-based equipment working from above the Icicle Creek OHWM or within a dewatered work area isolated from Icicle Creek live water by another cofferdam. Further, Reclamation would monitor and collect water samples to measure potential increases in turbidity to ensure compliance with Water Quality Standards for Surface Waters (WAC 173-201A) during cofferdam placement and removal.

Also, the cofferdams would confine surface water flow through a constricted portion of Icicle Creek during construction. Natural stream flow, excluding the temporary 40 cfs diversion to the Hatchery, would be maintained within the greatest amount of natural streambed width as possible during the use of the cofferdams. A minimum depth of 0.8 feet would be maintained within the greatest amount of the natural stream channel during the use of the cofferdams to facilitate fish passage.
The cofferdam design is estimated to be approximately 12-feet wide at the base with a tapered width as it rises to approximately 9 feet. Cofferdam configurations (shown in Figure A-14 in Appendix A) and height are modeled for a July through October construction timeframe in *Surface Water Intake Screening and Fish Passage 2D Hydraulic Modeling* and are incorporated here by reference (Reclamation 2020d). The hydraulic modeling informs height requirements to prevent overtopping and identifies high velocity areas that may require additional stabilization to prevent breaching failure from lateral erosion.

Cofferdams would be used between July 1 and November 15 for two separate construction seasons to complete Phase I construction. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to November 15 would be an exception to the general and approved in-water work window. Typically, mean daily flows peak during snowmelt months in late spring (May to June) and can drop quite low for autumn months (September to December) (Reclamation 2020d). Changes to stream geomorphology from cofferdam use would be minimized during autumn months because of low flow conditions.

High flows generally occur in May and June, but winter months can have high flows or extensive snow and ice conditions. Occasionally peak annual floods have occurred in July and October, which may require adjustment to the start and completion date for a given construction year (Reclamation 2020d). As flow in the creek increases, more water is forced to flow through a constricted portion of Icicle Creek during construction. The rapid flow through a confined area can scour the creek bed or creekbank. Snow and ice can block water flow; this would be more likely to occur in confined areas.

Floods would also be a concern for inundating areas and overtopping a cofferdam. Geo-bag cofferdams would not be suitable for use in Icicle Creek during heavy or prolonged precipitation or rain-on-snow events that typically occur between November and April, or during typical flows resulting from spring runoff in May and June. The possibility of flash-flooding events in Icicle Creek is not speculative; analysis of long-term flow data indicates a 50 percent probability that mean daily flow rates can more than double during fall flash-flow events, and increase by an order of magnitude during certain spring runoff events (Reclamation 2020d). Cofferdams are proposed for use from July 1 to November 15 of each of the two Phase I construction seasons, thus there is the potential for overtopping in early November, depending on the precipitation events.

Both typical and unpredictable high-flow events would have the potential to dislodge or destroy geo-bag cofferdams. Further, cofferdam failure during high flows could release tons of rock into Icicle Creek, and a plume of accumulated sediment. Depending on the volume and type of material released, there could be long-term changes to the Icicle Creek streambed, primarily by increasing the proportion of sands, gravels, and fine sediments. The potential for detrimental changes to the streambed in the case of cofferdam failure would be reduced by BMPs (Appendix B) requiring cofferdams to utilize clean, round river rock (known as a stream mix). Further, cofferdam failure could expose uncured concrete to water in Icicle Creek. Concrete is highly alkaline (pH 12.5). If concrete were cast less than four days before cofferdam failure, the leaching of alkali from the uncured concrete would likely result in increases to both the pH and phosphorus levels in Icicle Creek, which could also lead to a violation of the pH and phosphorus TMDLs.
During construction, open trench work would occur next to Icicle Creek. This would involve removing trees adjacent to Icicle Creek during Phase I and Phase II. Activities that modify the amount of shade over streams have been associated with increases in water temperature. The loss of riparian vegetation can be directly linked to increased water temperatures due to the loss of shade. Also, the solubility of oxygen decreases as water temperature increases. The precise number of mature riparian trees that would be removed is unknown, but it is likely that no fewer than six trees would be removed during Phase I construction, and additional trees would be removed during Phase II construction. As a result, tree removal under Alternative B could contribute to increased water temperature and lower dissolved oxygen. To address this, Phase III would involve planting riparian trees and shrubs (see Appendix D). These impacts would persist until riparian trees and shrubs matured.

During operation and maintenance, compared with Alternative A, the intake design would manage sediment deposition to prevent accumulation of sediment that would impede or bury the NMFS-compliant fish screens at the intake location. It would also manage debris including large logs that may be transported into the site and impact fish passage or intake operations. This would allow sediment and logs to remain in the creek and contribute to stream conditions and greatly reduce effects to intake operations.

Arrangement of bed materials would demonstrate similar channel complexity to the adjacent stream reaches. The cap of the existing low-head diversion dam would be removed or buried, and the channel would be recontoured to promote fish passage and the movement of sediment from above the intake to downstream areas, thereby improving stream flow and stream conditions. Also, because the site uses a constructed roughened channel, an annual (at a minimum) monitoring plan at least until after a 50-year stream flow event has occurred would be prepared and implemented. This would identify any stream geomorphology concerns, such as accumulation of sediment exceeding levels that cannot be managed by proposed intake and delivery system design. Such cases would be considered extraordinary maintenance and would continue to be handled on a case-by-case basis as determined to be necessary by the Hatchery.

During construction, surface disturbances and equipment use in and adjacent to Icicle Creek could result in contaminants entering the creek and affecting the quality of the water. Construction would occur within the area isolated by the cofferdam and adjacent to the creek, above the OHWM. This would involve the use of equipment containing lubricants, fuel, or other substances, that could contaminate creek water if, for example, these materials were deposited on the ground during construction work and carried to the creek by surface water runoff. Surface water runoff could also carry soil into the creek from areas where the soil surface is disturbed during construction work, thereby increasing turbidity downstream in the creek.

Under Alternative B, increases or decreases to water quality concentrations or limits as they relate to the state standards and construction permit limits would be addressed by complying with the following permits or approvals:

- CWA Section 401 from Ecology
- CWA Section 404 from the USACE
- Hydraulic Project Approval from WDFW
Water quality would continue to be monitored during construction at the LNFH by the USFWS. Compliance with TMDLs for the LNFH would be monitored at RM 2.3, Ecology’s TMDL monitoring site, to verify that construction at the intake is not exceeding TMDL limitations; exceedance of the TMDLs is not expected to occur. Additionally, BMPs in Appendix B, Best Management Practices, would be implemented to minimize impacts on water quality. Lead-containing materials on Hatchery infrastructure would be removed and disposed of in accordance with CFRs and associated safety regulations.

Cement is rich in calcium and contains aluminum and iron. All three can readily bind phosphorus. The TMDL indicates phosphorus is the limiting nutrient in Icicle Creek and the nutrient tied to pH levels. Concrete used for proposed in-water infrastructure would be cured in place behind cofferdams for at least four days before exposure to Icicle Creek water. Similarly, because work to break apart and remove large boulders from the intake construction area would be done behind cofferdams, freshly fractured rock would not be expected to contribute phosphorus to Icicle Creek water. This would guard against fresh concrete or broken rock increasing phosphorus in surface water, especially during the critical periods of March to May and July to October.

In addition to Alternative B, other plans, and projects in or near the Analysis Area would affect water resources, including water quality parameters, stream geomorphology, and riparian zone conditions in the long term. These include the Trout Unlimited Icicle Creek Boulder Field Fish Habitat Improvement Project (including relocating and replacing the City of Leavenworth water supply pipeline and fish screen, replacing and relocating the Icicle/Peshastin Irrigation District’s fish screens, and improving fish passage at the Icicle/Peshastin Irrigation District and City of Leavenworth diversion dam and at the boulder field), and continued implementation of the Recovery Plan for Upper Columbia River Spring Chinook Salmon and Steelhead, the USFWS Bull Trout Recovery Plan, and the Icicle Strategy. Effect type and intensity would vary by project; generally, projects involving in-water or streamside construction would temporarily degrade water quality parameters and riparian zone condition, and projects improving fish passage and habitat conditions would improve stream geomorphology and riparian zone condition.

**Alternative C**

The impacts under Alternative C on stream geomorphology and water quality would be similar to those under Alternative B, except Alternative C would remove fewer streamside trees that shade Icicle Creek, so the potential for increased water temperature and lowered dissolved oxygen would be reduced compared to Alternative B. As under Alternative B, it is likely that no fewer than six trees would be removed during Phase I construction. Reclamation estimates that approximately four times as many trees would be removed during Phase II construction under Alternative B compared with Alternative C.

**Alternative D**

The nature and type of impacts on stream geomorphology and water quality under Alternative D would be the same as those described under Alternative B; however, under Alternative D, Phase I construction would span four in-water work windows as compared to two under Alternative B, because construction would be limited to 7:00 a.m. to 10:00 p.m. and the in-water work window would be two weeks shorter (July 1 to October 31). July 1 to August 15 is the approved in-water
work window for Icicle Creek (USACE 2018). Extending the in-water work window to October 31 would be an exception to the general and approved in-water work window. Phase I construction would start in 2022 and end in 2025. As such, temporary impacts to stream geomorphology and water quality would be experienced over a longer total duration than under Alternative B.

Installation and removal of cofferdams would be required for each of the four Phase I construction in-water work windows (July 1 to October 31). For comparison, under Alternative B, installation and removal of cofferdams would be required for only two Phase I construction in-water work windows (July 1 to November 15). The types of impacts from cofferdam use would be the same as those described under Alternative B, but they would span two more in-water construction seasons. Additionally, due to the shorter in-water work window, Alternative D would reduce the potential for geo-bag cofferdams to be dislodged or destroyed due to high-flow events potentially occurring in November.

From November 1, 2022 to June 30, 2023, the Hatchery’s surface water would be supplied by pumping from the spillway pool. Two high capacity diesel-powered pumps would be used to provide 40 cfs of water to the Hatchery, with an additional back-up pump on site. Although long-term reliable delivery of water and the ability to meet Hatchery production goals would be improved under this alternative; there would be a risk of temporary impacts to Hatchery production from relying on pumps operating continuously for eight months from 2022-2023. Pumping water from the spillway pool would recirculate Hatchery effluent water, as the pool is the location of the Hatchery’s main discharge point. Over time, without water treatment, water quality reaching the Hatchery would be decreased.

3.4 Fisheries, including Special Status Species and Aquatic Ecosystems

3.4.1 Analysis Area
The Analysis Area for fisheries, including special status species and aquatic ecosystems, includes the area below the OHWM of Icicle Creek, from 230 feet upstream of the intake construction area at RM 4.5, to Ecology’s compliance monitoring location at RM 2.3, downstream of the LNFH (see Map 3-1 in Appendix A).

3.4.2 Affected Environment

Aquatic Habitat
Icicle Creek is a snowmelt-fed, 31.8-mile-long, fourth order tributary of the Wenatchee River (USFWS 2011). The measured flow in Icicle Creek ranges from a minimum of 44 cfs to a maximum of 14,100 cfs, according to readings taken from the U.S. Geological Survey gauging station (No. 12458000) at RM 5.8, located above all major water diversions (Reclamation and USFWS 2018, pp. 43–49). The discharge of Icicle Creek is altered by water diversions, which can reduce the flow in the lower reaches to very low levels during summer and early fall. Near the LNFH, Icicle Creek splits to form the Hatchery Channel and the Historical Channel of Icicle Creek. The Hatchery and Historical
3. Affected Environment and Environmental Consequences (Fisheries, including Special Status Species and Aquatic Ecosystems)

Channels split at Structure 2 (RM 3.8) and rejoin one another at RM 2.8 (Map 3-1 in Appendix A). The Hatchery Channel is a human-made, straight channelized section of this creek segment.

Icicle Creek is characterized by steep slopes on both banks. Vegetation on the banks of both the Historical and Hatchery Channels of Icicle Creek is primarily upland vegetation and shrub habitat (USFWS 2016). Thus, aquatic habitat within the channels essentially transitions to upland habitats with no intermediate riparian zone or floodplain. When combined with high water fluctuations throughout the year, this limits establishment of mature riparian vegetation. Although freshwater wetlands have been documented in the vicinity and are associated with the Historical Channel (see Section 3.2.1 of the SWISP Project EIS Biological Resources Report), there are no wetlands associated with Icicle Creek and the Hatchery Channel in the Analysis Area (USFWS 2016).

There are approximately 4.0 miles of instream (aquatic) habitat in the Analysis Area. Instream habitat includes the combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources (WDFW 2008).

In its entirety, Icicle Creek provides important, high quality, and relatively undisturbed instream habitat for a variety of anadromous and resident fish. However, aquatic habitat quality in lower Icicle Creek (which includes the Analysis Area) is considered impaired due to previous land uses, such as forestry practices, private land development in the historical floodplain and riparian zone, roads, and agriculture. The installation of dams and diversions have created passage barriers, decreased flows, altered in-stream morphology and floodplain function, degraded water quality, and caused overall instream habitat degradation (Chelan County and Ecology 2019; NMFS 2017a).

Current streamflow in Icicle Creek during low flow periods is too low for reliable fish passage at the low-head diversion dam or fish ladder/sediment sluice and reduces habitat availability (Reclamation 2020d). The construction of LNFH and continued development in the Icicle Creek basin has exacerbated aquatic habitat and fish passage issues (Chelan County and Ecology 2019; NMFS 2017a). Two instream structures (Structure 2 [RM 3.8], and Structure 5 [RM 2.9]) are used during Hatchery operations and broodstock collection. Operation of these structures periodically limits fish passage on Icicle Creek. Currently, operation of Structures 2 and 5 may limit fish passage during spring and early summer when broodstock collection for LNFH is occurring (beginning as early as June 3). Structure 5 is closed once a 50-fish "trigger" has been hit or low Chinook returns warrant a closure. This also prohibits non-Hatchery fish from moving upstream of LNFH during this time. Until such time, Structure 5 would remain open to fish passage (NMFS 2017a). Structure 2 and Structure 5 would be reopened by June 24, restoring passage opportunities between RM 2.9 and 3.8 (USFWS 2011).

Operation of Structure 2 can also limit passage by decreasing flows in this reach when the gates are closed to divert water into the Hatchery Channel (Chelan County and Ecology 2019). The Icicle Creek Boulder Field at RM 5.6, upstream of the Analysis Area, also serves as a natural barrier under typical flow conditions, and, thus, limits fish passage above the Analysis Area reach. At the existing intake facilities, the low-head diversion dam diverts water from Icicle Creek to the intake channel, through an unscreened diversion. The diversion sediment sluice has been modified to function as a
fish ladder; however, fish passage is impeded because current flows at the fish ladder/sediment sluice do not meet NMFS guidelines for fish attraction. Fish passage is impeded during low flows in particular. Entrainment of anadromous and resident fish occurs at the existing unscreened intake facilities.

Icicle Creek within the Analysis Area has very steep banks, which limit riparian cover and does not provide much access to slow moving pools with overhanging banks for fish to feed or rest. Stream velocities and substrate limit production of the macroinvertebrate community and do not offer significant foraging opportunity for fish species. Suitable spawning gravel/cobble patches and substrate are not common within the Analysis Area, and much of the substrate is embedded with fine sediment or armored making it unsuitable spawning habitat for ESA-listed species (USFWS 2005).

Climate change effects (e.g., elevated temperatures and changes in precipitation patterns) are expected to shift the hydrograph so peak flows occur earlier in the year, with low flow periods spanning more of the summer months. These changes in streamflow are expected to impact aquatic habitat conditions and fish passage (Chelan County and Ecology 2019). Also, water temperature may increase as water input from snowmelt decreases, and input from rain increases, due to climate change.

**Hatchery Fish Production History**

Over the years, the LNFH production program has included a variety of species, including Spring and Summer Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*Oncorhynchus kisutch*), Steelhead, Sockeye Salmon (*Oncorhynchus nerka*), and various resident salmonids. The LNFH currently rears only the “Carson lineage” stock of the Spring Chinook Salmon and targets a release of 1.2 million Spring Chinook Salmon smolts into Icicle Creek (at approximately RM 2.7) during mid-April. Production goals at LNFH are set by the Columbia River Fish Management Plan under *U.S. v. Oregon* Management Agreement (Agreement Parties 2018). The migration corridor for LNFH-produced smolts and returning adult fish is approximately 489 RMs (RM 2.8 of Icicle Creek, RM 26 of the Wenatchee River, and RM 460 of the Columbia River). Adult salmon returning to the LNFH in excess of brood stock needs support a Tribal fishery at and just downstream of the spillway pool at RM 2.8, and a sport fishery from approximately RM 0 to RM 2.7 in Icicle Creek. For more information regarding the Tribal fishery, see Section 3.10, Tribal Interests.

**Fish and Aquatic Species**

Salmonid species in the Analysis Area are Hatchery-reared Spring Chinook Salmon, Hatchery-reared Coho Salmon, Steelhead, Sockeye Salmon, Bull Trout (*Salvelinus confluentus*), nonnative Brook Trout (*Salvelinus fontinalis*), Westslope Cutthroat Trout (*O. clarki lewisi*), Redband Trout (*O. mykiss gairdneri*), Mountain Whitefish (*Prosopium williamsoni*), and Rainbow Trout (*O. mykiss*). Genetically identical to Steelhead, Rainbow Trout exhibit a non-migratory resident life history. Native non-salmonids are also present in Icicle Creek, such as dace (*Rhinichthys* spp.), lamprey (*Lampetra* spp.), sculpin (*Cottus* spp.), and suckers (*Catostomus* spp.) (NMFS 2017a).
3. Affected Environment and Environmental Consequences (Fisheries, including Special Status Species and Aquatic Ecosystems)

**Special Status Species**

ESA-listed fish that may inhabit the Analysis Area are Bull Trout, Upper Columbia River Spring-run Chinook Salmon, and Upper Columbia River Steelhead. Additionally, designated foraging, migrating, and overwintering critical habitat for Bull Trout and designated critical habitat for Upper Columbia River Steelhead occur in the Analysis Area (USFWS 2010; NMFS 2016). These species are briefly described below. More detailed information on the status and trends of these listed resources, and their biology and ecology, can be found in the species’ recovery plans (UCSRB 2007; USFWS 2015) and 5-year reviews published in the *Federal Register*, as well as in the SWISP Project Biological Assessment (Reclamation 2020e).

The USFWS listed all U.S. populations of Bull Trout as a threatened species under the ESA in 1999 (64 *Federal Register* 58910, November 1, 1999). The Bull Trout’s current range includes the Columbia River and Snake River basins in Washington, Oregon, Montana, Idaho, and Nevada; Puget Sound and Olympic Peninsula watersheds in Washington; the Saint Mary basin in Montana; and the Klamath River basin of south-central Oregon. At the time of the listing in 1999, Bull Trout were estimated to have been extirpated from approximately 60 percent of their historical range (USFWS 2015).

Bull Trout are native to the Wenatchee River watershed (including Icicle Creek and other tributaries). Upper Icicle Creek and other headwater areas of the basin offer some of the best habitat in the Mid-Columbia region. The Wenatchee River watershed has been designated as one of 24 Bull Trout core areas in the Mid-Columbia Recovery Unit. This is one of four core areas that contain the healthiest and most stable Bull Trout populations (USFWS 2015). Bull Trout have specific habitat requirements, preferring river environments with cold water temperatures (often less than 54 degrees Fahrenheit [12 degrees Celsius]); complex stream habitat with deep pools, overhanging banks and large woody debris; and connectivity between spawning and rearing areas and downstream foraging, migration, and overwintering habitats (USFWS 2015). Populations are isolated to headwater areas by downstream conditions that are too warm for incubation and early rearing (USFWS 2015).

Most of the Icicle Creek population of Bull Trout are resident; they spawn and rear in tributaries upstream of the Analysis Area and mature and forage throughout Icicle Creek, including in the Analysis Area. They could be present in the Analysis Area year-round. A small percentage of the population (15 to 20 percent) may migrate long distances to other subbasins of the Columbia River for foraging or overwintering, returning to spawning areas annually every few years. Bull Trout from other core areas also migrate to Icicle Creek for foraging and refuge habitat in and upstream of the Analysis Area. Most populations in the Wenatchee River Watershed spawn from mid-September to mid-October (USFWS 2015). However, there is no spawning or rearing habitat for Bull Trout in the Analysis Area, nor are there records of Bull Trout redds39 in the Analysis Area (unpublished data on file with the USFWS Mid-Columbia Fish and Wildlife Conservation Office).

The main threats to Bull Trout are habitat destruction, modification, fragmentation, or curtailing (e.g., dewatering, sedimentation, thermal modification, water quality degradation) due to land and

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39 Riverbed hollows made and used by fish for spawning.
water management activities and isolation and habitat fragmentation due to fish passage issues and impaired connectivity. In the Analysis Area, Bull Trout spawning and rearing habitat is limited in late summer and early fall because of low in-stream flows in some years (see Table 3-2). Entrainment is also an issue; in the 2017 NMFS Biological Opinion (NFMS 2017a), the NMFS required LNFH to provide entrainment protection (NMFS-compliant fish screens) and fish passage for anadromous fish, which would also benefit Bull Trout.

Designated Bull Trout foraging, migrating, and overwintering critical habitat includes all areas of Icicle Creek in the Analysis Area that are accessible to Bull Trout (75 Federal Register 63897). The critical habitat designation for Bull Trout applies only to the stream channel, as defined by its OHWM by the USACE at 33 CFR 329.11. The critical habitat designation does not extend to the floodplain or the adjacent land (USFWS 2010).

Table 3-2. Current Listed Fish Habitat Limitations on Lower Icicle Creek

<table>
<thead>
<tr>
<th>River Mile(^1)</th>
<th>Affected Species/Life Stage</th>
<th>Months When Target WUA(^2) Not Achieved (Average Year)</th>
<th>Months When Target WUA Not Achieved (Low-Flow Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2–2.4</td>
<td>• Steelhead rearing • Bull Trout rearing/foraging</td>
<td>• Late July–October • None</td>
<td>• Mid-June through October • September through October</td>
</tr>
<tr>
<td>2.7–3.9 (Historical Channel)</td>
<td>• Steelhead rearing/Bull Trout rearing</td>
<td>• None</td>
<td>• Mid-June through October</td>
</tr>
<tr>
<td>3.9–4.5</td>
<td>• Steelhead rearing/Bull Trout rearing</td>
<td>• Early August to late October</td>
<td>• Early to mid-April and mid-June through October</td>
</tr>
<tr>
<td>6.0–9.1</td>
<td>• Steelhead rearing/Cutthroat Trout rearing/Bull Trout rearing</td>
<td>• September</td>
<td>• No Data</td>
</tr>
</tbody>
</table>

Source: Chelan County and Ecology 2019

Notes:

\(^1\)Analysis Area includes RM 2.3–4.5

\(^2\)Weighted Usable Area (WUA): A quantity that can be used to describe the spatial habitat area of a specific fish species for a particular life stage

Upper Columbia River Steelhead was listed as an Endangered species under the ESA in 1997 (62 Federal Register 43937, August 18, 1997) and reclassified to Threatened in 2006 (71 Federal Register 833, January 5, 2006). Upper Columbia River Steelhead exhibit complex life histories. Adults return to the Columbia River in the late summer and early fall. A portion of the returning run overwinters in the mainstem reservoirs, passing over the Upper Columbia River dams in April and May of the following year. Spawning occurs in the late spring following entry into the river. Steelhead currently spawn and rear in the Wenatchee River between Tumwater Canyon and Nason Creek, the Chiwawa River, and in Nason, Icicle, Peshastin, Chumstick, and Mission creeks (UCSRB 2007). Most Steelhead spawning in the wild are hatchery fish. Juvenile Steelhead generally spend one to three
years rearing in freshwater before migrating to the ocean, and most adults return to the Upper Columbia River after one or two years at sea (UCSRB 2007). Redds for Upper Columbia River Steelhead have been identified in the Analysis Area within the Historic Channel and Lower Icicle Creek (see Map 3-1 in Appendix A) (unpublished data on file with the USFWS Mid-Columbia Fish and Wildlife Conservation Office).

Upper Columbia River Steelhead critical habitat occurs in the Analysis Area. It is designated in the upper Wenatchee River and lower mainstem areas, as well as the tributaries above and below Tumwater Dam, including Icicle Creek. These waterbodies serve as major migration, spawning, and rearing areas for adults and juveniles (NMFS 2005).

The Upper Columbia River Spring-run Chinook Salmon evolutionarily significant unit (ESU) was listed as Endangered in 1999 (64 Federal Register 14308, March 24, 1999). Spring Chinook Salmon broodstock used in the LNFH program are not included in an ESA-listed ESU. Little natural production from the native Spring Chinook population is thought to occur in Icicle Creek (NMFS 2017a; UCSRB 2007). Although Spring-run Chinook Salmon critical habitat is designated in the upper and lower mainstem Wenatchee River, including tributaries above Tumwater Dam that serve as major migration, spawning, and rearing areas for adults and juveniles, none occurs in the Analysis Area. The Analysis Area is designated as EFH for both Chinook and Coho Salmon (NMFS 2017a).

Spring-run Chinook Salmon enter the Upper Columbia tributaries from April through July; spawning occurs in the late summer, peaking in mid to late August. Juvenile Spring-run Chinook Salmon spend a year in freshwater before migrating to salt water in the spring of their second year of life, and most return as adults after two or three years in the ocean (UCSRB 2007). Primary spawning areas of Spring-run Chinook Salmon in the Wenatchee subbasin include Nason Creek and the Chiwawa, Little Wenatchee, and White rivers (UCSRB 2007). Spawning also occurs in Icicle Creek, and these spawners are believed to be primarily returns from LNFH. Between 2014 and 2019, Spring-run Chinook redds were observed and counted. Redds were observed in the Historical Channel and near the existing intake facilities (unpublished data on file with the USFWS Mid-Columbia Fish and Wildlife Conservation Office).

Natural spawning of native anadromous fish in Icicle Creek has been reduced from historical conditions as a result of habitat degradation, including flow diversions, and overfishing. Historical barriers to upstream passage, including historical LNFH infrastructure, also have limited natural anadromous fish spawning to the lower 2 RMs of Icicle Creek until improvements to fish passage were made in recent years (Chelan County and Ecology 2019). Current streamflow in Icicle Creek during low flow periods (late summer and early fall) is too low for reliable fish passage at the low-head diversion dam or fish ladder/sediment sluice and reduces habitat availability (Reclamation 2020d; Chelan County and Ecology 2019).

Habitat degradation and loss is a major threat to the listed fish species described above. These are a lack of habitat diversity (e.g., pools and spawning areas, riparian vegetation) and quantity, excessive sediment load, anthropogenic barriers, a lack of channel stability, low flows, and high summer temperatures (NMFS 2016). Specific areas of concern regarding habitat conditions in the Analysis Area are passage conditions and upstream passage barriers in Icicle Creek at LNFH and the boulder...
3. Affected Environment and Environmental Consequences (Fisheries, including Special Status Species and Aquatic Ecosystems)

Several Washington State Priority Species are found in the Analysis Area. These are the described ESA-listed salmon and trout species, Pacific Lamprey, Mountain Sucker, Leopard Dace, and Umatilla Dace (WDFW 2008).

3.4.3 Environmental Consequences

Indicators and Assumptions

The indicators for fisheries, including special status species and aquatic ecosystems are as follows:

- Changes to habitat quantity, including spawning habitat (count of redds), EFH (miles), and critical habitat (miles)
- Changes to habitat quality (connectivity/fish passage, water quality (temperature, dissolved oxygen, pH, and turbidity, total phosphorus), and geomorphology)
- Potential for disturbance, injury, or mortality of aquatic wildlife

The following analysis assumptions were used in the analysis:

- Impacts on fish and aquatic resources are directly related to changes within aquatic habitats.
- BMPs will limit impacts on fish and aquatic resources.
- Conservation measures for ESA-listed fish species will be developed under Section 7 consultation and would reduce impacts to most fish and aquatic species.
- Successful installation and utilization of NMFS-compliant screening will reduce take of ESA-listed fish species.
- Successful completion of the roughened channel and low-flow boulder weir fishway will facilitate and improve fish passage for all aquatic species over a greater range of flows.
- Mobile special status fish species would move away from direct, short-term disturbances to nearby higher quality habitat during Project activities.

Additional Project assumptions used in the analysis are described in Appendix C, SWISP Project EIS Analysis Assumptions. Impacts to ESA-listed fish species are included in the impact analyses below.

Alternative A – No Action Alternative

The No Action alternative represents the continuation of the current operations of the LNFH surface water intake and delivery system as well as ongoing O&M activities. Continuing O&M under the No Action alternative would not fulfill the requirements of the 2017 NMFS Biological Opinion (NMFS 2017a). This is because continued operation of the LNFH under the baseline condition would leave the existing fish ladder/sediment sluice and low-head diversion dam in place. The fish ladder/sediment sluice would not be modified to alter flow or enhance fish passage and current regulatory criteria would not be met. Current flows at the fish ladder/sediment sluice would continue to not meet NMFS guidelines for fish attraction. Therefore, these pieces of infrastructure...
would continue to limit habitat quality (connectivity) by inhibiting ESA-listed species passage within the Icicle Creek aquatic ecosystem during low flows (see Table 3-2).

The No Action alternative would also leave the existing unscreened diversion and conveyance pipeline in place. This continued operation of infrastructure would maintain the current potential for take of ESA-listed species due to entrainment and need for removal from the existing intake facilities. For example, between 30 and 63 Steelhead were removed from the existing intake facilities each year between 2009 and 2013 (Hall et al. 2014). Under existing conditions, between 2008 and 2018, 34 Bull Trout have been entrained in the surface water intake and delivery system (Potter 2019).

NMFS relied on the Hatchery and Genetics Management Plan’s description of the proposed action to complete the formal consultation with the release of the September 2017 Biological Opinion (NMFS 2017a). For this consultation to remain valid, the USFWS and Reclamation must implement the conservation actions included as part of the proposed action evaluated in the consultation. Without completing the fish screening and fish passage improvements by May 2023, the USFWS and Reclamation may be required to reinitiate consultation with NMFS.

Several assessments of LNFH facilities have noted that much of the infrastructure is nearing the end of its expected service life. Repair and improvements are needed to ensure that infrastructure failure does not result in a catastrophic loss of Hatchery facilities or fish production resources. O&M activities would continue, including daily visual inspections of existing intake facilities. Extraordinary maintenance would occur every couple of years and would be expected to continue into the future. This includes the removal of sediment from the intake channel. Failure of the diversion or water delivery system would be an emergency situation. The timing and extent of potential impacts from extraordinary maintenance or emergency repairs would depend on the nature, extent, and timing of the necessary repairs. Additionally, lead-based materials are present at existing Hatchery infrastructure; these may enter the environment causing exposure to aquatic species.

As a result of the existing infrastructure within the Analysis Area, the impacts it has on fish passage and aquatic habitat conditions would continue. These include the limitations on fish passage, habitat quantity and connectivity, and habitat quality as described in Section 3.4.2 (see Aquatic Habitat).

Under the No Action alternative, the existing intake facilities and delivery infrastructure would remain in place and continue to degrade, causing infrastructure problems for the Hatchery and causing it to become even more unreliable. For example, the conveyance pipeline would continue to degrade resulting from the sediments transported through it. This unreliability would jeopardize the Hatchery’s ability to meet the U.S. v. Oregon Management Agreement (Agreement Parties 2018) annual objectives for the LNFH to release 1.625 million Spring Chinook Salmon smolt to Icicle Creek.

Catastrophic failure of any part of the water delivery system could result in the loss of one to two years of Chinook Salmon broodstock at the Hatchery. This could result in a failure to meet U.S. v. Oregon Management Agreement (Agreement Parties 2018) mitigation requirements and would impact
the amount of fish returning annually in the out-years. Effects of catastrophic failure could last five to eight years, depending on how long Hatchery production is down to complete necessary repairs.

**Alternative B – Proposed Action**

Under Alternative B, the existing intake facilities and delivery infrastructure would be replaced and rehabilitated, improving the reliability of water delivery and the Hatchery’s ability to meet the *U.S. v. Oregon* Management Agreement (Agreement Parties 2018) annual objectives for the LNFH to release 1.625 million Spring Chinook Salmon smolts to Icicle Creek.

Alternative B would have long-term beneficial effects to fisheries, including special status fish, and aquatic ecosystems in the Analysis Area. Alternative B would provide NMFS-compliant fish screening, reducing potential for injury or mortality to fish species, including ESA-listed species, due to entrainment in the existing intake facilities. Entrainment and take of ESA-listed species would be reduced compared with existing conditions; however, entrainment and take would not be completely eliminated. This is because the screens would need to be periodically removed during certain planned events (such as during sediment sluicing) and unplanned events (such as during frazil ice events).

The low-flow boulder weir fishway would provide NMFS-compliant fish passage for anadromous salmonids during typical low flows, and the portion of the roughened channel extended upstream of the existing low-head diversion dam would facilitate fish passage overall and at higher flows in particular. This would increase connectivity of aquatic habitat in Icicle Creek, and access to high-quality aquatic habitat upstream of the Analysis Area. Improving habitat connectivity and fish passage, which is currently limited in the Analysis Area, would allow for a more complete expression of essential life history characteristics related to reproduction, feeding, rearing, and migration.

Despite localized and temporary habitat losses for expansion of the intake structure and IO&MA and for constructing the low-flow boulder weir fishway and roughened channel (described in further detail below), habitat quantity in the Analysis Area would increase overall because the roughened channel would facilitate natural sediment movement past the existing intake facilities. This would ultimately improve habitat quality downstream of the intake facilities by decreasing the amount of spawning gravels that are currently entrained in the intake facilities and lost from the Icicle Creek system, and instead retaining these gravels in Icicle Creek. This could result in increased availability of spawning habitat and number of redds of Spring Chinook Salmon, which have been observed in the Analysis Area. Corresponding beneficial effects on critical habitat for Bull Trout and Upper Columbia River Steelhead and EFH would be expected since these habitats occur in the Analysis Area.

After Phase I and Phase II construction, the woody vegetation that would be removed in the intake construction area would be reestablished by planting of native upland and riparian trees and shrubs to restore vegetation communities to pre-disturbance conditions or better. Container plantings would be installed in temporarily disturbed upland areas at the intake construction area, while riparian cuttings would be installed in the Icicle Creek riparian zone. Revegetation of riparian trees and shrubs would increase shading of Icicle Creek, improving aquatic habitat quality by buffering stream temperatures, and maintaining dissolved oxygen levels in the creek, especially during summer
months. It would also stabilize streambanks, helping to decrease erosion and sediment transport into Icicle Creek. However, there would be a delay of several years between the time trees were removed and the time planted trees became large enough to provide these benefits.

Increased fish passage and access to upstream habitat, and minimization of injury, mortality, and take of ESA-listed fish species from installing NMFS-compliant screening, would work in conjunction with other plans and projects in or near the Analysis Area to benefit fisheries, including special status fish species and aquatic ecosystems in the Analysis Area in the long term. These include the Trout Unlimited Icicle Creek Boulder Field Fish Habitat Improvement Project (including relocating and replacing the City of Leavenworth water supply pipeline and fish screen, replacing and relocating the Icicle/Peshastin Irrigation District’s fish screens, and improving fish passage at the Icicle/Peshastin Irrigation District and City of Leavenworth diversion dam and at the boulder field), and continued implementation of the Recovery Plan for Upper Columbia River Spring Chinook Salmon and Steelhead, the USFWS Bull Trout Recovery Plan, and the Icicle Strategy. These projects would increase fish passage and lower the potential for injury or mortality of aquatic species (e.g., by reducing entrainment in water diversions). For example, the Icicle Creek Boulder Field Fish Habitat Improvement Project would create accessibility to more than 26 mainstem miles of high-quality fish habitat in Icicle Creek available above the boulder field. The habitat above the boulder field includes more than 20 miles of virtually undisturbed National Forest System lands and wilderness (Trout Unlimited 2020a, 2020b).

Temporary impacts from Phase I construction would occur during the in-water work window of July 1 to November 15; two construction seasons would be needed to complete Phase I construction. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to November 15 would be an exception to the general and approved in-water work window. Although the proposed extended window would have to be approved by regulatory agencies prior to construction, working outside the approved window would increase the duration of impacts to aquatic habitat by extending the length of time that in-water work would occur. This may result in changes to the number and types of species and life stages of fish species that are present in the Analysis Area relative to the shorter, approved work window. For example, Upper Columbia River Steelhead adults return to the Columbia River in the late summer and early fall, so conducting in-water work within this window may affect more individuals than if work was restricted to the general and approved window of July 1 to August 15.

The proposed extended in-water work window would also increase the potential for injury or mortality of special status fish species. Salmon are particularly vulnerable to these effects during the fall and winter, when adults are migrating and spawning, and the extended in-water work window would overlap this sensitive period. It would also increase the potential for interference with spawning Spring Chinook Salmon or Bull Trout (which spawn in late summer and late fall, respectively). This may come about because potential spawning habitat may be unavailable to fish species, either because it was isolated behind a cofferdam or because it was removed during construction of the intake structure and IO&MA, roughened channel, or another in-stream Project component.
Species that are present in the Analysis Area in late summer through fall (in addition to those present in early summer) would be subject to impacts including changes in habitat quantity, quality, and potential for injury or mortality. Specific impacts are described in more detail below.

Potential temporary effects to habitat quality during in-water construction activities include effects to habitat connectivity and fish passage. Fish passage would be temporarily reduced because temporary cofferdams would be installed to isolate the in-water work area (see the Temporary Cofferdams heading in Section 2.4.2, Alternative B – Proposed Action, and Figure A-14 in Appendix A). At no point would the entire width of Icicle Creek be blocked, but cofferdams would temporarily reduce the effective width of Icicle Creek while installed, potentially limiting, but not completely blocking, passage opportunities. For Bull Trout, this would result in migration delays to spawning habitat upstream of the Analysis Area, and post-spawn migrations from spawning and rearing habitat to foraging, migrating, and overwintering habitat in and downstream of the Analysis Area. Effects would be minimized through BMPs (Appendix B) that require cofferdam installation maintain a minimum water depth of 0.8 feet within the greatest amount of natural streambed width as possible to facilitate fish passage while cofferdams are in place. Fish passage criteria in Icicle Creek Fish Passage Evaluation for the Leavenworth National Fish Hatchery (Anglin et al. 2013, pages 26-28) would be consulted for minimum depth and maximum velocity criteria, and attempts would be made to provide fish passage to the greatest extent practical across the natural stream channel width and hydrograph.

Because cofferdams would be in Icicle Creek beyond the low flow timeframe (lowest flows typically occur from July through September), this creates risk of cofferdam failure during high flows. High flows generally occur in May and June, but winter months can have high flows or extensive snow and ice conditions. Occasionally peak annual floods have occurred in July and October, which may require adjustment to the start and completion date for a given construction year (Reclamation 2020d). Floods would be a concern for inundating areas and overtopping a cofferdam. Geo-bag cofferdams would not be suitable for use in Icicle Creek during heavy or prolonged precipitation or rain-on-snow events that typically occur between November and April, or during typical flows resulting from spring runoff in May and June.

Cofferdam failure during high flows could release tons of rock into Icicle Creek and a plume of accumulated sediment. Depending on the volume and type of material released, there could be long term changes to the Icicle Creek streambed, primarily by increasing the proportion of sands, gravels, and fine sediments. Released materials could reduce ESA-listed fish habitat quantity or quality by burying or degrading suitable spawning substrate in Icicle Creek. Depending on the timing of cofferdam failure, released materials could bury ESA-listed fish species redds or eggs, which could be considered take under the ESA. The potential for detrimental changes to habitat in the case of cofferdam failure would be reduced by BMPs (Appendix B) requiring cofferdams to utilize clean, round river rock (known as a stream mix).

During low summer flows, constricting the stream and providing a minimum water depth of 0.8 feet would likely be an improvement over baseline water depth conditions, as the water across the width of the stream under the No Action alternative could be less than 0.8 feet deep during previous low-flow conditions.
3. Affected Environment and Environmental Consequences (Fisheries, including Special Status Species and Aquatic Ecosystems)

During Phase I, the temporary Hatchery water supply of 40 cfs via the gravity-fed bypass would divert water from Icicle Creek; however, more water would be left in Icicle Creek than under typical operations, when 42 cfs is diverted. Since this diversion rate would be less than the Hatchery’s water right diversion rate of 42 cfs, no net decrease in stream flows are expected, and there would be no decrease in instream flow or effects to fish passage.

The gravity-fed bypass intake would be unscreened, meaning that fish could be entrained in the bypass pipeline. Entrained individuals would be carried via the conveyance pipeline to the sand settling basin on the LNFH grounds. Effects of entrainment would include risk of injury due to abrasion in the pipeline, and stress and potential for injury associated with capture and salvage from the sand settling basin and return to Icicle Creek. Capture and salvage would be done according to the Terms and Conditions of the LNFH operations consultations with the NMFS and USFWS; however, handling activities, even when accomplished carefully and efficiently, are likely to result in some adverse effects, including stress, of all fish handled.

Potential effects to aquatic habitat quality from instream construction would include changes to stream geomorphology. The SWISP Project EIS Water Resources Report and Section 3.3, Water Resources describe these types of changes in more detail. Geomorphological alterations could impact fish habitat quality and quantity by altering the availability of features such as pools and riffles. This impact would mainly occur within the area of streambed that would be permanently lost due to construction of the IO&MA, which is approximately 0.12 acres (Reclamation GIS 2020; see Table 2-4; this is a subset of acres of permanent disturbance in the Phase I construction area). Lead-containing materials on Hatchery infrastructure would be removed and disposed of in accordance with CFRs and associated safety regulations.

Instream surface-disturbing activities, such as placement of cofferdams, partial removal of the fish ladder/sediment sluice, and construction of the intake structure would also affect stream geomorphology through direct physical alterations of the streambed as well as by mobilizing sediments that settle in downstream gravels or pools. However, sediment plumes would be temporary and minimized through BMPs (Appendix B), such as working in dewatered areas. As a result, the loss of geomorphological habitat features would be minor.

High levels of underwater sound can have negative physiological effects on fish (Hastings and Popper 2005), and underwater sounds that interfere with the ability of a fish to detect and respond to biologically relevant sounds can decrease survival and fitness of individuals and populations (Popper and Hawkins 2019). The severity of the effects depends on physical, environmental, and biological factors, including the sound-generating activity, sound intensity, sound duration, distance of fish from the point of origin, depth of water and the location of the fish in the water column, size of fish, fish species, and ambient noise levels.

For example, impact pile driving and blasting can generate intense underwater sound pressure waves that have been shown to injure and kill fishes (Hastings and Popper 2005, Popper and Hawkins 2019). Radiating sound pressure waves alternately compress and decompress water molecules, which will alternately compress and decompress the swim bladder and other organs, leading to internal hemorrhage and rupture injuries. Sound pressure levels 100 decibels (dB) above the threshold for
hearing are sufficient to damage the auditory system in many fishes (Hastings and Popper 2005). Sound waves in excess of 190 dB may be fatal to fish; however, 155 dB may be sufficient to stun small fish (NMFS 2003). Pile driving and blasting are not proposed as part of the SWISP Project.

Streambed preparation (scraping, removing, and leveling Icicle Creek substrate materials with an excavator before placing the temporary cofferdams), placement of cofferdams to isolate the in-water work area in July, and their removal in November, would temporarily generate and expose fish in Icicle Creek to underwater sounds and vibration. Sounds and vibrations generated during these activities are not expected to reach injurious or lethal intensities associated with, for example, blasting or impact pile driving. However, temporary, sub-lethal behavioral effects (i.e., disturbance, displacement, masking of biologically relevant sounds) could occur. If present in or near the construction work area, most fish would disperse into nearby habitat in response to the noise and vibration. This avoidance is expected to be localized and temporary, such that effects to feeding and sheltering would be undetectable.

A pneumatic tool would be used to break apart large boulders to facilitate their removal from the intake construction area, and partially demolish existing intake facilities, such as the existing fish ladder/sediment sluice. The pneumatic tool would generate impact sounds, which result from a rapid release of energy when two objects hit one another (Hastings and Popper 2005); these impact sounds can propagate into the surrounding water. High levels of underwater sound could have negative physiological effects on fish, the intensity of effects depends on physical, environmental, and biological factors, including the sound-generating activity, sound intensity, distance of fish from the point of origin, depth of fish in the water, size of fish, fish species, and ambient noise levels. Though demolition work would be done in an area dewatered by a cofferdam, some impact sounds and vibration are anticipated to propagate into the Icicle Creek water column via the air and via the bedrock and boulder substrate of the streambed.

While sound generated by the pneumatic tool is not expected to reach intensities associated with blasting or pile driving, some physiological effects on fish could occur if individuals were present in or near the work area. Because fish would be removed from work areas isolated by cofferdams as discussed above, effects would be minimized. However, there is a chance that individuals may elude capture and therefore be present during construction activities. Sound levels experienced by fish in Icicle Creek near the construction area are not expected to reach injurious or lethal levels. Sound levels would likely be of intensities that would cause temporary disturbance and displacement. Effects would be temporary, lasting the duration of the noise-generating activity. Preparation of the streambed and placement and removal of the cofferdams would mobilize sediments on the Icicle Creek streambed. This could increase turbidity in and downstream of the work area during and shortly after cofferdam placement or removal, exposing fish to elevated levels of suspended sediment. Suspended sediments can result in short- and long-term effects on fish depending on the quantity and composition of sediment and length of exposure. Potential exposure would be minimized because cofferdams would be placed and removed by land-based equipment working from above the Icicle Creek OHWM or within a dewatered work area isolated from Icicle Creek live water by another cofferdam. As noted above, most fish would be expected to move to other areas of Icicle Creek in response to the noise and vibration caused by placing and removing the cofferdams. Further, Reclamation would monitor and collect water samples to measure potential increases in
turbidity to ensure compliance with Water Quality Standards for Surface Waters (WAC 173-201A) during cofferdam placement and removal.

Fish may be stranded inside the construction work area established by cofferdam placement. Reclamation would capture and remove fish stranded inside the work area. To minimize harm from capture, handling, and relocation into Icicle Creek, this process would be done by qualified biologists, in accordance with the USFWS (2012) *Recommended Fish Exclusion, Capture, Handling, and Electroshocking Protocols and Standards for Bull Trout*.

The area isolated by the cofferdam would be partially dewatered prior to fish capture. To minimize injury or mortality from fish entrainment in sump pumps, Reclamation would screen sump pump intakes to help prevent aquatic life from entering the intake. Fish screens or guards would comply with the most recent fish screening guidelines for anadromous salmonids prescribed by the NMFS. Areas isolated by cofferdams would be monitored for aquatic organisms, and fish would be captured and relocated from the construction work area in accordance with approved methods; this would reduce the potential for injury or mortality of fish and aquatic species during construction.

During construction in and adjacent to Icicle Creek, alteration of water quality parameters could also occur due to sediment entering the aquatic ecosystem. Many native salmonid species and aquatic invertebrates require high oxygen levels, and clear water with low turbidity (UCSRB 2007; USFWS 2015). High concentrations of limiting nutrients, such as phosphorus, can induce excessive growth of algae resulting in lower dissolved oxygen concentrations, which may reduce habitat quality for aquatic species.

The Ecology TMDL (see Section 3.3, Water Resources) indicates phosphorus is the limiting nutrient in Icicle Creek. Cement is rich in calcium and contains aluminum and iron also. All three can readily bind phosphorus. Setunge et al. (2009) reports freshwater contact with freshly cast concrete can lead to an increase in the pH level of water in contact with the concrete during the first four days from the casting of the concrete. To avoid the potential that construction would increase phosphorus in Icicle Creek, concrete used for proposed in-water infrastructure would be cured in place behind cofferdams for at least four days before exposure to Icicle Creek water. This would guard against fresh concrete increasing phosphorus in surface water.

In addition to increasing turbidity levels, sedimentation can alter substrate used by fish species for spawning and rearing. Adhering to BMPs to reduce the potential for impacts on water quality (Appendix B) would minimize the potential for water quality degradation and release of sediment into Icicle Creek during construction. The SWISP Project EIS Water Resources Report contains additional detail on effects to water quality and sedimentation from construction.

Changes to habitat quantity would arise from the changes to habitat quality as described above if the habitat quality alterations prevent species from using habitat. These would be temporary changes, generally lasting the duration of construction activities.

Permanent habitat loss would result from expanding the intake structure and IO&MA, and temporary habitat loss would occur from constructing the roughened channel and low-flow fishway...
within the area isolated by the cofferdam and dewatered work areas. As an approximation, the intake structure and IO&MA would cause about 0.12 acres of fill below the OHWM (Reclamation GIS 2020; see Table 2-4; this is a subset of acres of permanent disturbance in the Phase I construction area). This would result in a loss of streambed habitat for fish and aquatic invertebrates. General aquatic habitat, critical habitat for Bull Trout and Upper Columbia River Steelhead, and EFH loss would also result from constructing the IO&MA within the OHWM of Icicle Creek. A permanent change in habitat of approximately 0.35 acres would result from construction of the roughened channel and low-flow fishway (Reclamation GIS 2020; see Table 2-4; this is a subset of acres of permanent disturbance in the Phase I construction area).

Mature riparian trees adjacent to Icicle Creek would be removed during Phase I and Phase II construction. Activities that modify the amount of shade over streams have been associated with increases in water temperature. The loss of riparian vegetation can be directly linked to increased water temperatures due to the loss of shade. Also, the solubility of oxygen decreases as water temperature increases. The precise number of mature riparian trees that would be removed is unknown, but it is likely that no fewer than six trees would be removed during Phase I construction, and additional trees would be removed during Phase II construction. Inputs of woody materials to the creek from fallen trees and limbs, would also be reduced. Together, this would reduce habitat quality for aquatic species. To address this Phase III would involve planting riparian trees (see Appendix D). These impacts would persist until riparian trees matured.

During Phase II construction, sediment that becomes mobilized by erosion would be added to Icicle Creek; this would increase turbidity downstream of the construction area, thereby decreasing habitat quality, including for critical habitat and EFH. WAC 173-201A-200 includes water quality standards, criteria, and monitoring for turbidity during construction; adhering to these standards would minimize this impact. Construction BMPs (Appendix B), including preparation of and adherence to a stormwater pollution and prevention plan, would further minimize the release of sediment into Icicle Creek during construction. Seeding of temporarily disturbed surfaces with herbaceous vegetation would stabilize soils and minimize or prevent erosion and release of sediment into Icicle Creek as vegetation matured over one to several growing seasons following construction.

Temporary Hatchery water supply pumping at the spillway pool during Phase II would utilize NMFS-approved screened sump pumps to ensure a continuous water supply while reducing the potential for injury or mortality of fish from entrainment in pump intakes. During the actual CIPP lining process (April 17 to May 13, with provisions of emergency extension to May 20), temporary pumping would supply 20 cfs, and could be augmented by existing groundwater wells (up to 8 cfs). Sound generated by diesel-powered pumps may result in temporary behavioral impacts to fish and aquatic species, such as avoidance of the immediate area while pumping is ongoing. This is because sound waves and vibration from pumping would propagate into the Icicle Creek water column via the air, and via the pump intake within the water column. Effects would be temporary, lasting for the duration of pumping. Fish are expected to avoid the immediate area and displace into other areas of Icicle Creek while pumping is ongoing.

The potential for effects on fish and the aquatic ecosystem from surface disturbance and equipment use during rehabilitation of the conveyance pipeline on USFWS property between the PISMA and
the adjacent private parcel would be small relative to effects from in-stream work, but there could be some temporary effects to habitat quality, such as alteration of water quality parameters from increased sedimentation. As described for Phase I, the potential for effects would be minimized by implementing water quality measures in Appendix B. Native reseeding in uplands would improve aquatic habitat quality by increasing bank stability, thereby reducing the potential for erosion and sediment transport into Icicle Creek.

Following construction of the proposed intake facilities, temporarily removed woody vegetation would be reestablished by planting native upland and riparian trees and shrubs (Phase III). Container plantings would be installed in temporarily disturbed upland areas, while riparian tree cuttings would be installed in the Icicle Creek riparian zone. This would improve riparian vegetation structure and function compared with existing conditions. Over time, and as planted vegetation matured, the amount of shade provided to Icicle Creek would be increased, helping to moderate stream temperatures, especially during summer months.

Extraordinary maintenance activities would occur every couple of years and would be expected to continue into the future. These activities would affect fish, including special status fish species, and aquatic ecosystems; the type of effects would depend on the type of maintenance activities that are required. Likely effects include temporary water quality reductions from increases in turbidity associated with removal of accumulated sediments from the fish screen area.

**Alternative C**

Alterations to aquatic habitat quantity and quality, critical habitat, and EFH, and potential for injury or mortality of fish species, would be similar to those described in Alternative B. Under Alternative C, there would be less vegetation removal in the Icicle Creek riparian zone during conveyance pipeline rehabilitation (Phase II) than under Alternative B. This is because the entire conveyance pipeline length between the PISMA and the adjacent private parcel would be lined with CIPP, and no pipeline would be replaced. As a result, loss of shade-generating vegetation would be reduced, and more trees would remain to provide inputs of woody materials to the creek, compared with Alternative B. Therefore, potential impacts to habitat quality such as elevated water temperatures from reduced shading and alteration of water quality parameters from increased erosion and sedimentation would be reduced, relative to Alternative B. Reclamation estimates that approximately 4 times as many trees would be removed during Phase II construction under Alternative B compared with Alternative C. Extraordinary maintenance activities would be expected to occur every few years and would be expected to continue into the future. Impacts from extraordinary maintenance activities would be the same as described under Alternative B.

**Alternative D**

The types and nature of impacts to fish and aquatic ecosystems resulting from components and elements of the surface water intake facilities and Phase I construction activities would be the same as those described for Alternative B. However, under Alternative D, Phase I construction would be limited to 7:00 a.m. to 10:00 p.m. Additionally, instead of the cofferdams remaining in Icicle Creek until November 15 for two in-water work windows, they would be removed two weeks earlier, by October 31 of each year, and would be placed and removed for a total of four in-water work windows. As a result, Phase I construction would require four years, and four in-water work
The types of impacts to fish and aquatic ecosystems described under Alternative D would occur over separate in-water work windows, creating a longer total duration of impacts to fish and aquatic species.

Although the in-water work window would be two weeks shorter under Alternative D relative to Alternative B, it would still extend beyond the approved in-water work window for Icicle Creek of July 1 to August 15 (USACE 2018). Working outside the approved window would increase the duration of impacts to aquatic habitat by extending the length of time that in-water work would occur, though to a lesser extent (two weeks shorter) than Alternative B. This may result in changes to the number and types of species and life stages of fish species that are present in the Analysis Area. For example, the potential for injury or mortality of special status fish species may decrease slightly under Alternative D relative to Alternative B due to the two-week shorter in-water work window. This is because salmon are particularly vulnerable to disturbance during the fall and winter when adults are migrating and spawning; there would be less overlap of the in-water work window with salmon migration and spawning periods under Alternative D, and thus, less potential for effects such as disturbance to interfere with these essential life history functions. There would also be lower potential for interference (e.g., due to reduced spawning habitat) with Bull Trout spawning in late fall as a result of the shorter in-water work window under Alternative D relative to Alternative B.

The in-water construction under Alternative D over additional seasons, including installation and removal of cofferdams, would result in additional impacts on listed and non-listed fish species and habitat, compared with Alternative B. Although the types of impacts would be the same as those described for Alternatives B, these impacts could be realized for an additional two construction seasons. These would include temporary alterations to fish passage, stream geomorphology, and water quality and quantity in Icicle Creek; additional direct effects to fish species from construction noise; and stress from handling and salvage from the in-water work area. However, impacts would not occur during the first two weeks of November when flows and the risk of cofferdam failure would be higher. Further, because the surface water intake would remain unscreened for additional seasons, listed fish could continue to be entrained into the unscreened intake for a longer time. Because these effects would occur to listed fish species, they could be considered take. As described under Alternative B, impacts would be minimized through BMPs (Appendix B).

Inundating the area of the partially constructed intake headworks after cofferdam removal at the end of the 2022 in-water work window would potentially increase the possibility for injury or mortality of fish relative to Alternative B. This is because fish could become entrained in areas where water is isolated due to the partially constructed intake area. For example, there would likely be at least a small strip along the 2-foot foundation slab that could fill with water at higher flows and be isolated from the stream when flows decrease.

Fish may be stranded inside the construction work area established by cofferdam placement. USFWS personnel would capture and remove any fish found stranded inside the work area. To minimize harm from capture, handling, and relocation into Icicle Creek, this process would be done by qualified biologists, in accordance with the USFWS (2012) Recommended Fish Exclusion, Capture, Handling, and Electroshocking Protocols and Standards for Bull Trout.
Limiting construction to workday hours between 7:00 a.m. to 10:00 p.m. under Alternative D would reduce impacts to some fish species, such as Bull Trout, which are primarily nocturnal. This is because species that are inactive during the day would be less likely to be disturbed by daytime construction activities because they would not be engaging in activities such as foraging that could otherwise be disrupted.

Under Alternative D, pumping of two high capacity diesel-powered pumps to provide 40 cfs of water to the Hatchery during Phase I construction would occur 24 hours per day, seven days per week for eight months (November 1, 2022 to June 30, 2023). Sound generated by pumps may result in temporary behavioral impacts to fish and aquatic species, such as avoidance of the immediate area, while pumping is ongoing, and these effects would last eight months longer under Alternative D as compared to Alternative B under which pumping would occur for approximately seven days in mid-July 2022 and three days in early November 2022 (Table 2-3). Avoidance of the immediate area and displacement into other areas of Icicle Creek while pumping is ongoing may interfere with overwintering, spawning, and migration of fish species for which the eight-month temporary Hatchery water supply pumping period overlaps these life history phases.

Although long-term reliable delivery of water and the ability to meet Hatchery production goals would be improved under this alternative in comparison to Alternative A – No Action, there would be a risk of temporary impacts to Hatchery production from relying on pumps operating continuously for eight months from 2022-2023. If pumps fail, and back-up pumps do not respond effectively in time, there could be a catastrophic loss of fish. Further, pumping water from the spillway pool would recirculate Hatchery effluent water, as the pool is the location of the Hatchery's main discharge point. Over time, without water treatment, pathogen loading to the fish would be increased and water quality reaching the Hatchery decreased, compromising health of Hatchery fish.

During the second in-water work window in 2023, impacts resulting from preparation for and installation of cofferdams, the gravity bypass pipeline, and gravity bypass outlet would be similar to those described above under Alternative B, including temporary reduction of fish passage and potential blocking of spawning habitat due to cofferdam installation, potential entrainment of fish in the gravity bypass pipeline, disturbance from cofferdam placement, and noise and vibration from the use of construction equipment. Except for installing the gravity bypass pipeline and gravity bypass outlet, this would also be true for the 2024 and 2025 in-water work windows. Removing cofferdams two weeks earlier each season would minimize the risk of overtopping or failure in comparison to Alternative B. Overall, impacts to fish and aquatic species and habitats would be repeated over four construction seasons under Alternative D as opposed to two seasons under Alternative B.

During the 2024 in-water work window, impacts from construction of the low-flow boulder weir fishway and the left bank portion of the roughened channel (which entail placement of cofferdams, dewatering of the construction area, regrading of the stream channel bottom, construction of the low-flow boulder weir fishway and the left bank portion of the roughened channel and, removal of the cofferdam) would be the same as those described under Alternative B with additional (repeated) temporary impacts from cofferdam installations and removals. Likewise, during the 2025 in-water work window, impacts from construction of the remaining portion of the roughened channel would
be the same as those described under Alternative B with additional impacts from temporary
cofferdam installation and removal. Phase I construction would not be completed until fall of 2025,
approximately 29 months past the May 2023 Biological Opinion deadline.

Impacts from Phase II construction activities and schedule and Phase III revegetation efforts would
be the same as those described under Alternative B.

### 3.5 Noise and Vibration

#### 3.5.1 Analysis Area

The Analysis Area stretches from the Forest Service kiosk on Icicle Creek Road to the USFWS
property, including the LNFH grounds (see Map 3-2 in Appendix A). In addition, because sound
waves that create noise propagate outward from their source, the Analysis Area also includes
sensitive noise receptors on the lands surrounding the Project Area out to 0.25 miles.

#### 3.5.2 Affected Environment

Sound is measured in decibels (dB). Decibels A-weighted (dBA) is one of the most frequently used
sound measurements because it best matches the range of human hearing. Low and very high
frequencies are given less weight than on the standard decibel scale.

A sound-level meter is used to measure the decibel level. It is designed to respond in approximately
the same way as the human ear and gives an objective assessment of sound pressure level (Ecology
2020d).

Decibels are measured on a logarithmic scale, meaning a small change in the number of dB indicates
a large change in the level of sound (Occupational Safety and Health Administration 2020). In
general, to measure loudness, a sound must be increased by 10 dB to be perceived as twice as loud
(Centers for Disease Control and Prevention 2020). If a sound is generated at a point source in an
area with no walls or other obstructions, there will be a reduction by 6 dB each time the distance
from the sound source is doubled. A soft whisper about 5 feet away is 40 dBA, a conversation about
3 feet away is about 60 dBA, a freight train 100 feet away is 80 dBA, a night club with music is 110
dBA, and operating heavy equipment is 120 dBA (Occupational Safety and Health Administration
2020).

In describing vibration in the ground and in structures, the motion of a particle (i.e., a point in or on
the ground or structure) is used. The concepts of particle displacement, velocity, and acceleration are
used to describe how the ground or structure responds to excitation. Although displacement is
generally easier to understand than velocity or acceleration, it is rarely used to describe ground and
structure-borne vibration because most transducers used to measure vibration directly measure
velocity or acceleration, not displacement. Accordingly, vibratory motion is commonly described by
identifying the peak particle velocity or peak particle acceleration (California Department of
Transportation 2013).
WAC 173-60-030 defines environmental designation for noise abatement (EDNA) zones into three classifications (A, B, and C). Maximum permissible noise levels are established in WAC 173-60-040. The maximum allowed amount of noise coming into a property depends on property type (Table 3-3). For example, 55 decibels dBA is the maximum allowed level of noise a Class A property can receive from another Class A property; 57 dBA is the maximum allowed level of noise a Class A property can receive from a Class B property; and 60 dBA is the maximum allowed level of noise a Class A property can receive from a Class C property (Ecology 2020d). Between 10:00 p.m. and 7:00 a.m., the noise limitations in Table 3-3 shall be reduced by 10 dBA for receiving properties in Class A areas.

The existing surface water intake and delivery system is found alongside and in Icicle Creek (see Map 2-1 in Appendix A). The predominant community noise sources involve sounds from rural residential activities, recreation, cultural events, and agricultural activities. Recreation sites and lodging and permanent and seasonal residences flank Icicle Creek, especially on the south side, west of the existing intake facilities, and on the north side of Icicle Creek, east of the existing intake facilities (see Map 3-2 in Appendix A).

Table 3-3. Maximum Permissible Noise Levels for Nonexempt Activities

<table>
<thead>
<tr>
<th>EDNA of Noise Source</th>
<th>EDNA of Class A Receiving Property (dBA) 1</th>
<th>EDNA of Class B Receiving Property (dBA)</th>
<th>EDNA of Class C Receiving Property (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A—Lands where humans reside and sleep, such as residential, recreational, entertainment, or community services</td>
<td>55</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>Class B—Lands with uses requiring protection against noise interference with speech, such as commercial, retail, or offices</td>
<td>57</td>
<td>60</td>
<td>65</td>
</tr>
<tr>
<td>Class C—Lands with economic activities of such a nature that higher noise levels than experienced in other areas is normally anticipated, such as industrial, warehouse, or agricultural</td>
<td>60</td>
<td>65</td>
<td>70</td>
</tr>
</tbody>
</table>

Source: Chapter 173-60-040 WAC
Notes: Exemptions to WAC 173-60-040 are listed in WAC 173-60-050 and include construction noise generated between 7:00 a.m. and 10:00 p.m.

  1 Between the hours of 10:00 p.m. and 7:00 a.m. the noise limitations of the table above shall be reduced by 10 dBA for receiving property within Class A EDNAs.

Sensitive noise receptors (see Map 3-2 in Appendix A) are individuals who would be affected by noise levels. Examples are individuals recreating in the area for such activities as hiking, biking, fishing, rafting, snowshoeing, and cross-country skiing. They also include permanent and seasonal residents. The sensitive noise receptors in the Analysis Area belong to Class A EDNA areas, because they involve areas where humans reside, sleep, or recreate. In addition to residents, sensitive noise receptors are at the Snow Lakes Trail, Sleeping Lady Mountain Resort, Icicle Creek Center for the Arts, the Icicle River RV Resort, Icicle River Trails on USFWS property, and the spillway pool (where Tribal fishing takes place; see Section 3.10, Tribal Interests).
The predominant traffic noise sources in the Analysis Area are from Icicle Creek Road, Fish Hatchery Road, and East Leavenworth Road. There are also sparse, single lane, paved and unpaved roads used for residential, commercial, and recreation access within the Analysis Area. Proposed Project activities would take place along Icicle Creek Road, from the Forest Service kiosk to the LNFH. In addition, supplies and materials would be transported to the Project Area on Icicle Road from Highway 2.

During the week of August 3, 2020, Reclamation conducted an ambient noise study around the LNFH using devices calibrated by a Reclamation Industrial Hygienist prior to deployment. Nine locations were tested with noise dosimeters, and ten locations were tested with a sound level meter during the morning and evening. Table 3-4 lists morning and evening ambient noise levels that were collected before and after the testing, the minimum and maximum ambient noise levels that were collected during the testing, and the equivalent sound level (Leq). Leq quantifies the noise environment to a single value of sound level for a certain duration. The testing occurred over approximately 6 hours and 15 minutes and approximately 10 hours, depending on ambient noise level point location. Map 3-2 in Appendix A shows the locations of the ambient noise points listed in Table 3-4 for the ambient noise study. As summarized in Table 3-4, baseline noise data collection indicates peak season noise levels are in exceedance of EDNA Class A levels.

### Table 3-4. Ambient Noise Levels

<table>
<thead>
<tr>
<th>Ambient Noise Point</th>
<th>Leq (dBA) Using Dosimeter</th>
<th>Maximum Noise Level (dBA) Using Dosimeter</th>
<th>Minimum Noise Level (dBA) Using Dosimeter</th>
<th>Before and After Noise Levels (dBA) at Ambient Noise Level Sampling Using Sound Level Meter</th>
</tr>
</thead>
</table>
| 1                   | 72                        | 98                                        | 55                                        | Morning: 60  
                           |                           |                                           |                                           | Evening: 72  |
| 2                   | 69                        | 99                                        | 51                                        | Morning: 60  
                           |                           |                                           |                                           | Evening: 60  |
| 3                   | 69                        | 101                                       | 44                                        | Morning: 48  
                           |                           |                                           |                                           | Evening: 39  |
| 4                   | 66                        | 98                                        | 42                                        | Morning: 46  
                           |                           |                                           |                                           | Evening: 60  |
| 5                   | 68                        | 101                                       | 47                                        | Morning: 60  
                           |                           |                                           |                                           | Evening: 63  |
| 6                   | 70                        | 98                                        | 46                                        | Morning: 49  
                           |                           |                                           |                                           | Evening: 62  |
| 7                   | 62                        | 94                                        | 41                                        | Morning: 42  
                           |                           |                                           |                                           | Evening: 42  |
| 8                   | 68                        | 102                                       | 37                                        | Morning: 54  
                           |                           |                                           |                                           | Evening: 52  |
| 9                   | 69                        | 101                                       | 51                                        | Morning: 57  
                           |                           |                                           |                                           | Evening: 58  |
| 10                  | Not available             | Not available                             | Not available                             | Morning: 55  
                           |                           |                                           |                                           | Evening: 57  |
There are no sources of ongoing vibration in the Analysis Area. Occasional construction activities, however, may involve vibration, depending on the type of equipment, construction methods, and ground conditions. Vibrations can spread through the ground and will diminish in strength with distance from the source of the vibrations. Ground vibrations from construction activities can be audible and felt. Vibration can have a high amplitude and short duration, such as for pile driving or blasting. It can also have a low amplitude and long duration, such as for excavation equipment, tracked vehicles, or vibratory pile drivers.

### 3.5.3 Environmental Consequences

**Indicators and Assumptions**

The indicators for identifying impacts on noise and vibration are the following:

- Changes to ambient community sound level from construction machine and equipment noise
- Changes to ambient traffic sound level from construction traffic noise
- Changes to vibration

In identifying impacts on indicators, the following analysis assumptions were used:

- For every doubling of distance, the sound level reduces by 6 dBA.
- A 3 dBA increase in sound level is barely noticeable to the human ear. A rise in sound level by 5 dBA would be needed before most listeners report a change. It takes a 10 dBA increase before the average listener hears double the sound.
- A free field is used in calculating the reduction of sound levels. A “free field” is defined as a flat surface without obstructions. Also, equipment would be used sequentially rather than at the same time.
- Example noise levels from typical construction equipment that may be used are listed in Table 3-5. Of the example construction noise levels listed in Table 3-5, the pneumatic tool, usually attached to heavy equipment, is expected to be the loudest piece of equipment used during Phase I construction (i.e., at the intake construction area).
- Hot air blowers can use a heated element or gas to warm air before blowing the heated air. Hot air blowers to completely dry out the existing pipeline prior to lining with CIPP are expected to be the loudest piece of equipment used at the Phase II construction areas (i.e., CUAs) and are assumed to be 115 dB at 5 feet. Hot air blowers would be utilized at each CUA.
- Example construction noise levels from a truck are listed in Table 3-5. In-bound and out-bound tractor trailers or dump trucks are expected to be the loudest mobile source of noise along area roads.

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40 The free field assumption gives Reclamation the ability to disclose, to the public, sound attenuation over distance as it pertains to impacts on sensitive receptors (such as residents) in the Analysis Area. More complex modeling of sound attenuation is not currently possible since the types and timing of equipment used to construct the proposed project are normally at the contractor's discretion (but within the bounds of the analysis and proposed minimization and offset measures of the EIS).

• A 150-horsepower diesel engine for a 16-inch pump is assumed to have a noise level of 93.3 dB at 3.3 feet. Two diesel pumps operating at the same time would have a noise level of 96 dB at 3.3 feet. Two diesel pumps would operate at the same time at the temporary Hatchery water supply pump site.

• Leq is used for analyzing impacts because it is commonly used to describe sound levels that vary over time.

• Environmental conditions, such as weather, ground surfaces, or vegetation, are not accounted for in the propagation of noise.

• Vehicle speed is not accounted for in the propagation of noise.

• There would be no pile driving for cofferdam installation or blasting.

• The maximum allowed level of noise an EDNA Class A property can receive from an EDNA Class A property during the daytime (between 7:00 a.m. and 10:00 p.m.) is 55 dBA.

• The maximum allowed level of noise an EDNA Class A property can receive from an EDNA Class A property during the nighttime (between 10:00 p.m. and 7:00 a.m.) is 45 dBA. See Section 2.4.2 and Appendix C for details on timing of construction activities.

Table 3-5. Example Construction Equipment Noise Levels

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Typical Noise Level (dBA) 50 feet from Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air compressor</td>
<td>81</td>
</tr>
<tr>
<td>Backhoe</td>
<td>80</td>
</tr>
<tr>
<td>Compactor</td>
<td>82</td>
</tr>
<tr>
<td>Concrete mixer</td>
<td>85</td>
</tr>
<tr>
<td>Concrete pump</td>
<td>82</td>
</tr>
<tr>
<td>Concrete vibrator</td>
<td>76</td>
</tr>
<tr>
<td>Crane derrick</td>
<td>88</td>
</tr>
<tr>
<td>Dozer</td>
<td>85</td>
</tr>
<tr>
<td>Generator</td>
<td>81</td>
</tr>
<tr>
<td>Grader</td>
<td>85</td>
</tr>
<tr>
<td>Jack hammer</td>
<td>88</td>
</tr>
<tr>
<td>Loader</td>
<td>85</td>
</tr>
<tr>
<td>Pneumatic tool</td>
<td>85</td>
</tr>
<tr>
<td>Rail saw</td>
<td>90</td>
</tr>
<tr>
<td>Rock drill</td>
<td>98</td>
</tr>
<tr>
<td>Truck</td>
<td>88</td>
</tr>
</tbody>
</table>

Source: Federal Highway Administration 2006

Using the expected loudest noise levels (from a pneumatic tool, hot air blower, truck, and diesel pumps) and the other analysis assumptions, Table 3-6, Table 3-7, and Table 3-8 list the noise attenuation distances relevant to Class A EDNA areas. Additional assumptions used in the analysis

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42 Personal communication from Crisafulli Sludge Removal Systems to Derek Holmgren, EMPSi. Subject: Crisafulli. October 5, 2020.

43 Distances that it takes for noise to lessen in magnitude.
are described in Appendix C, SWISP Project EIS Analysis Assumptions. Map 3-3 through Map 3-9 in Appendix A show the noise attenuation distances for these stationary noise sources.

### Table 3-6. Noise Attenuation Distances for Pneumatic Tool and Truck

<table>
<thead>
<tr>
<th>Distance from Noise Source (Feet)</th>
<th>Noise Level of Pneumatic Tool at Intake Construction Area (dBA)</th>
<th>Noise Level of Truck Along Area Roads (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>85</td>
<td>88</td>
</tr>
<tr>
<td>100</td>
<td>79</td>
<td>82</td>
</tr>
<tr>
<td>200</td>
<td>73</td>
<td>76</td>
</tr>
<tr>
<td>400</td>
<td>67</td>
<td>70</td>
</tr>
<tr>
<td>800</td>
<td>61</td>
<td>64</td>
</tr>
<tr>
<td>1,600</td>
<td>55</td>
<td>58</td>
</tr>
<tr>
<td>3,200</td>
<td>49</td>
<td>52</td>
</tr>
<tr>
<td>6,400</td>
<td>43</td>
<td>46</td>
</tr>
<tr>
<td>12,800</td>
<td>37</td>
<td>40</td>
</tr>
</tbody>
</table>

Note:  
1 Rounded to the nearest whole number

### Table 3-7. Noise Attenuation Distances for Hot Air Blower

<table>
<thead>
<tr>
<th>Distance from Noise Source (Feet)</th>
<th>Noise Level of Hot Air Blower at CUAs (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>115</td>
</tr>
<tr>
<td>10</td>
<td>109</td>
</tr>
<tr>
<td>20</td>
<td>103</td>
</tr>
<tr>
<td>40</td>
<td>97</td>
</tr>
<tr>
<td>80</td>
<td>91</td>
</tr>
<tr>
<td>160</td>
<td>85</td>
</tr>
<tr>
<td>320</td>
<td>79</td>
</tr>
<tr>
<td>640</td>
<td>73</td>
</tr>
<tr>
<td>1,280</td>
<td>67</td>
</tr>
<tr>
<td>2,560</td>
<td>61</td>
</tr>
<tr>
<td>5,120</td>
<td>55</td>
</tr>
</tbody>
</table>

Note:  
1 Rounded to the nearest whole number.
Table 3-8. Noise Attenuation Distances for Diesel Pumps

<table>
<thead>
<tr>
<th>Distance from Noise Source (Feet)</th>
<th>Noise Level of Diesel Pumps at Temporary Hatchery Water Supply Pump Site (dB)&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>96</td>
</tr>
<tr>
<td>6.6</td>
<td>90</td>
</tr>
<tr>
<td>13</td>
<td>84</td>
</tr>
<tr>
<td>26</td>
<td>78</td>
</tr>
<tr>
<td>52</td>
<td>72</td>
</tr>
<tr>
<td>105</td>
<td>66</td>
</tr>
<tr>
<td>210</td>
<td>60</td>
</tr>
<tr>
<td>420</td>
<td>54</td>
</tr>
<tr>
<td>840</td>
<td>48</td>
</tr>
<tr>
<td>1,680</td>
<td>42</td>
</tr>
</tbody>
</table>

Note:
<sup>1</sup> Rounded to the nearest whole number.

**Alternative A – No Action Alternative**

Under Alternative A, there would be no new construction activity or Project components that would affect ambient sound levels. Sensitive noise receptors in the area would continue to experience community and traffic noise at, or about, the levels described above in Section 3.5.2, including peak season noise levels in exceedance of EDNA Class A levels. There would continue to be noise and occasional vibration (such as from the use of heavy equipment during intake or pipeline repairs) associated with current operations and maintenance of the existing Project components. See Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems, for impacts on wildlife from noise and vibration.

**Alternative B – Proposed Action**

Compared with Alternative A, ambient noise levels for sensitive receptors would increase above those listed in Table 3-4 (which range from 62 dBA to 72 dBA) under Alternative B. The ambient noise levels would increase because of equipment and vehicle use associated with construction activities. The loudest expected equipment and vehicle noises and their attenuation distances are listed in Table 3-6, Table 3-7, and Table 3-8, above.

Map 3-3, Map 3-5, Map 3-7, and Map 3-9 in Appendix A show the distances for the expected loudest noise levels to attenuate to Class A EDNA noise levels under Alternative B. A Class A EDNA of 55 dBA is the lowest daytime permissible noise level exposure listed in Table 3-3. A Class A EDNA of 45 dBA is the lowest nighttime permissible noise level exposure listed in Table 3-3. The sensitive noise receptors in the Analysis Area belong to Class A EDNA areas, which should experience noise levels of 55 dBA during daytime hours and 45 dBA during nighttime hours.
3. Affected Environment and Environmental Consequences (Noise and Vibration)

The ambient noise study characterized the ambient noise levels for these areas as already being elevated. Possible causes for the elevated ambient noise levels are any existing construction activities or the valley shape of the topography confining and redirecting sound waves. Noise generated by construction equipment and vehicle use under Alternative B would decrease to the elevated ambient noise levels, described above, before they would decrease to a Class A EDNA. See Map 3-3, Map 3-5, and Map 3-7, and Map 3-9 in Appendix A for how noise levels would decrease over distance.

The temporary noise generated under Alternative B would occur during equipment and vehicle use associated with construction. The in-water work window for Alternative B is July 1 to November 15 (Phase I construction), and would occur up to 24 hours per day, up to seven days per week44. The Phase II construction work associated with lining the conveyance pipeline with CIPP would occur between April and May of 2023 and 2024, from 7:00 a.m. to 10:00 p.m. daily, up to six days per week45. See Section 2.4.2 and Appendix C for details on timing of construction activities.

To minimize impacts from construction, the following would occur:

- A Noise Reduction Plan would be developed by the Phase I contractor.
- BMPs listed in Appendix B would be implemented.

Construction equipment would be a source of vibration. The closest sensitive receptor to the intake construction area is approximately 0.2 miles away. The closest sensitive receptor to a CUA is approximately 200 feet away. At these distances, vibration is not expected to damage property from the use of construction equipment. As the distance from the vibration source increases, the amount of vibration decreases.

**Alternative C**

The impacts under Alternative C would be similar to those described under Alternative B. Under Alternative C, however, Reclamation would line the entire upper segment of the conveyance pipeline on USFWS property. Additionally, under Alternative C, starting at the PISMA, the entire conveyance pipeline would be lined with CIPP down to the USFWS parcel boundary, which could result in a slight increase in the duration of noise from use of the hot air blower. Map 3-3 in Appendix A shows the distances for the pneumatic tool to attenuate to a Class A EDNA of 45 dBA or less under Alternative C. Map 3-6 in Appendix A shows the distances for the hot air blower noise levels to attenuate to a Class A EDNA of 55 dBA or less under Alternative C.

Under Alternative C, there would be fewer truck trips to access the intake construction area, resulting in less truck noise. Map 3-7 in Appendix A shows the distances for truck noise levels to attenuate to a Class A EDNA of 45 dBA or less under Alternative C.

44 Additional noise reduction measures would occur from 7:00 p.m. to 7:00 a.m.
45 Reclamation analyzed a 7:00 a.m. to 10:00 p.m. workday in conformance with the Chelan County Noise Ordinance (Chelan County Code Chapter 7.35) and WAC 173-60-040; this therefore represents the most conservative level of impacts. However, the Project specifications require workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s COR approval.
3. Affected Environment and Environmental Consequences (Noise and Vibration)

Map 3-9 in Appendix A show the distances for the diesel pump noise levels to attenuate to a Class A EDNA of 45 dBA or less under Alternative C. This would be the same as described under Alternative B.

**Alternative D**

Under Alternative D, Phase I construction would occur from 7:00 a.m. to 10:00 p.m., up to six days per week, instead of up to 24 hours per day, up to seven days per week as described under Alternative B. This would result in less nighttime noise at the intake construction area as compared with Alternative B. Map 3-4 in Appendix A shows the distances for the pneumatic tool noise levels to attenuate to a Class A EDNA of 55 dBA or less.

Under Alternate D, truck trips related to construction activities would occur between 7:00 a.m. and 10:00 p.m. six days per week, instead of 24 hours per day, seven days per week as described under Alternative B. This would result in less nighttime noise along Icicle Creek Road as compared with Alternative B. Map 3-8 in Appendix A shows the distances for the truck noise levels to attenuate to a Class A EDNA of 55 dBA or less.

Map 3-5 and Map 3-9 in Appendix A show the noise attenuation distances for the hot air blower and the diesel pumps associated with the temporary Hatchery water supply, respectively. The noise attenuation distances for these pieces of construction equipment under Alternative D would be the same as described under Alternative B. The hot air blower would only be used between the hours of 7:00 a.m. and 10:00 p.m. Map 3-5 in Appendix A shows the distances for the hot air blower to attenuate to a Class A EDNA of 55 dBA or less. The diesel pumps associated with the temporary Hatchery water supply for Phase I would operate 24 hours per day and seven days per week (Map 3-9 in Appendix A). Under Alternative D, the total duration of time the diesel pumps would operate would be approximately eight months, instead of approximately 10 days under Alternative B (Table 2-3). This would result in a longer duration of daytime noise and more nighttime noise as compared with Alternative B. Map 3-9 in Appendix A shows the distances for the diesel pumps to attenuate to a Class A EDNA of 45 dBA or less.

3.6 Transportation and Traffic

3.6.1 Analysis Area

The Analysis Area for transportation and traffic includes East Leavenworth Road and Icicle Road from their intersections with U.S. Highway 2 to the intersection of these two roads north of the LNFH, where Icicle Road turns into Icicle Creek Road, and Icicle Creek Road to the Forest Service kiosk and construction vehicle turnaround area (Map 3-10 in Appendix A). The kiosk is approximately 1.25 miles southwest of the intake facilities. The primary Analysis Area is Icicle Creek Road, between the intersection with East Leavenworth Road and the Forest Service kiosk, and Fish Hatchery Road. Icicle Creek Road is accessed by either East Leavenworth Road or Icicle Road.

3.6.2 Affected Environment

Icicle Road/Icicle Creek Road is the proposed haul route for the Project. It is used for access to recreation areas, private residences, inns, and hotels, and the LNFH. Icicle Creek Road is the main
access road to recreation opportunities on the Okanogan-Wenatchee National Forest, including the Snow Lakes Trail, a popular hiking trail (Forest Service 2020). Fish Hatchery Road intersects Icicle Creek Road south of the Icicle Road and East Leavenworth Road intersection and is the main access road to the LNFH facilities.

Seasonal tourism directly influences traffic volume on roads in and near the Analysis Area. In general, traffic is lighter during the recreation off-season, between November and early May. Visitor use and associated traffic volume generally increases during the peak recreation season between mid-May and September. Snow Lakes Trailhead overnight reservation permits are required from May 15 to October 31 due to the heavy use of the Snow Lakes Trail and surrounding wilderness (Forest Service 2020).

Level of Service (LOS) is used in traffic analysis to rate roadway segment operations using a traffic volume to road capacity ratio (TRPC 2016). It is also used to determine how well a transportation facility is operating from a traveler’s perspective (TRPC 2016). LOS ratings for the State of Washington range from A to F, with A being the most free-flowing and F the least (WSDOT 2020). The LOS rating decreases as a result of higher traffic volumes, decreased road capacity, or both. All roads within the Analysis Area are in Chelan County. The Chelan County LOS policy for rural roads is C or better (Chelan County 2015), and the City of Leavenworth strives for an LOS of C or better.46

The typical LOS is C or better on northbound Icicle Road. The intersection of Icicle Road and U.S. Highway 2 is the only road segment or intersection near the Project Area for which LOS has been officially calculated (RBT Consultants 2018). Since average daily traffic counts on Icicle Road are less than the lowest average daily traffic counts for the U.S. Highway 2 and Icicle Road intersection for both Saturdays and weekdays, and roadway capacity is the same, it can be inferred that Icicle Road has a baseline LOS of C or better. While traffic volume at this intersection is not necessarily representative of the Analysis Area, it suggests that Icicle Road has an LOS C or better and provides context for possible daily, weekly, and seasonal traffic conditions on roads in the Analysis Area. For example, the available LOS data indicate that Icicle Road and Icicle Creek Road experience increases in traffic during the peak recreation season and on weekends (RBT Consultants 2018).

Traffic congestion typically occurs near the Snow Lakes Trailhead area due to parking overflow along both sides of the road. During the peak recreation season, especially on weekends when visitor use is highest, traffic conditions on Icicle Creek Road within 0.25 miles of the Snow Lakes Trailhead is more representative of an LOS D.

3.6.3 Environmental Consequences

Indicators and Assumptions
Indicators for impacts on transportation and traffic are changes in the LOS on roads and changes in access on roads to points of interest.

46 Andrew Brunner, Chelan County Public Works Department, email to Elizabeth Heether, Bureau of Reclamation, on May 20, 2020, regarding “L-SWISP: Transportation—Level of Service (LOS) Data Request.”
3. Affected Environment and Environmental Consequences (Transportation and Traffic)

The following assumptions are used for the transportation and traffic analysis:

- Traffic volume in the Analysis Area is greatest during peak recreation season (from mid-May to September) and is typically greater on weekends than weekdays. On a daily basis, typical traffic volumes are greatest during daylight hours.
- Icicle Road and Icicle Creek Road have an LOS of C or better under baseline conditions.
- All impacts on transportation and traffic, including road repairs after Phase I and Phase II construction, would be temporary.

Additional Project assumptions used in the analysis are described in Appendix C, SWISP Project EIS Analysis Assumptions.

**Alternative A – No Action Alternative**

Under the No Action alternative, there would be no change in the LOS on roads and drivers would not experience any increase or decrease in delays or frustrations while accessing or leaving the Alpine Lakes Wilderness. No planned construction activities would occur; however, the existing intake facilities would continue to operate and require routine maintenance. O&M activities would involve one to two pickup trucks entering and leaving the Analysis Area on the days when maintenance occurs. Extraordinary maintenance would occur every couple of years and would be expected to continue, which would require the use of one to three heavy construction vehicles. The LNFH’s primary point of diversion and water delivery system on Icicle Creek is nearly 80 years old and is reaching or exceeding its expected service life. Failure of the diversion or water delivery system would be an emergency situation. Hatchery staff responding to the situation would have an immediate and potentially sustained impact on traffic both during the emergency and until repairs are made. The timing and extent of potential impacts on transportation and traffic from extraordinary maintenance or emergency repairs would depend on the nature, extent, and timing of the necessary repairs. For the purposes of this analysis, it is assumed the No Action alternative would result in no changes to the baseline LOS or access in the Analysis Area.

**Alternative B – Proposed Action**

Compared with Alternative A, there would be an increase in heavy vehicle traffic using Icicle Road and Icicle Creek Road under Alternative B. The requirement to turn around at the Forest Service and Alpine Lakes Wilderness kiosk and the need to back in against traffic onto the intake access road would result in temporary, localized reductions in LOS. The changes would be largely confined to the Wenatchee Bridge and the 1.25-mile segment of Icicle Creek Road between the intake construction area and Snow Lakes Trailhead. Reduced parking at the Forest Service and Alpine Lakes Wilderness Area kiosk to accommodate the construction vehicle turnaround area would change the level of access to the area compared with Alternative A because there would be fewer places for visitors to park. The greatest potential for impacts would be during daylight hours, on weekends, during the summer when traffic volumes and demands for access to nearby recreation opportunities are highest. Distributing certain types of construction traffic across a 24-hour period would result in the potential for impacts occurring 24 hours a day.

Under Alternative B, Phase I construction activities would occur up to 24 hours a day, seven days a week. During Phase I of construction, temporary reductions in LOS below C would be expected.
between the intake construction area and the Forest Service and Alpine Lakes Wilderness kiosk as heavy construction vehicles would utilize the turnaround point and then back into the intake access road. There would continue to be open access to the Snow Lakes Trailhead and businesses along Icicle Creek Road. An LOS below C would also occur on Icicle Road at Wenatchee Bridge when construction vehicles with oversized loads access the bridge. This is because the road would be reduced to one lane and would temporarily stop northbound or southbound traffic, depending on the vehicles’ direction of travel. Vehicles in the Analysis Area would be delayed at most 10 minutes (see the SWISP Project EIS Recreation Resource Report), accessing Icicle Road and Icicle Creek Road due to temporary and intermittent lane closures at the Wenatchee Bridge, intake access road, and the Forest Service and Alpine Lakes Wilderness kiosk at the turnaround. The lane closure would be considered a delay rather than a change in the level of access because the lane would immediately reopen. Impacts to traffic and transportation within the Analysis Area would be reduced during nighttime construction activities because baseline LOS is typically higher at night due to fewer vehicles on the roads.

Traffic control BMPs such as flagging, cones, delineators, safety barriers, flasher lights, danger signals, temporary fencing, and signs would help maintain an LOS of C and maintain vehicle access by maintaining traffic flow, minimizing obstruction, and ensuring public safety (see Appendix B). These measures would meet the requirements of the Manual on Uniform Traffic Control Devices for Streets and Highways, Part 6 (Temporary traffic control) and WAC 296-155-305 (Signaling and flaggers). In addition to providing safe access for the public traveling on Icicle Creek Road, these BMPs would increase safety of pedestrians and other recreationists on public and private property in the Analysis Area.

During Phase II of construction, use of CUAs would temporarily delay access, intermittently, to the Icicle River RV Resort, Icicle Creek Center for the Arts, and Sleeping Lady Mountain Resort from mid-April to mid-May. Cyo Road (accessed from Icicle Creek Road) would be used to access CUA 5, which may delay access, intermittently, to the Mid-Columbia Fish and Wildlife Conservation Office. Impacts on access would be minimized by maintaining convenient access to driveways and buildings along the line of work, as listed in Appendix B.

Construction vehicles would make two to three trips daily, per worker, with a maximum of 15 workers per shift during Phase I construction, and 7-10 workers per shift during Phase II construction. While roadways would be maintained to ensure smooth condition (see Appendix B), this level of high use may result in any combination of ruts, broken pavement, potholes, or low areas with standing water on Icicle Creek Road. These would be minimized to the extent possible during Phase I and Phase II construction through the applicable BMPs listed in Appendix B. The construction contractor would also comply with the permitting requirements for Chelan County ROW use and repairs and Forest Service road repairs within both jurisdictional boundaries on Icicle Creek Road.

**Alternative C**

Alternative C would temporarily reduce LOS compared with Alternative A, but to a lesser extent than Alternative B. This is because Alternative C would require fewer heavy equipment vehicle trips accessing the intake construction area. The locations where there would be temporary LOS
3. Affected Environment and Environmental Consequences (Transportation and Traffic)

reductions would be the same as discussed under Alternative B. Impacts on access would be the same as described under Alternative B.

**Alternative D**

Alternative D would temporarily reduce LOS and vehicle access compared with Alternative A. Alternative D would have a similar LOS as Alternative B with respect to impacts from construction vehicle trips along the construction vehicle route. Impacts on access would be the same as described under Alternative B. However, under Alternative D, Phase I construction would be limited to the workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days per week under pre-approved circumstances. Even though traffic is usually heavier during daytime hours, overall daily impacts to traffic and transportation within the Analysis Area would be reduced under Alternative D as compared with Alternative B, as construction activities between 10:00 p.m. and 7:00 a.m. would not occur. The LOS and vehicle access would be maintained during inactive construction hours, as described under Alternative A.

By limiting the construction time window to workday hours of 7:00 a.m. to 10:00 p.m., and five days per week instead of up to 24 hours per day, and up to seven days per week as proposed under Alternative B, two additional years of Phase I construction activities would be required under Alternative D, including two more full equipment and crew mobilizations than would occur under Alternative B. No additional heavy equipment would be required under this alternative. As such, impacts to traffic and vehicle access during Phase I construction would last for a total of four years, or two more years than under Alternative B. Impacts from Phase II construction on transportation and traffic would be the same as described under Alternative B. Traffic conditions and vehicle access would return to baseline conditions in four years, after construction is completed.

3.7 Recreation

3.7.1 Analysis Area

Lands containing access to recreation opportunities within the City of Leavenworth and the surrounding landscape comprise the Analysis Area for recreation, including all areas accessed by Icicle Creek Road (Map 3-11 in Appendix A).

3.7.2 Affected Environment

National Forest System land in the Icicle Creek drainage serves as one of the most popular recreation areas in the Pacific Northwest. The Alpine Lakes Wilderness is visited by nearly 150,000 people each year. An unpaved parking area located at the Snow Lakes Trailhead off Icicle Creek Road provides approximately 55 informal parking spaces and is frequently at or above capacity during the summer months, with vehicles often parking along the highway. Driving time to the Snow Lakes Trailhead parking area from the intersection of East Leavenworth Road and Icicle Creek Road/Icicle Road is approximately 5 minutes. Public access to recreational fishing opportunities is located at the end of the Fishing Access Road at the northern end of the LNFH. In addition to offering fishing opportunities, this area is also a popular location for river tubing and boating access on Icicle Creek between the Hatchery and the confluence of the Wenatchee River and Icicle Creek. A sport fishery occurs downstream from the Hatchery during years of abundant
Affected Environment and Environmental Consequences (Recreation)

LNFH Spring Chinook Salmon returns. Various recreation also occurs year-round on the Icicle River Trails, a system of informal trails located on a 200-acre parcel located on USFWS property at the LNFH. The five-mile Icicle River Trail is popular for Nordic skiing during winter months. The Icicle River Trail ticket booth and entrance to the trail system are located off Cyo Road. Informal parking is available at this location.

Two privately-owned and operated entities that offer lodging and recreational amenities are located within the Analysis Area. The Icicle River RV Resort is located adjacent to Icicle Creek approximately 0.2 miles downstream of the low-head diversion dam. The nearby Sleeping Lady Mountain Resort also offers overnight accommodations to visitors, a venue for meetings and events, and provides organized outdoor recreation on the Leavenworth Winter Sports Club trail system. The Icicle Creek Center for the Arts, located immediately west of the Sleeping Lady Mountain Resort, is an arts complex providing artist, instructor, student, guest, visitor, and staff amenities on 14 acres containing 19 buildings, including cabins, a theater and stage, an outdoor stage, music practice huts, a recital hall, and an extensive network of footpaths. The Icicle Creek Center for the Arts offers arts education and community programs, events, and activities throughout the year.

3.7.3 Environmental Consequences

Indicators and Assumptions

Indicators identified for analysis of potential impacts on recreation include:

- Changes in accessibility of local recreation areas, such as trail systems and fishing areas
- Change in quality or quantity of recreational opportunities
- Changes in LOS, a function of roadway capacity and traffic volume, on local roadways providing visitor access to recreation opportunities
- Increased traffic delays and reductions in parking availability

The analysis assumes that most vehicle trips along Icicle Road and Icicle Creek Road are recreation related. As described in Section 3.6.2, motorists travelling from the City of Leavenworth commonly access the Okanogan-Wenatchee National Forest and Alpine Lakes Wilderness from trailheads located along Icicle Creek Road.

Other assumptions used in the analysis are described in Appendix C, SWISP Project EIS Analysis Assumptions.

Alternative A – No Action Alternative

Continuation of current O&M of the LNFH surface water intake and delivery system on Icicle Creek would not result in any changes to the accessibility of local recreation areas, such as trail systems and fishing areas. The quality and quantity of existing recreational opportunities would remain unchanged, and roadway capacities and parking availability at recreational destinations such as trailheads would be unaffected. Overall, there would be no short-term or long-term changes to the quality of the recreation setting or quantity of recreation opportunities under Alternative A. However, in the absence of improvements to the LNFH surface water intake and delivery system on Icicle Creek, the existing intake and delivery system would continue to deteriorate and cause O&M
problems for the Hatchery. More frequent repairs to the system could be required, which would temporarily impact recreation users by decreasing the quality of the recreation setting from noise and traffic associated with the repairs, and temporarily displace recreation activities from the vicinity of the maintenance activities. In addition, if conditions were unchanged, fish production could decrease or, in event of catastrophic failure, cease altogether, resulting in adverse effects to recreational fishing in Icicle Creek.

**Alternative B – Proposed Action**

Under Alternative B, long-term benefits to recreational fishing would result from enhanced fish passage due to improvements at the Hatchery intake facilities. The improvements to aquatic species and resulting long-term productivity of the riverine ecosystem of Icicle Creek would contribute to an enhanced quality of recreational experience over the long term.

Under Alternative B, impacts to recreational users would be caused by temporary access constraints on Icicle Creek Road associated with the Phase I construction period as well as delays caused at the vehicle turnaround point approximately 1.25 miles southwest of the intake facilities. Most recreational visitors accessing areas downstream of the intake structure and near the LNFH (e.g., the public fishing area located at the end of Fishing Access Road, the Sleeping Lady Mountain Resort, and the Icicle Creek Center for the Arts) would experience minimal disturbance from construction-related vehicle traffic or CUAs. The temporary Hatchery water supply pipeline would not prohibit vehicular access over the spillway bridge, so recreational access to this area would not be impeded. Recreational visitors accessing areas upstream of the intake structure (such as the Snow Lakes Trailhead) would experience intermittent traffic delays resulting from trucks exiting and re-entering the highway from the designated turnaround point located at the Forest Service and Alpine Lakes Wilderness Area kiosk. Annual recreational visits at the Snow Lakes Trailhead are anticipated to decline by approximately 8 percent during the in-water work period from July 1 to November 15. Due to safety concerns, haul vehicles bypassing the Snow Lake Trailhead would temporarily eliminate 15 non-developed parking spaces along the roadside during a 138-day construction window. This would result in a maximum loss of approximately 4,761 visits. Construction-related activities, such as haul vehicles using the turnaround at the Forest Service and Alpine Lakes Wilderness Area kiosk, would also temporarily reduce available parking by 14 spaces resulting in an additional 4,444 visits lost. Overall, due to the above-described construction-related disturbances and access constraints related to staging, temporary negative impacts to recreational users would be experienced.

Where CUAs and associated access routes prevent recreational visitors from entering certain locations, impacts would result in noticeable reductions in the quality or quantity of recreational opportunities. For instance, amenities at Icicle River RV Resort would be temporarily reduced to accommodate lining of the conveyance pipeline at CUA 2 between April and May. One seasonal guest would be displaced by Project activities, should they occur within the April to May timeframe, as a result of the need to utilize up to five RV sites for staging, maneuvering, and ingress/egress related to the CUA 2 site where conveyance pipe lining would be installed. As described in Table 2-1 in Section 2.4.2, Alternative B – Proposed Action, construction activities at CUAs are anticipated to last up to 16 total days over the course of four to five weeks at each CUA.
Construction of several temporary access points on private lands along the conveyance pipeline alignment would be required to provide ingress and egress for construction. Noise propagated from construction activities could, depending on the timing and nature of visitor activities, be audible to visitors and guests utilizing indoor and outdoor facilities at the Icicle Creek Center for the Arts and Sleeping Lady Mountain Resort, as described in further detail in the following paragraphs.

At the Icicle Creek Center for the Arts, the locations of the CUAs and timing of activities could noticeably impair sound quality at noise-sensitive locations. CUA 4 would be located away from the theater, stage, rental cabins, and practice huts, and CUA 3 would be located on the south end of the staff and student parking lot. Although these locations are not near noise-sensitive areas of the Icicle Creek Center for the Arts, the loudest potential construction-related noise source, a hot air blower, would have the noise levels and attenuation distances depicted in Map 3-5 in Appendix A. Sound levels from the hot air blower would be between approximately 97 and 79 dB, which exceed the EDNA Class A noise levels and ambient equivalent sound levels (Table 3-3 and Table 3-4). BMPs (Appendix B) would help offset impacts from construction noise, including limiting Phase II construction to daytime hours (7:00 a.m. to 7:00 p.m., with potential extensions to 10:00 p.m.). As described in Table 2-1 in Section 2.4.2, Alternative B – Proposed Action, construction activities, and associated effects from noise, are anticipated to last up to 16 total days over the course of four to five weeks at each CUA. However, the hot air blower would only be needed for up to approximately four days over this period.

Similarly, noise could measurably affect visitor experience at the Sleeping Lady Mountain Resort. CUA 5, while not near guest accommodations, is located on USFWS property adjacent to the Sleeping Lady Mountain Resort. The associated contractor parking area would be located across Cyo Road. CUA 4 is located approximately 280 feet west of the fountain cluster of lodging facilities of the Sleeping Lady Mountain Resort and approximately 150 feet northwest of the Tadpole Meeting Room at the Resort. Noise propagated from construction activities at CUA 4 would potentially affect visitors and guests at these locations, depending on the timing and nature of visitor activities (see Map 3-5 in Appendix A). The durations of noise-generating construction activities at these CUAs would be the same as described above, and noise BMPs (Appendix B) would minimize impacts from construction noise. Light emitted during Phase I nighttime construction could potentially affect visitors and guests at the Icicle River RV Resort and other recreation facilities depending on the timing and nature of visitor activities. Because of the distance of the resort from construction activities and the screening from trees, impacts are anticipated to be minor. Further, BMPs (Appendix B) would be implemented to reduce impacts from construction lighting.

Alternative B would result in temporary, localized LOS reductions along Icicle Creek Road at the surface water intake and turnaround locations due to construction vehicle movements. The greatest intensity of Project activities and associated disturbances would occur from July 1 through November 15 during the in-water work period. When combined with recreational traffic, this would effectively result in adverse impacts to recreational visitors. Traffic delays are anticipated to be, on average, 10 minutes for motorists travelling to recreational destinations along Icicle Creek Road. These delays would be caused by the need for construction vehicles to access the LNFH surface water intake area off Icicle Creek Road, as well as a truck turnaround point located approximately 1.25 miles southwest of the intake facilities. BMPs, which would be incorporated into Project design
to minimize impacts to recreation, include prohibiting construction activities (such as parking, storage, or vehicle turnaround) in the Snow Lakes Trailhead parking area (Appendix B). No impacts to recreation are expected to occur during normal O&M for the expected service life of the Project once construction activities are complete.

**Alternative C**

Under Alternative C, Reclamation would line the entire upper segment of the conveyance pipeline on USFWS land rather than replace the pipeline as described under Alternative B. As a result, less disruption to recreational activities would occur under Alternative C than described under Alternative B. Effects to recreation users under Alternative C would be of lower intensity than under Alternative B given that the degree of noise and traffic disturbances would be reduced from Alternative B. This is because Alternative C would require less overall excavation of the conveyance pipeline, which would normally occur over several days and require daily hauling of equipment to construction sites, adding additional traffic and possible delays. Aside from these differences in recreational impacts due to replacement and lining of the conveyance pipeline, all other impacts to recreation (both adverse and beneficial) from Alternative C would be the same as described under Alternative B.

**Alternative D**

Under Alternative D, temporary changes in accessibility of local recreation areas during each Phase I construction season would be similar to those described under Alternative B. There would be less of a decline in annual recreational visits at the Snow Lakes Trailhead under Alternative D (a maximum loss of approximately 3,485 visits or approximately 6 percent of annual visits) as compared to Alternative B, due to the shorter in-water work window from July 1 to October 31. However, overall impacts to recreationists would be experienced over a longer total period compared with Alternative B. Instead of Project completion in 2024 as described under Alternative B, Project completion, including Phases I, II, and III of construction, would likely extend until 2025 under Alternative D. This means that Phase I construction-related disturbances, including noise, traffic delays, and temporary loss of recreationist parking along Icicle Creek Road and at the Snow Lakes Trailhead would extend for an additional two years, including during the peak recreation season for two additional seasons, compared with Alternative B.

As described under Alternative B, long-term benefits to recreational fishing would result from enhanced fish passage under Alternative D. However, temporary adverse impacts may occur during Phase I construction from the presence of noise generated at the spillway pool from two high capacity 16-inch diesel-powered pumps which would be in operation from November 1, 2022 to June 30, 2023 for the purpose of providing a temporary water supply to the Hatchery. These pumps would operate 24 hours per day, seven days per week during the eight-month period (Map 3-9 in Appendix A). Noise propagated from pumping during this period would potentially affect the experience of recreationists using the Icicle River Trails at the LNFH.

As described under Alternative B, temporary, localized LOS reductions would occur along Icicle Creek Road at the intake and turnaround locations due to construction vehicle movements. These reductions in LOS would extend for an additional two years of construction seasons under Alternative D as compared with Alternative B, including during the peak recreation season for two additional seasons, compared with Alternative B. Similarly, delays would be caused by the need for
construction vehicles to access the surface water intake area on Icicle Creek, as well as at the truck turnaround point located approximately 1.25 miles above the intake access road, at the Forest Service and Alpine Lakes Wilderness Area kiosk. Under Alternative D, these delays would extend for an additional two years of Phase I construction seasons as compared with Alternative B. No impacts to recreation are expected to occur resulting from O&M activities for the expected service life of the Project once construction is complete.

3.8 Environmental Justice

3.8.1 Analysis Area
The Analysis Area for environmental justice is shown in Map 3-12 in Appendix A. It includes the City of Leavenworth and Chelan County, Washington. Data were collected from these geographic areas to best represent the Analysis Area.

3.8.2 Affected Environment

Low-Income and Minority Populations
The CEQ guidance on environmental justice (CEQ 1997) defines low-income populations based on the U.S. Census Bureau’s annual statistical poverty thresholds. The U.S. 2018 poverty level is based on total income of $12,140 for an individual and $25,100 for a family of four (HHS 2018). The CEQ guidance does not specify percentage guidelines for defining a population as low income; for this analysis, this is defined as an area where the number of individuals living below the poverty line exceeds 50 percent of the total population, or if the percentage of the low-income population is meaningfully greater than the percentage below poverty in the comparison population. The CEQ guidance defines a minority population as one where an individual group or the aggregate population of all minority groups combined exceeds 50 percent of the total population, or if the percentage of the population comprising all minority groups is meaningfully greater than the minority population percentage in the broader region. Chelan County and the City of Leavenworth do not meet the criteria for low-income and minority environmental justice populations. As a result, no minority or low-income populations have been identified for further environmental justice consideration at these geographic levels.

Native American Tribes
Potentially affected minority populations include members of area Native American Tribes. Tribal affiliated groups with a connection to resources within the Analysis Area include members of the Yakama Nation and Colville Tribes. Both Tribes have legally defined fishing rights in the Analysis Area. These groups represent populations of environmental justice concern.

3.8.3 Environmental Consequences

Indicators and Assumptions
The indicator used for potential impacts on environmental justice is:

- Disproportionate environmental effects on low-income, minority and Tribal populations
3. Affected Environment and Environmental Consequences (Environmental Justice)

Project assumptions are described in Appendix C, SWISP Project EIS Analysis Assumptions.

**Alternative A – No Action Alternative**

Impacts under Alternative A would be indirectly related to the potential reduction in fishing opportunities, as described in the SWISP Project EIS Socioeconomics and Environmental Justice Report. Ongoing impacts on fish passage from LNFH operations would continue, and LNFH fish production, Tribal fish programs, and the quality of the Tribal fishery could be jeopardized in the future due to continued degradation of existing facilities. Such effects would impact all users, regardless of income level or ethnicity, and therefore, there would not be disproportionate environmental effects on low-income, minority, and Tribal populations. Impacts to Tribal fisheries are discussed in Section 3.10, Tribal Interests.

**Alternative B – Proposed Action**

Alternative B is not expected to result in disproportionate environmental effects on low-income, minority, and Tribal populations because these populations do not reside in the Analysis Area. However, there are Tribal populations which use the fishery resource to meet subsistence needs. Impacts to Tribal fisheries are discussed in Section 3.10, Tribal Interests.

**Alternative C**

Impacts to environmental justice under Alternative C would be the same as described under Alternative B.

**Alternative D**

Impacts to environmental justice under Alternative D would be the same as described under Alternative B.

3.9 Public Health and Safety

3.9.1 Analysis Area

The Analysis Area for public health and safety is shown in Map 3-13 in Appendix A.

3.9.2 Affected Environment

The LNFH is an active site, where employees are exposed to weather and other safety concerns during daily operations. Snow and ice removal from the existing intake facilities, especially from the fine rack in the gatehouse, is one of the primary safety concerns. Employees must manually remove ice and debris so it does not accumulate on the racks and prevent water from entering the system. This requires employees to move on and around icy, slippery surfaces while trying to remove ice and debris from the structures.

Icicle Creek Road is the only access point to the existing surface water intake facilities and would be used for all construction vehicles to access the Phase I construction area. Icicle Creek Road is also the only transportation corridor for residents in the Icicle Creek canyon, upstream of the existing intake facilities, and for the Snow Lakes Trailhead.
As described in Section 3.7, Recreation, the Icicle River RV Resort, Sleeping Lady Mountain Resort, and Icicle Creek Center for the Arts provide lodging and artist, instructor, student, guest, visitor, and staff amenities. The Icicle River RV Resort is located adjacent to Icicle Creek and approximately 0.2 miles downstream of the low-head diversion dam. Access to the Icicle River RV Resort is via Icicle Creek Road. The nearby Sleeping Lady Mountain Resort and the Icicle Creek Center for the Arts are located adjacent to Icicle Creek Road and are also accessed via this road. The Sleeping Lady Mountain Resort can also be accessed via Cyo Road, off of Icicle Creek Road.

3.9.3 Environmental Consequences

Indicators and Assumptions
The indicator used for potential impacts on public health and safety is:

- Change in health and safety concerns for the public, construction workers, and LNFH staff

Project assumptions are described in Appendix C, SWISP Project EIS Analysis Assumptions.

Under all action alternatives, hazardous materials would either be recycled or disposed of at an appropriately permitted treatment or disposal facilities. Any accidental release of hazardous materials would be cleaned up according to the Contractor’s Spill Prevention, Control, and Countermeasure (SPCC) Plan (see Appendix B). Proper disposal of hazardous materials and implementation of the SPCC in case of an accidental spill of hazardous materials would decrease the risk of hazardous material spills during construction of the proposed action and provide for quick cleanup of any spills that may occur.

Reclamation would require the contractor to follow the regulations included in CFR 1926.62 for lead removal and 40 CFR 402/404 for the safe removal of lead-based paints to limit lead exposure and ensure the health of construction workers. Adherence to CFR 1926.62 and associated safety regulations would minimize the risk of lead exposure during removal of these structures and maintain the health of construction workers.

Alternative A – No Action Alternative
Under Alternative A, impacts to the safety of LNFH employees would continue associated with O&M activities for the intake trashrack structure and conveyance pipeline. Because the existing sediment sluice does not function reliably, difficulties and inefficiencies in removing accumulated sediment from the intake channel and associated O&M and safety issues would persist. The existing intake facilities would not be modified, which would continue unsafe work conditions for workers attempting to clear the intake trashrack structure of debris, snow, or ice, especially during frazil ice events. Employees would also continue to experience safety issues in the existing gatehouse related to hazardous materials (lead paint), fine rack maintenance, and sediment removal.

Alternative B – Proposed Action
Proposed improvements would no longer require LNFH staff to access the existing intake facilities and gatehouse during icy, slippery conditions to remove frazil ice and snow. This would have the beneficial effect of decreasing the risk of injury from unsafe conditions for LNFH employees.
3. Affected Environment and Environmental Consequences (Public Health and Safety)

compared with Alternative A. Occupational Safety and Health Administration regulations for worker safety would be followed during construction under Alternative B, minimizing the potential for injury.

Phase I construction activities could take place up to 24 hours per day, six days per week, and up to seven days per week. Phase II construction activities could occur during workday hours of 7:00 a.m. to 10:00 p.m., five days per week, and up to six days per week. However, the Project specifications require workday hours of 7:00 a.m. to 7:00 p.m., five days a week, with potential extensions (to 10:00 p.m. or six days per week) requiring Reclamation’s COR approval. While residential traffic levels would decrease during the night, the added construction traffic could increase the risk of accidents. Increased risk of vehicular accidents with either wildlife or other drivers could be caused due to the lack of light, shadows, blinding light, or increased fatigue. In addition, construction noise and light pollution could affect local residents at nearby houses, and guests and visitors at the Icicle River RV Resort, Icicle Creek Center for the Arts, and the Sleeping Lady Mountain Resort. Section 3.5, Noise and Vibration outlines permissible noise levels for construction. Between 7:00 p.m. and 7:00 a.m., the noise limitations in Table 3-3 shall be reduced by 10 dBA for receiving property in Class A areas. This would reduce possible noise impacts on local residents, which could include health-related impacts such as disrupted sleep patterns from construction traffic or discomfort from construction noise. The risk of fire resulting from construction-related activities is considered low due to the application of BMPs (Appendix B) designed to minimize this risk and adherence to the Fire Protection Plan and Fire Prevention Plan developed by the construction contractor.

As discussed in Section 3.7, Recreation, noise BMPs (Appendix B) such as limiting Phase II construction to daytime hours (7:00 a.m. to 7:00 p.m.) would offset noise-related impacts on artists, instructors, students, guests, visitors, and staff at the Icicle River RV Resort, Icicle Creek Center for the Arts, and the Sleeping Lady Mountain Resort during construction at CUAs. As described in Table 2-1 in Section 2.4.2, Alternative B – Proposed Action, construction activities, and associated effects from noise, are anticipated to last up to 16 total days over the course of four to five weeks at each CUA. However, the loudest construction activity at CUAs, using the hot air blower to dry the conveyance pipeline prior to lining, would only be needed for up to approximately four days over this period.

Under Alternative B, traffic would increase on Icicle Creek Road during construction. Reclamation would implement a traffic control program to maintain traffic flow through the Analysis Area and minimize public exposure to construction traffic. Reclamation would also implement BMPs included in Appendix B to maintain traffic flow and protect public safety, including visitors to the Icicle River RV Resort, Icicle Creek Center for the Arts, and the Sleeping Lady Mountain Resort.

The proposed configuration of the intake access road under Alternative B would not allow for safe construction vehicle turnaround; therefore, large construction vehicles would use a turnaround area at the Forest Service kiosk west of the intake construction area. Construction contractors would obtain a road use permit from the Forest Service prior to construction, provide flaggers to direct traffic, and install signs to prevent Snow Lakes Trail users from parking on or near the turnaround area.
3. Affected Environment and Environmental Consequences (Public Health and Safety)

Reclamation has identified temporary access routes through the Icicle River RV Resort, Icicle Creek Center for the Arts, and the Sleeping Lady Mountain Resort to access CUAs 2, 3, and 4 required for lining several sections of the conveyance pipeline (Figure A-9 and Figure A-10 in Appendix A). To enhance safety of pedestrians and other users in the Analysis Area, Reclamation would coordinate with these entities to separate construction traffic from public access where feasible using traffic control BMPs identified in Appendix B.

Alternative C
Impacts to public health and safety under Alternative C would be the same as those described under Alternative B.

Alternative D
Types of impacts to public health and safety under Alternative D would be the same as those described under Alternative B; however, the timing and duration of Phase I construction work would change. Alternative D would restrict work on Phase I to the workday hours of 7:00 a.m. to 10:00 p.m.; restricting the construction work hours would require two additional years to complete Phase I construction compared to Alternative B, for a total of four years. The extra construction seasons for Phase I would continue the risk of impacts to public health and safety described under Alternative B for an additional two years. Because Phase I construction work would not take place from 10:00 p.m. to 7:00 a.m., this would reduce the risk of vehicular accidents and noise impacts to sensitive receptors near the intake structure during these times as compared with Alternative B.

Between the first two in-water work window Phase I construction seasons, from November 1, 2022 to June 30, 2023, the temporary Hatchery water supply would be pumped using two high capacity diesel-powered pumps that would operate 24 hours per day and seven days per week for a total duration of approximately eight months. This would result in a longer total duration of daytime noise and more nighttime noise as compared with Alternative B. Map 3-9 in Appendix A indicates that noise levels would exceed the nighttime Class A EDNA of 45 dBA or less for several residences off East Leavenworth Road and Cemetery Road near the spillway pool, although the ambient noise study characterized the ambient noise levels around the Project as already being elevated over noise thresholds (Table 3-4 in Section 3.5.3). Nighttime noise impacts could include disrupted sleep patterns and general discomfort.

3.10 Tribal Interests

3.10.1 Analysis Area
The Analysis Area for Tribal Interests includes the Tribal fishery on Icicle Creek just downstream of the spillway pool at RM 2.8, and the Project’s APE, which begins at an area centered on the existing intake facilities and follows the route of the conveyance pipeline to its end point at the sand settling basin (Map 3-14 in Appendix A). In 2020, the USFWS as the designated lead agency for carrying out the National Historic Preservation Act (NHPA) Section 106 review for this Project, received concurrence from the Washington State DAHP on the Project’s APE.
3. Affected Environment and Environmental Consequences (Tribal Interests)

3.10.2 Affected Environment

**Indian Sacred Sites**

EO 13007, Indian Sacred Sites (May 24, 1996), directs federal agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites on federal land. The EO further directs agencies to provide reasonable notice for proposed land actions or policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. The EO defines a sacred site as a “specific, discrete, narrowly delineated location on federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.”

Sacred sites may include ceremonial areas and natural landmarks that are religious or symbolic representations. Sacred sites are typically identified during NHPA Section 106 consultation (54 USC 300101) or during Government-to-Government consultation. Consultation that has occurred for the SWISP Project is detailed in Chapter 4, Consultation and Coordination. To date, no sacred sites have been identified in the Analysis Area.

**Indian Trust Assets**

Indian Trust Assets (ITAs) are legal interests in property held in trust by the U.S. for Indian Tribes or individuals. ITAs include trust lands, natural resources, trust funds, or other assets held by the federal government in trust. An ITA has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset.

The Department of the Interior requires that all impacts to trust assets, even those considered nonsignificant, be analyzed in NEPA documentation, and that appropriate compensation and/or mitigation be implemented for impacts. To date, coordination with the Yakama Nation and Colville Tribes has occurred as part of NHPA Section 106 consultation, which was completed April 2020, and as part of the NEPA process, as initiated with publication of the NOI in April 2020 (see Section 4.2.3, Tribal Coordination, Communication, and Consultation).

There are no Native American lands, including reservation and trust lands, within 25 miles of the Analysis Area (Reclamation GIS 2020). The Analysis Area is on federal and private lands that do not occur on any identified or known trust lands or otherwise relate to any trust assets.

**Tribal Fisheries and Culturally Important Plants and Wildlife**

**Tribal Fisheries**

The Yakama Nation and Colville Tribes have legally defined fishing rights in the Analysis Area and fishing in Icicle Creek is closely tied to the cultural traditions of the Wenatchi people (USFWS 2002). Tribal members mainly fish the portion of Icicle Creek at and just downstream of the spillway pool at RM 2.8, referred to as the Wenatshapam Fishery; fishing occurs from both left and right banks. Ceremonial and subsistence fishing, consisting of scaffolding repair, ceremonies, and fishing, typically occur between April and July. Scaffolding repairs typically occur in April each year and ceremonies take place the first weekend in May. There are no exact dates for the Tribal fishing window. The fishery is dependent upon the return of Spring Chinook Salmon to Icicle

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Creek. The trend over the last several years has been that fishing starts late-May and runs through July.

**Culturally Important Plants and Wildlife**  Historical Wenatchi subsistence practices revolved around the seasonal availability of specific resources. Anadromous salmon is considered to have been the primary traditional staple food among the Wenatchi (Miller 1998; Ray 1933), and Wenatchi people from both the Yakama Nation and Colville Tribes have continued to fish at the Wenatshapam Fishery, as described above (Shutler 2011).

Among plant foods, edible roots and bulbs were the most significant in terms of their contribution to subsistence. These plants included bitterroot, arrowleaf balsamroot, various types of *Lomatium*, and camas (Scheuerman 1982), with roots gathered from late spring into the summer months. An important camas gathering area for the Wenatchi was located in the present-day City of Leavenworth (Sharley and Hamilton 2017), approximately 3 miles north of the Analysis Area. Various types of berries were also an important food and were gathered from mountain locations in the summer and fall. Deer, mountain goat, bear, and elk were among the primary animals hunted by the Wenatchi (Curtis 1911; Miller 1998; Ray 1933), with other smaller mammals and birds also hunted. Coordination with the Yakama Nation and Colville Tribes (see Section 4.2.3, Tribal Coordination, Communication, and Consultation) to date has not identified traditional or culturally important hunting or plant gathering areas.

### 3.10.3 Environmental Consequences

**Indicators and Assumptions**

Impact indicators for Indian sacred sites are the potential for disturbing or limiting access to such sites. Impact indicators for ITAs are the potential for effects to ITAs.

Impact indicators for Tribal fisheries and culturally important plants and wildlife include:

- Changes in access to and activities at the Wenatshapam Fishery
- Changes in access to traditional plant gathering and hunting areas
- Disturbance or removal of culturally important plants

Assumptions used in this analysis are as follows:

- Reclamation policy is to avoid impacts on Indian sacred sites whenever possible. Continued coordination with affected Tribes may result in future identification of sacred sites. If this occurs, Reclamation would further evaluate impacts on these resources. Consultation with the Yakama Nation and Colville Tribes would identify how to protect sacred sites if they were identified and how to provide continued access if any such sites were affected by Project construction.
- Because there are no ITAs in the Analysis Area, minimizing or offsetting impacts on ITAs is not required.
- In-water work would not occur in the spillway pool during the Tribal fishing preparations or season.
Additional Project assumptions used in the analysis are described in Appendix C, SWISP Project EIS Analysis Assumptions.

**Alternative A – No Action Alternative**

**Indian Sacred Sites** Impacts on Indian sacred sites are not anticipated under the No Action alternative. This is because to date, Reclamation has not identified any Indian sacred sites in the Analysis Area.

**Indian Trust Assets** Impacts on ITAs would not occur under the No Action alternative. This is because there is no trust land or other trust assets in the Analysis Area.

**Tribal Fisheries and Culturally Important Plants and Wildlife** There would not be changes in access to or activities at the Wenatshapam Fishery. Traditionally and culturally important hunting or plant gathering areas have not been identified specific to the Analysis Area and would therefore not be impacted.

Ongoing effects on fisheries and aquatic ecosystems in the Analysis Area, such as impacts on fish passage, would continue due to LNFH operations (see Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems). Further, fish production at the Hatchery, which provides a harvestable surplus of Spring Chinook Salmon facilitating the Tribal fishery, tribal fish program, and the quality of the Tribal fishery, could be jeopardized in the future due to continued degradation of the system.

**Alternative B – Proposed Action**

**Indian Sacred Sites** To date, Reclamation has identified no Indian sacred sites in the Analysis Area. Therefore, no impacts are anticipated to the access to or use of Indian sacred sites or to the physical integrity of such sites.

**Indian Trust Assets** Alternative B would not occur on any identified or known trust lands or trust assets. Therefore, there would be no impacts on ITAs under Alternative B.

**Tribal Fisheries and Culturally Important Plants and Wildlife** As described in Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems, Alternative B would improve fish passage and reduce the potential for entrainment in the existing intake facilities over the long term. It would also improve the reliability of water delivery and the ability to meet Hatchery production goals. These would be benefits to the Tribal fishery.

Changes to access to the Wenatshapam Fishery are not anticipated during construction or subsequent O&M activities. Further, there would be no change to activities at the fishery because of O&M. However, there could be temporary impacts to fishing activities during construction.
construction activities would impact access to the fishery. Temporary traffic delays along Icicle Creek Road would occur during the Phase I and Phase II construction periods (see Section 3.6, Transportation and Traffic) but are not expected to affect access to the Tribal fishery, as multiple access points to the fishery are available from East Leavenworth Road. The majority of Tribal fishing activities would occur outside of the proposed in-water work window (i.e., July 1 to November 15) and no in-water construction work would occur in the fishing areas. Any in-water construction that would occur between July 1 and November 15 would occur during Phase I at the intake construction area over 1 mile upstream from the fishery. There would be, however, some overlap of land-based construction activities in April and May with the Tribal fishing period.

Temporary Hatchery water supply pumping at the spillway pool during Phase I of construction (approximately one week in mid-July 2022) and during Phase II of construction (in mid-April to mid-May 2022, 2023, and 2024) may overlap some scaffolding repair, ceremonial, and/or fishing activities, depending on timing of such activities, but would not impact the ability of the Tribes to perform these functions. Noise would be generated during pumping at the spillway pool that would exceed Class A EDNA noise levels and could exceed ambient noise levels (see Section 3.5, Noise and Vibration, and Map 3-9 in Appendix A). The noise generated by the diesel-powered pumps and potential smell from the diesel could disrupt or annoy Tribal members performing activities at the fishery. Pumping at the spillway pool could potentially lead to temporary behavior modifications of fish in the vicinity of the pump, including avoidance of the immediate area and displacement to other areas of Icicle Creek. However, it is uncertain if these behaviors would result in any impact on fishing success and catch rates. Pumping would utilize NMFS-approved screened sump pumps to ensure a continuous water supply to the Hatchery while reducing the potential for injury or mortality to fish (see Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems). Other potential impacts to Tribal fishers from pumping at the spillway pool could include a reduction in area to fish due to the physical presence of pump screen boxes within the spillway pool or possible entanglement of fishing equipment with pumps and screen boxes. The construction contractor would coordinate with Reclamation, USFWS, and the Tribes regarding the location of the temporary Hatchery water supply pumps, pump screen boxes in the spillway pool, and temporary pipeline alignment prior to pumping to ensure access and implementation of the Tribal fishery would not be impeded. Retrieval of the pumps and pump screen boxes may overlap briefly with the Tribal fishery depending on the timing of the fishery. The temporary pipeline would not prohibit vehicular access over the spillway bridge.

Map 3-3, Map 3-5, and Map 3-7 in Appendix A show the noise attenuation distances under Alternative B for the stationary noise sources (pneumatic tool and hot air blower) and mobile noise sources (a single truck) on area roads, respectively. Of these noise sources, the hot air blower used at CUA 5 during Phase II construction would generate noise that would be above the acceptable noise level of 55 dBA at the fishing platforms. The potential for disruption of fishing activities at the fishing platforms due to temporary noise from the hot air blower would depend on the timing of both fishing and hot air blower use. Phase II construction timing most likely would not overlap much or at all with Tribal fishing activities.

No traditional or culturally important hunting or plant gathering areas have been identified specific to the Analysis Area; therefore, access to such areas would not be affected under Alternative B.
Construction activities would result in removal of limited amounts of ponderosa pine savanna and mixed conifer woodland (see the SWISP Project EIS Biological Resources Report); culturally important plants may grow in these areas. However, coordination with the Yakama Nation and Colville Tribes (see Section 4.2.3, Tribal Coordination, Communication, and Consultation) to date has not identified vegetation in the Analysis Area as culturally important, and BMPs (Appendix B) would be implemented to minimize disturbance to native vegetation.

**Alternative C**

**Indian Sacred Sites**  Effects on Indian sacred sites under Alternative C would be the same as described under Alternative B.

**Indian Trust Assets**  Effects on ITAs under Alternative C would be the same as described under Alternative B.

**Tribal Fisheries and Culturally Important Plants and Wildlife**  Long-term benefits to the Tribal fishery described for Alternative B would be the same under Alternative C. Effects on the Wenatchapam Fishery and culturally important hunting or plant gathering areas would be similar to those described under Alternative B. Impacts from pumping out of the spillway pool to Tribal fishing activities would be the same as under Alternative B. Slightly less vegetation that could support culturally important plants would be disturbed during construction at the intake construction area compared to Alternative B, because lining the conveyance pipeline with CIPP would cause less surface disturbance and vegetation removal than replacing the same segment. However, as described under Alternative B, vegetation in the Analysis Area has not been identified as culturally important to date.

**Alternative D**

**Indian Sacred Sites**  Effects on Indian sacred sites under Alternative D would be the same as described under Alternative B.

**Indian Trust Assets**  Effects on ITAs under Alternative D would be the same as described under Alternative B.

**Tribal Fisheries and Culturally Important Plants and Wildlife**  Long-term benefits to the Tribal fishery under Alternative D would be the same as described under Alternative B. Likewise, there would be no change in access to the Wenatchapam Fishery during construction or subsequent O&M activities or changes to activities at the fishery from O&M under Alternative D. Temporary traffic delays along Icicle Creek Road are not expected to affect access to the Tribal fishery as described under Alternative B. Under Alternative D, Phase I construction activities would only occur five days per week, and up to six days per week under pre-approved circumstances versus up to seven days per week under Alternative B. However, Phase I construction activities would occur over two more construction seasons than Alternative B. Temporary impacts to Tribal fishing activities during Phase I construction could occur, and the duration of such impacts during Phase I would occur over a longer period of time than for Alternative B. Temporary disturbance to Tribal fishers from noise during Phase II construction would be the same as described under Alternative B.
Pumping from the spillway pool would occur during Phase I of construction and could result in temporary impacts to Tribal fishing activities. In addition to the approximately one week of pumping at the spillway pool during Phase I of construction in mid-July 2022 described for Alternative B, water would need to be pumped from the pool continuously for an additional eight months (November 1, 2022 through June 30, 2023) under Alternative D to supply water to the Hatchery. Pumping activities during 2023 for Phase I would therefore overlap all activities occurring at the Tribal fishery between April and the end of June 2023. Pumping would temporarily impact the ability of the Tribes to perform scaffolding repair, ceremonial, and fishing activities and, the temporary construction noise generated could exceed community noise level limits (see Section 3.5.3, Noise and Vibration) and disturb and annoy Tribal members. Sound generated by diesel-powered pumps may result in avoidance or displacement of fish, as described under Alternative B, and would continue for more than half of the Tribal fishing season. Two high capacity diesel-powered pumps would be used during the eight-month period in Phase I with an additional back-up pump on site. Potential reduction in area for Tribal members to fish or possible entanglement of fishing equipment with pumps and screen boxes could also occur as described under Alternative B, but would occur over a longer period under Alternative D. The construction contractor would coordinate with Reclamation, USFWS, and the Tribes regarding location of the temporary Hatchery water supply pumps, pump screen boxes, and temporary pipeline route alignment, as described for Alternative B. Relying on pumps operating continuously for eight months would also create a risk of temporary impacts to Hatchery production (see Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems). Temporary Hatchery water supply pumping at the spillway pool during Phase II of construction and associated potential impacts to activities at the Tribal fishery would be the same as described for Alternative B.

Access to traditional or culturally important hunting or plant gathering areas would not be affected since such areas have not been identified within the Analysis Area. Limited removal of vegetation under Alternative D would be the same as described under Alternative B and has not been identified as culturally important. BMPs (Appendix B) would be implemented to minimize disturbance to native vegetation.

### 3.11 Short-Term Uses and Long-Term Productivity

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR, Subpart 1502.16). This involves using all practicable means and measures, including financial and technical assistance, in a manner calculated to: foster and promote the general welfare; create and maintain conditions under which man and nature can exist in productive harmony; and fulfill the social, economic, and other requirements of present and future generations of Americans. Short-term refers to the temporary phases of construction for the SWISP Project, while long-term refers to the expected service life of the Project and beyond.

All action alternatives analyzed in this EIS would involve new construction, such as installing a new headworks and creek-width roughened channel and replacing portions of the surface water conveyance pipeline to the Hatchery. Current access routes into the intake facilities would also be
modified and extended to provide better entry to an expanded IO&MA. Short-term uses related to implementation of the action alternatives would include construction activities resulting in temporary impacts such as increased noise, traffic delays, disturbances to recreational access and Tribal fishers, and increases in fugitive dust. The temporary installation of cofferdams to isolate the instream work area would confine surface water flow through a constricted portion of Icicle Creek during construction and temporarily reduce fish passage. These impacts would be balanced through the implementation of BMPs listed in Appendix B, as applicable.

Short-term benefits would result from increased employment (construction jobs) and revenue generated for the local economy during the construction phases.

Long-term productivity of fish and aquatic species would result from the new surface water intake facilities implemented under the action alternatives. This would result from improved fish passage and access to upstream habitat, and minimization of take through the new, screened intake and NMFS-compliant fish screens of the action alternatives. The improvement of fish passage would also result in the long-term productivity to the recreational and Tribal fisheries. The Draft Phase III Riparian Revegetation Plan (Appendix D) would increase the structural diversity and species composition of upland and riparian vegetation near the intake construction area, which could improve the long-term productivity of vegetation communities, wildlife habitat, and water quality.

### 3.12 Unavoidable Adverse Impacts

Unavoidable adverse impacts are those impacts on natural and human resources that would remain after mitigation measures have been applied. They are environmental consequences of an action that could not be avoided, either by changing the nature of the action or through mitigation. After consideration of actions, operations, and features to avoid, minimize, or compensate for adverse effects, as detailed in Appendix B, the action alternatives would likely result in the unavoidable adverse impacts detailed below.

There would be unavoidable adverse impacts occurring during construction of the action alternatives, including changes to the visual landscape, increased air emissions, and localized impacts on geology. These impacts are detailed in the SWISP Project EIS Resource Reports, available on the Project website: [https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html](https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html).

**Biological Resources.** Under the No Action alternative, adverse impacts to fish passage, aquatic habitat quantity and connectivity, and habitat quality resulting from the existing surface water intake and delivery system would continue. Continuing current operations and maintenance of the deteriorating facilities would not fulfill the requirements of the 2017 NMFS Biological Opinion (NMFS 2017a). The unreliability of the system would also jeopardize the Hatchery’s objectives for Spring Chinook Salmon production as required by the *U.S. v. Oregon* Management Agreement (Agreement Parties 2018).

**Noise.** Unavoidable adverse impacts from noise or vibration would occur during Project construction to varying degrees depending on the action alternative. Ambient noise levels for
sensitive receptors would intermittently experience temporary increases due to construction vehicle and equipment use.

Public Health and Safety. Hatchery employees would continue to experience unavoidable adverse impacts under the No Action alternative resulting from operations and maintenance activities for the intake trashrack structure, particularly during frazil ice events. Employees would also continue to be exposed to lead-based materials from the gatehouse and intake access pad.

Recreation. Recreational visitors would experience unavoidable adverse impacts through intermittent traffic delays, reductions in access to the Icicle River Trail System, and reductions in available parking at the Snow Lakes Trailhead during various periods of Project construction under all action alternatives. Visitor experience at the Icicle River RV Resort, Icicle Creek Center for the Arts, and Sleeping Lady Mountain Resort would be temporarily adversely impacted from disruptions to patron access or facility use, or from noise or views associated with construction equipment.

Transportation. The action alternatives would result in temporary unavoidable adverse impacts on traffic and transportation and an increase in delays and frustration of drivers during Project construction. Likewise, delays associated with vehicles crossing the Wenatchee Bridge, turning around at the Forest Service and Alpine Lakes Wilderness Area kiosk, and backing into the intake construction area would result in a change of LOS on the roads. These changes would also delay access on roads by inhibiting access to points of interest within the Analysis Area.

Tribal Interests. Tribal fishers could experience temporary unavoidable adverse impacts to fishing activities from noise generated from hot air blowers and diesel-powered pumps and the physical presence of pump screen boxes in the spillway pool under all action alternatives.

3.13 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments involve the use of nonrenewable resources and the effects of use on future generations. Irreversible effects primarily result from the use or destruction of specific resources that cannot be replaced within a reasonable time frame, such as energy and minerals. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action, such as extinction of a listed species or the disturbance of a cultural resource.

The action alternatives would result in the irreversible and irretrievable commitment of the following resources during Project construction and operation:

- Construction materials, including resources such as soil and rocks
- Labor
- Land area committed to new/expanded Project facilities
- Energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for Project construction and operations
Nonrenewable resources are expected to account for a minimal portion of the region’s resources; the Project’s use of nonrenewable resources would not affect the availability of these resources for other needs within the region. Construction would not result in inefficient use of energy or natural resources. The selected construction contractors would use best available engineering techniques, construction and design practices, and equipment operating procedures.
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Chapter 4. Consultation and Coordination

4.1 Introduction

This chapter describes the consultation and coordination among Reclamation and other federal, state, and local agencies, Native American Tribes, and the public in preparing this EIS. Reclamation followed the public involvement requirements documented in the CEQ regulations implementing NEPA (40 CFR 1501.9 for scoping, and 1506.6 for public involvement). NEPA and associated laws, regulations, and policies require Reclamation to seek public involvement early and throughout the EIS process, to develop a reasonable range of alternatives to the proposed action, and to prepare environmental documents that disclose the potential impacts of the proposed action and alternatives. As summarized in Section 1.6, Public Involvement, and fully detailed in the public Scoping Report (Reclamation 2020a), Reclamation involved the public, Tribes, and other agencies in the development of the EIS through Federal Register notices, news releases, VPM websites, live Question and Answer/Public Comment video teleconferences, and updates on Reclamation’s Project website.47

4.2 Consultation and Coordination

Federal laws require Reclamation to consult with certain federal and state agencies, other entities, and Native American Tribes during the NEPA decision-making process (40 CFR 1502.24). Reclamation is also directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays (40 CFR 1500.4-5).

4.2.1 Cooperating and Participating Agencies

Cooperating agencies are those federal, state, and local agencies, and Tribes, that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative (40 CFR 1508.5). At the outset of the EIS process, Reclamation, as the lead agency, asked federal, state, and local agencies and Tribes if they would like to be cooperating agencies. Those entities that declined the cooperating agency request but desired to participate in the EIS processes became participating agencies. Cooperating and participating agency statuses are as follows:

Cooperating Agencies
- USFWS
- USACE
- Yakama Nation

47 The project website can be accessed at: https://www.usbr.gov/pn/programs/leavenworth/swisp/index.html.
4. Consultation and Coordination (Consultation and Coordination)

**Participating Agencies**
- Chelan County
- Colville Tribes (Fish and Wildlife Department)\(^{48}\)
- NMFS
- Forest Service
- Washington State DAHP
- Ecology
- WDFW
- Washington State Department of Natural Resources (WDNR)

Reclamation has held numerous meetings with the cooperating and participating agencies throughout the Project design and EIS development process and will continue through development of the ROD. Cooperating and participating agency meetings were held at Project and permitting milestones and as needed. The purpose of these meetings was to inform and receive input from cooperating and participating agencies respective to their jurisdiction, special expertise, or interests. Reclamation has also met with various interested parties (particularly through participation in the Icicle Work Group) and will continue outreach throughout the NEPA process. Meetings with the cooperating and participating agencies throughout the Project design and EIS development process are summarized in Table 4-1.

**Table 4-1. Cooperating and Participating Agency Meetings**

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<th>Meeting</th>
<th>Date</th>
<th>Cooperating and Participating Agency Representation</th>
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<tr>
<td>Biweekly design meetings</td>
<td>Starting March 6, 2019</td>
<td>USFWS, Yakama Nation, Colville Tribes</td>
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<td>30 percent Design, Permitting, and ESA Meeting</td>
<td>October 23, 2019</td>
<td>USFWS, Yakama Nation, Colville Tribes, NMFS, USACE, Ecology, WDFW, WDNR, Chelan County</td>
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<td>Value Engineering Study</td>
<td>November 4-8, 2019</td>
<td>USFWS, WDFW</td>
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<td>60 percent Design, Permitting, and ESA Meeting</td>
<td>February 19, 2020</td>
<td>USFWS, Yakama Nation, Colville Tribes, NMFS, USACE, Ecology, WDFW, WDNR, Chelan County</td>
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<td>NEPA kickoff field visit</td>
<td>March 11, 2020</td>
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<td>Alternatives Screening</td>
<td>April 14, 2020</td>
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<td>Colville Tribes Kickoff Meeting</td>
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<td>90 percent Design, Permitting, and ESA Meeting</td>
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<td>USFWS, Yakama Nation, Colville Tribes, NMFS, USACE, Ecology, WDFW, WDNR, Chelan County</td>
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</table>

\(^{48}\) Although the Colville Tribes have not accepted the invitation to become a cooperating agency, they are listed as a participating agency because a representative from the Fisheries Department has been actively engaged with the design and planning for the SWISP Project since its inception.
4. Consultation and Coordination (Consultation and Coordination)

<table>
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<th>Meeting</th>
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<th>Cooperating and Participating Agency Representation</th>
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<td>Biological Assessment Coordination</td>
<td>August 17, 2020,</td>
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<td>Final Design Update, Permitting, and ESA Meeting</td>
<td>September 9, 2020</td>
<td>USFWS, USACE, WDFW, Ecology, Yakama Nation, Chelan County, NMFS</td>
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4.2.2 Interested Parties

Interested parties were identified by their proximity to the SWISP Project or through their involvement in the Icicle Work Group that was co-convened in December 2012 by Chelan County and Ecology’s Office of Columbia River to find collaborative solutions for water management within the Icicle Creek Watershed. Interested parties include:

- Cascade Orchard Irrigation Company
- City of Leavenworth
- Icicle Creek Center for the Arts
- Icicle/Peshastin Irrigation District
- Icicle River RV Resort
- Icicle Watershed Council
- Icicle Work Group
- Sleeping Lady Mountain Resort
- Trout Unlimited
- Wild Fish Conservancy Northwest
- Washington Water Trust

4.2.3 Tribal Coordination, Communication, and Consultation

Coordination and consultation with Native American Tribes is part of the NEPA process. On April 14, 2020, Reclamation sent letters to notify the Yakama Nation and Colville Tribes of the publication of the NOI for the SWISP Project EIS, to invite the Tribes to participate in the EIS process as a cooperating agency, and to invite the Tribes to formally consult on the Project on a Government-to-Government basis. EO 13175 requires federal agencies to coordinate and consult on a Government-to-Government basis with sovereign Native American Tribal governments whose interests may be directly and substantially affected by activities on government-administered lands.

As captured in Table 4-1, Reclamation held kickoff meetings with both Tribe’s Natural Resources Department staff. Reclamation provided a copy of the presentation to be shared with the respective Tribal Councils. To date, Reclamation has not received a request for formal Government-to-
Government consultation from either Tribe. Outreach, communication, and coordination continued throughout the NEPA process. Continued communication and coordination will help to ensure that management actions are consistent with rights retained by Tribes and that the concerns of Tribal groups are considered.

The USFWS, acting as the lead agency for NHPA compliance for the SWISP Project, consulted with the Yakama Nation Cultural Resource Program and Colville Tribes Tribal Historic Preservation Officer (THPO) to identify historic properties. On February 12, 2020, the USFWS requested the Yakama Nation Cultural Resource Program and the Colville Tribes’ THPO concur with the determination that Alternative B (the proposed action) would have no adverse effect on historic properties (36 CFR 800.4(d)(l)) and requested input regarding sites of religious or cultural significance. On April 14, 2020, the Colville Tribes THPO concurred with the USFWS’ determination that Alternative B (the proposed action) would have no adverse effect on historic properties and no additional cultural resource identification efforts are necessary. Because the impacts to cultural resources are identical to or less than Alternative B, Alternatives C and D would also have no adverse effect on historic properties. To date, the USFWS has not received a response from the Yakama Nation Cultural Resource Program. The law requires the federal agency to consult with affected Tribes but does not require Tribes to respond to the federal agency. The USFWS Zone Archaeologist has prepared a Plan and Procedures for the Inadvertent Discovery of Cultural Resources and Human Remains (Inadvertent Discovery Plan) in advance of Project implementation.

4.2.4 U.S. Fish and Wildlife Service Consultation
Reclamation has held meetings with USFWS to assess potential ESA Section 7 consultation requirements for the Project. These included the 30 percent, 60 percent, 90 percent, and Final Design, Permitting, and ESA meetings, in addition to other meetings described in Table 4-1. In 2008, the NMFS and USFWS prepared the ESA Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Washington State Fish Passage and Habitat Enhancement Restoration Programmatic (FPRP; NMFS and USFWS 2008). The FPRP provided ESA coverage by both NMFS and USFWS for the USACE’s Nationwide Permit program. The USACE has reinitiated Section 7 Consultation with USFWS; however, a Biological Opinion covering their Nationwide Permit program has not been completed and the temporary extension of the current Biological Opinion has expired. Therefore, to comply with ESA Section 7(a)(2) and 50 CFR 402, USFWS recommended informal and formal consultation for the Project. Reclamation prepared a biological assessment to determine the potential impacts of the agency preferred action on the threatened Bull Trout (Salvelinus confluentus) and its designated critical habitat and the gray wolf (Canis lupus) (Reclamation 2020e).

In the biological assessment, Reclamation determined that the proposed action may affect and is likely to adversely affect individuals from the Columbia River Bull Trout DPS. Reclamation further concluded that the short-term construction related activities may affect and are likely to adversely affect Bull Trout designated critical habitat in the Icicle Creek watershed because removal of several mature trees in the intake construction area would diminish potential inputs of large woody debris to Icicle Creek and also may reduce shading to Icicle Creek and contribute to water temperature increases. In addition, Reclamation determined that the proposed action may affect but is not likely to adversely affect the gray wolf (Reclamation 2020e).
The biological assessment was received by USFWS on October 16, 2020. On November 13, 2020, USFWS responded to Reclamation's request for both formal and informal consultation on the SWISP Project. The information provided by Reclamation was determined to be sufficient to complete informal consultation on the gray wolf and to start the official formal consultation for Bull Trout and its designated critical habitat (USFWS 2020b). The USFWS issued a SWISP Biological Opinion for Bull Trout and its designated critical habitat on March 4, 2021, thereby concluding ESA Section 7 formal consultation (USFWS 2021). The USFWS' SWISP Biological Opinion states that the action, as proposed, is not likely to jeopardize the continued existence of the Bull Trout and is not likely to destroy or adversely modify designated critical habitat. A term and condition requiring monitoring and reporting was included in the Incidental Take Statement to implement the stipulated reasonable and prudent measure (RPM; see Section B.4 in Appendix B).

4.2.5 National Marine Fisheries Service Consultation
Reclamation has held meetings with NMFS to assess potential ESA Section 7 consultation requirements for the Project. These were the 30 percent, 60 percent, 90 percent, and Final Design, Permitting, and ESA meetings, in addition to other meetings described in Table 4-1. In consultation with NMFS, it was determined that Reclamation would use the Programmatic ESA Section 7(a)(2) Biological Opinion and the Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Seattle District Corps of Engineers Permitting of Fish Passage and Restoration Action in Washington State (FPRP III; NMFS 2017b) from NMFS as part of Section 7 (a)(2) of the ESA. The FPRP III provides ESA coverage for 12 categories of actions related to aquatic habitat restoration under the USACE’s Nationwide Permit authority. NMFS, USACE, and Reclamation agreed that the SWISP Project would fall under the programmatic biological opinion. As the lead federal agency for the SWISP Project, Reclamation submitted the FPRP Project Information Form to NMFS on November 17, 2020. NMFS certified the SWISP Project under the FPRP III on November 18, 2020, thereby concluding ESA Section 7 consultation with NMFS. The USACE has received a copy of the SWISP Project FPRP certification from NMFS.

4.2.6 U.S. Army Corps of Engineers
Reclamation has held meetings with the USACE Seattle District Regulatory Branch to assess potential permitting requirements for the Project. These included the 30 percent, 60 percent, 90 percent, and Final Design, Permitting, and ESA meetings, in addition to other meetings described in Table 4-1. The CWA establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters. Activities in waters of the U.S. regulated under this program include water resource projects such as dams, levees, and irrigation outlets. Reclamation will comply with the CWA by submitting the JARPA for review under USACE’s CWA Section 404 and Ecology’s CWA Section 401 permitting programs. In accordance with Section 404 of the CWA, the USACE intends to issue the following Nationwide Permits for the Project: Nationwide Permit 27, Aquatic Habitat Restoration, Enhancement, and Establishment Activities, and Nationwide Permit 33, Temporary Construction, Access, and Dewatering. The USACE and Ecology are working closely together to certify the SWISP Project under the Nationwide Permit Program in lieu of an individual water quality certification. Reclamation submitted the JARPA to the USACE on October 16, 2020. The Pre-Construction Notification/Joint Application Form was logged as received on October 16, 2020. The Pre-Construction Notification was determined complete on
November 18, 2020. Reclamation will provide the SWISP Project Biological Opinion from USFWS and the signed ROD to the USACE to complete the JARPA permitting package. The USACE intends to issue the Nationwide Permits no later than July 22, 2021.

### 4.2.7 U.S. Department of Agriculture, Forest Service
Alternative B (the proposed action) includes the use of Icicle Creek Road on National Forest System lands, between the Snow Lakes Trailhead and the Forest Service and Alpine Lakes Wilderness Area kiosk. Reclamation has coordinated use of Icicle Creek Road between the Snow Lakes Trailhead and the kiosk with the Forest Service; however, the construction contractor would secure the required road use approval from the Forest Service, most likely under a road use permit, which would not require separate NEPA review.

### 4.2.8 Washington State Department of Archaeology and Historic Preservation
The USFWS, acting as the lead agency for NHPA compliance for the SWISP Project, consulted with the Washington State DAHP to identify historic properties. Although the LNFH complex was listed on the NRHP in 1998, the surface water intake, gatehouse, and conveyance pipeline were found to be non-contributing elements of the Hatchery complex at the time of listing. On February 11, 2020, the USFWS requested the Washington State DAHP concur with the determination that Alternative B (the proposed action) would have no adverse effect on historic properties (36 CFR 800.4(d)(1)). On March 12, 2020, the Washington State DAHP concurred with the USFWS' determination of no adverse effect, with stipulations for an inadvertent discovery plan and professional archaeological monitoring. Because the impacts to cultural resources are identical to or less than Alternative B, Alternatives C and D would also have no adverse effect on historic properties. The USFWS Zone Archaeologist has prepared a Plan and Procedures for the Inadvertent Discovery of Cultural Resources and Human Remains (Inadvertent Discovery Plan) in advance of Project implementation. A professional archaeological monitor would be present during Phase II pipeline replacement activities on USFWS property (Appendix B).

### 4.2.9 Washington State Department of Ecology
Reclamation has held meetings with Ecology to assess potential permitting requirements for the Project. These included the 30 percent, 60 percent, 90 percent, and Final Design, Permitting, and ESA Meetings, in addition to other meetings described in Table 4-1. Under Section 401 of the CWA, a federal permit to conduct an activity that may affect water quality in the State of Washington is subject to a water quality certification request. In response to the CWA regulations which went into effect on September 11, 2020, Reclamation submitted the Section 401 Water Quality Certification Pre-Filing Meeting Request Form to Ecology on October 2, 2020. Ecology did not request a meeting with Reclamation and requested that Reclamation not submit the JARPA to them. Ecology is working closely with the USACE to ensure the SWISP Project certifies under the USACE's Nationwide Permit Program in lieu of issuing an individual water quality certification.

### 4.2.10 Washington State Department of Fish and Wildlife
Reclamation has held meetings with WDFW to assess potential permitting requirements for the Project. These included the 30 percent, 60 percent, 90 percent, and Final Design, Permitting, and ESA meetings, in addition to other meetings described in Table 4-1. Washington State law (Revised Code of Washington [RCW 77.55]) requires hydraulic projects in or near state waters to obtain an
HPA from the WDFW. An HPA ensures that construction is done in a manner that protects fish and their aquatic habitats. Reclamation will submit the JARPA to the WDFW after the joint ROD for the SWISP Project has been issued and Chelan County has completed their State Environmental Policy Act (SEPA) review (see Section 4.2.11).

4.2.11 Chelan County
Reclamation has held meetings with Chelan County to assess potential permitting requirements for the Project. These included the 30 percent, 60 percent, 90 percent, and Final Design, Permitting, and ESA meetings, in addition to other meetings described in Table 4-1. Reclamation does not need a Shoreline Permit or exemption from Chelan County, as the SWISP Project is on federal land or on federal easement, which is as much federal property as is a fee interest (not just binding on the owner of underlying lands). Chelan County will be conducting a SEPA Review for the SWISP Project. Reclamation submitted the SEPA Checklist to Chelan County on December 15, 2020. Chelan County is currently reviewing the SEPA Checklist and comparing it to the analysis in the Icicle Strategy and Reclamation’s Draft EIS. Chelan County will also review this Final EIS as part of their SEPA process. Once Reclamation and USFWS have signed the ROD, it will be sent to Chelan County. Chelan County intends to adopt Reclamation’s EIS using the county’s Natural Resources Department Adoption Notice following WAC 197-11-630 (Adoption – Procedures). After issuance, Chelan County will circulate the Adoption Notice for a 7-day review period; no action will be taken on the proposal during this period. The SEPA process will be complete after the 7-day review period which is expected to conclude in early May 2021. The SEPA Adoption Notice will be submitted as part of Reclamation’s JARPA submittal to WDFW.

4.3 Public Collaboration and Outreach
Public involvement allows interested and affected individuals, organizations, agencies, and other governmental entities to be consulted and included in the decision-making process. Reclamation solicited comments from the public on the proposed Project through the NEPA scoping and public involvement process to help shape the alternatives considered in this document and the analysis of the impacts.

4.3.1 Scoping Process
As required by NEPA and its public involvement guidance, Reclamation solicited comments from cooperating and participating agencies, consulting parties, and other interested parties and the public, then organized and analyzed all comments received. Reclamation then evaluated the position statement of each comment and extracted the overarching issue or issues to address during the NEPA process. These issues define the scope of analysis for the SWISP Project EIS and were used to develop the Project alternatives.

As defined under NEPA, the scoping period began with the publication of the NOI in the Federal Register on April 24, 2020. It was titled Notice of Intent to Prepare an Environmental Impact Statement and Public Scoping Virtual Meeting Room for the Leavenworth National Fish Hatchery Surface Water Intake Fish Screens and Fish Passage Project, Chelan County, Washington. For the 32-day period between April 24, 2020 and May 26, 2020, Reclamation sought public comments to determine relevant issues that
could influence the scope of the environmental analysis, including alternative development, and
guide the process for developing the SWISP Project EIS. The comment period ended on May 26,
2020. There were no comment submissions received or postmarked after this date.

The public had an opportunity to participate in the scoping process and provide input through an
online VPM website that was available 24 hours a day, from April 24, 2020 to May 26, 2020
(https://www.virtualpublicmeeting.com/leavenworth-swisp-eis-completed). The VPM was
structured around stations, which were modeled on the topics typically seen at open house public
scoping meetings. The website provided access to information and materials including Project
background, the purpose and need for the Project, the proposed action, Project diagrams, and
Project Area maps. Additionally, the VPM provided the public an opportunity to submit their
comments and questions for Reclamation’s consideration. Each VPM station was a single interactive
web page that the public could view. The welcome station provided a place for website visitors to
sign in and add themselves to the Project mailing list. The welcome station also contained a link that
visitors could use to download all maps and documents in the VPM room. A commenting station
allowed visitors to submit written comments directly through the VPM comment form and provided
information on how to submit comments via mail or email. Reclamation also hosted a live question
and answer video teleconference on May 18, 2020 from 4:00 p.m. to 6:00 p.m. Pacific Daylight
Time. Reclamation provided a short presentation, followed by the question-and-answer session,
during which Reclamation and USFWS management and resource specialists were available to
discuss Project information and questions from teleconference participants.

In accordance with NEPA, Reclamation must document the public scoping results. The Scoping
Report (Reclamation 2020a) summarizes the scoping process and the comments received during the
formal scoping period, including those provided during the agency scoping meeting. The Scoping

4.3.2 Draft EIS

Information about the availability of the Draft EIS was distributed to the cooperating and
participating agencies (see Section 4.2.1), interested parties (see Section 4.2.2), as well as individuals
and businesses on the Project mailing list. The Draft EIS was also posted on the Project website for
viewing and download at: https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html.

The public was provided with the opportunity to review and comment on the Draft EIS during the
public comment period, from November 20, 2020 to January 4, 2021 through participation in two
video teleconferences and through a VPM website that was available 24 hours a day during the
comment period. Reclamation hosted two live video teleconferences on December 8, 2020 and
December 10, 2020. In each video teleconference, Reclamation provided a short presentation,
followed by a question-and-answer session, during which Reclamation and USFWS management
and resource specialists were available to discuss Project information and questions from meeting
participants. After all questions were addressed, the public comment session began, where
participants were able to provide verbal public comment on the Draft EIS. The VPM website
(https://www.virtualpublicmeeting.com/leavenworth-swisp-draft-eis) was structured around
stations, which were modeled on the topics typically seen at in-person open house public meetings.
The website provided access to information and materials including Project background, the
4. Consultation and Coordination (Public Collaboration and Outreach)

purpose and need for the Project, the alternatives analyzed in the EIS, Project diagrams and Project Area maps, and summaries of impacts for key resources. Additionally, the VPM website provided the public an opportunity to submit their comments and questions for Reclamation’s consideration.

Reclamation considered all substantive comments received during the 45-day comment period. The Public Comment and Response Report in Appendix E provides responses to all substantive comments submitted during the public comment period.

4.3.3 Final EIS
Information about the availability of the Final EIS was distributed to the cooperating and participating agencies (see Section 4.2.1), interested parties (see Section 4.2.2), as well as individuals and businesses on the Project mailing list. The Final EIS was also posted on the Project website for viewing and download at: https://www.usbr.gov/pn/programs/leavenworth/swisp/feis.html.

4.4 Submitted Alternatives, Information, and Analyses

Per 40 CFR 1502.17, this section provides a summary of all alternatives, information, and analyses submitted by state, Tribal, and local agencies, as well as other stakeholders for consideration during the scoping process or in developing the Final EIS. A summary of this information is as follows, and is available as part of this Final EIS:

- Reclamation has held numerous meetings with the cooperating and participating agencies throughout the Project design and EIS development process and will continue coordination through signing of the ROD. Cooperating and participating agency meetings were held at Project and permitting milestones and as needed and are summarized in Table 4-1. The purpose of these meetings was to inform and receive input from cooperating and participating agencies respective to their jurisdiction, special expertise, or interests.
- Reclamation has met with other interested stakeholders (particularly through participation in the Icicle Work Group) and private landowners at various stages of Project design and EIS development to obtain feedback.
- Section 1.6 describes the public involvement that took place during the EIS development process. The description and outcomes of the scoping process are summarized in the SWISP Project Scoping Report (Reclamation 2020a), including a list of the issues that were raised by stakeholders during the public scoping process.
- Section 2.5 describes alternatives and alternative elements considered but eliminated from detailed study. Many of these alternatives were raised during previous NEPA and planning efforts and were revisited during the SWISP Project alternatives screening process.
- Appendix E, the Public Comment and Response Report shows all substantive comments received on the Draft EIS and how each comment was addressed.
4.5 Preparers and Contributors

The SWISP Project EIS was prepared by the individuals identified in Table 4-2.

Table 4-2. List of Preparers

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<td>Water Rights and Authorities</td>
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*SWISP Project Final Environmental Impact Statement*
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Chapter 5. References


_____. 2003. Non-Fishing Impacts to Essential Fish Habitat and Recommended Conservation Measures. J. Hanson, M. Helvey, and R. Strach, eds. NMFS Alaska Region, Juneau, Northwest Region, Portland, Oregon, and Southwest Region, Long Beach, California.
5. References


5. References


5. References


Chapter 6. Glossary

Access—The ability of a particular transportation mode, such as a vehicle, bicycle, or pedestrian, to enter or use a portion of the transportation network.

Anadromous—The term that describes fish born in freshwater who spend most of their lives in saltwater and return to freshwater to spawn, such as salmon and some species of sturgeon.

Archaeological site—A location that contains material remains of past human activities, generally defined as over 50 years old.

Artifact—A human-modified object, often appearing on an archaeological site, that typically dates to over 45 years in age.

Attenuate—To lessen the amount, force, magnitude, or value of.

Average daily traffic—The number of vehicles that pass a point on a given road in a determined number of days, divided by the number of days.

Biological opinion—Document which includes: (1) the opinion of the USFWS or the NMFS as to whether or not a Federal action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of designated critical habitat; (2) a summary of the information on which the opinion is based; and (3) a detailed discussion of the effects of the action on listed species or designated critical habitat. [50 CFR Section 402.02, 50 CFR Section 402.14(h)]

Climate—The collective typical weather conditions in a region averaged over a series of years.

Climate change—A change in global or regional climate patterns, in particular a change apparent from the mid- to late twentieth century onward and attributed largely to the increased levels of atmospheric carbon dioxide.

Cofferdam—A watertight enclosure pumped dry to permit construction work below the waterline.

Cohort—A fish cohort is a group of fish of the same species that are born during the same year.

Consumptive use—Use of water that diminishes the volume or quality of the water source (WAC 173-518-030).

Container planting—Any native plant that is grown in a container.

Cooperating Agency—Those federal, state, and local agencies, and Tribes, that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative (40 CFR Section 1508.5).
Cubic feet per second (cfs) — An Imperial unit/U.S. customary unit volumetric flow rate, which is equivalent to a volume of 1 cubic foot flowing every second. The amount of cubic feet of water that passes a specific point on the river in 1 second.

Cultural resources — The present expressions of human culture and the physical remains of past activities, such as historic buildings, structures, objects, districts, landscapes, and archaeological sites. These resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features of landscapes that are significant to living communities.

Distinct Population Segment — "Population," or "distinct population segment," are terms with specific meaning when used for listing, delisting, and reclassification purposes to describe a discrete vertebrate stock that may be added or deleted from the list of endangered and threatened species. [61 FR 4722-4725 (February 7, 1996)]

Easement — Conveys a possessory interest (control of property without ownership) in real property.

Entrainment — Entrainment means the entrapment of fish into a watercourse diversion that has no screen or into high velocity water along the face of an improperly designed screen (WAC 220-660-030).

Environmental designation for noise abatement (EDNA) — An area or zone (environment) within which maximum permissible noise levels are established (Chapter 173-60-020 WAC).

Essential fish habitat (EFH) — Defined in the Magnuson-Stevens Fishery Conservation and Management Act as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Frazil ice — A collection of loose ice crystals that form in supercooled turbulent water that float, are suspended in the water column, or attach to the low-head diversion dam and intake structures.

Fugitive dust — Atmospheric dust arising from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed fugitive because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust are unpaved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations.

Headworks — Any dam, weir, barrage, or reservoir and all works appurtenant thereto, used for or in connection with the storage, control, conveyance, or distribution of water. For the SWISP Project, the headworks includes the combined intake structure elements, such as the fish screen structure, gates, and retaining walls.

Historic district — An area possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects unified historically or aesthetically by plan or physical development.
Hydraulic drop—A term used to describe rapid change that occurs in the depth of channel water. A hydraulic drop occurs when the depth goes from a high stage to a lower stage.

Impingement—The physical contact of a fish with a fish screen due to intake velocities which are too high to allow the fish to escape.

Incidental take—Take of listed fish or wildlife species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by a federal agency or applicant. [50 CFR Section 402.02]

Incidental take statement—The part of a biological opinion issued by the USFWS or NMFS that specifies the extent to which a federal agency’s proposed action will result in the incidental taking of a threatened or endangered species; includes measures that minimize the incidental taking’s impact, as well as terms and conditions that implement the measures.

Invasive plants—Nonnative plants that have been introduced into an environment that they did not evolve in and are capable of establishing free-living populations in areas beyond their natural range of dispersal.

Lead—Lead is a naturally occurring element found in small amounts in the earth’s crust. While it has some beneficial uses, it can be toxic to humans and animals, causing health effects.

Level of Service (LOS)—A metric that describes the operating conditions of a roadway based on factors such as physical roadway capacity, speed, maneuverability, safety, and traffic volume.

Listed species—Any species of fish, wildlife or plant which has been determined to be endangered or threatened under section 4 of the Endangered Species Act [50 CFR Section 402.02]

National Register of Historic Places (NRHP)—A listing of resources that are considered significant at the national, state, or local level and that have been found to meet specific criteria of historic significance, integrity, and age.

Noise—The intensity, duration, and character of sounds, from any and all sources (Chapter 173-60-020 WAC).

Noise dosimeter—A specialized sound level meter intended specifically to measure the noise exposure of a person integrated over a period of time; usually to comply with Health and Safety regulations.

Nonconsumptive use—A type of water use where either there is no diversion from a water source, or where there is no diminishment of the amount or quality of the water source (WAC 173-518-030).

Noxious weeds—Designated and regulated by state and federal laws because they are known to be detrimental to agriculture, commerce, natural resources, and public health. Noxious weeds are a subset of invasive plants.
Ordinary high water line (OHWL)—“The mark on the shores of all water that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in ordinary years as to mark upon the soil or vegetation a character distinct from the abutting upland. Provided, that in any area where the ordinary high water line cannot be found, the ordinary high water line adjoining saltwater is the line of mean higher high water and the ordinary high water line adjoining freshwater is the elevation of the mean annual flood.” (WAC 220-660-030). Also see Ordinary high water mark.

Ordinary high water mark (OHWM)—“That line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” (33 CFR 328.3(e)). Also see Ordinary high water line.

Pollutants (pollution)—Unwanted chemicals or other materials found in the environment. Pollutants can harm human health, the environment, and property. Air pollutants occur as gases, liquid droplets, and solids. Once released into the environment, many pollutants can persist, can travel long distances, and can move from one environmental medium—air, water, or land—to another.

Pool—A body of water of varying depth that share the characteristic of slow-moving water. Pools often form behind dams or after the vertical force of water falling over logs or rocks carves out a deep spot in the stream.

Rapid—A section of a river or creek where the water moves very fast, often over rocks.

Reportable quantity—The quantity of a hazardous substance that triggers reports under the Comprehensive Environmental Response, Compensation, and Liability Act. If a substance exceeds its reportable quantity, the release must be reported to the National Response Center, the State Emergency Response Commission, and community emergency coordinators for areas likely to be affected.

Riffle—Shallow, turbulent water running over rocks.

Riparian zone—The land adjacent to streams, rivers, ponds, lakes, and those wetlands whose soils and vegetation are influenced by ponded or channelized water. They are the transition areas between aquatic and upland habitats often with elements of both ecosystems (WAC 220-660-030).

Roughened channel—A constructed channel of a graded mix of sediment with enough roughness and hydraulic diversity to achieve fish passage. Roughened channels are designed to resist erosion and are often built at a steeper gradient than the prevailing channel (WAC 220-660-030).

Runs—Deep fast water and little to no turbulence.

49 Source: [http://www.epa.gov/oms/invtory/overview/definitions.htm](http://www.epa.gov/oms/invtory/overview/definitions.htm), EPA Glossary for Mobile Source Emissions
Section 7—The section of the ESA of 1973, as amended, outlining procedures for interagency cooperation to conserve federally-listed species and designated critical habitats. Section 7(a)(1) requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a)(2) requires federal agencies to consult with the Services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.

Stream mix—Clean, round, river rock.

Take—To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. [ESA Section 3(19)] Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the USFWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. [50 CFR Section 17.3]

Thalweg—A line connecting the lowest points of successive cross-sections along the course of a river.

Trashrack—A device designed to keep trash and other natural debris from entering the spillway and causing damage.

Viewshed—The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.
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Maps

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3-4 Noise Attenuation Distances for Pneumatic Tool at Intake Construction Area – Alternative D
3-5 Noise Attenuation Distances for Hot Air Blower at Contractor Use Areas – Alternatives B and D
3-6 Noise Attenuation Distances for Hot Air Blower at Contractor Use Areas – Alternative C
3-7 Noise Attenuation Distances for a Truck along Icicle Road and Icicle Creek Road – Alternatives B and C
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A-2  Phase I Intake Facilities Site Plan - Overview
A-3  Fish Screen Structure Site Plan and 3D Isometric Drawing
A-4  Roughened Channel and Low Flow Boulder Weir Fishway – Overview
A-5  Intake Area Demolition Plan
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A-7  Site Plans – CUAs 1 and 5
A-8  Site Plans – CUAs 2, 3, and 4
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A-12 Options for Temporary Pump Location
A-13 Options for Temporary Pumping Pipeline Location
A-14 Temporary Cofferdam Sequence
Map 2-1
Alternative A: No Action

- Existing Intake Facilities
- Spillway Pool
- Trailhead
- Road
- LNFH Production Facilities and Associated Structures
- Vehicle Parking
- Conveyance Pipeline
- LNFH Sand Settling Basin and Inside and Outside Screen Chambers

Forest Service Wilderness Area Kiosk
Snow Lakes Trailhead
Leavenworth Whole Hatchery
Icicle Creek Rd
Road

Section of Worst Condition Pipeline (6 feet) at Bifurcation Point

Cylindrical Map 2-1

Alternative A: No Action

- Hatchery Channel
- Historical Channel
- Creek

existing Intake Facilities
- F Trailhead Road
- LNFH Production Facilities and Associated Structures
- Spillway Pool
- Vehicle Parking
- Conveyance Pipeline
- LNFH Sand Settling Basin and Inside and Outside Screen Chambers

Spillway Pool
Structure 5
Leavenworth National Fish Hatchery

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021
L_SWISP_alts_AltAnoAction.mxd
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0 250 500 Feet
Map 2-2
Alternative A: No Action (Intake)

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021
L_SWISP_alts_AltAnoActionIntake.mxd

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Map 2-3
Alternative B (Proposed Action) and Alternative D

Intake Facilities
Temporary Access Route
Conveyance Pipeline lined with Cure-in-Place Pipe (approximately 4,000 feet)
Pipeline Replacement
Access Routes

Temporary Pump and Pipeline
Construction Vehicle Turnaround/ Vehicle Parking
Staging and Storage Site for Construction Equipment and Materials, and Construction Staff Administration

Forest Service Wilderness Area Kiosk
Snow Lakes Trailhead

Intake Facilities
*See Map 2-4 for Additional Details

Leavenworth National Fish Hatchery
LNFH Production Facilities and Associated Structures
LNFH Sand Settling Basin and Inside and Outside Screen Chambers

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Map 2-4
Alternative B (Proposed Action) and Alternative D: Intake

Phase I
- Intake Facilities
- Gravity Bypass Outlet
- Gravity Bypass Pipeline
- Temporary Access Route

Phase II
- Conveyance Pipeline lined with Cure-in-Place Pipe
- Pipeline Replacement
- Construction Area
- Contractor Use Area (CUA)

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021

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**Map 2-5**

**Alternative C**  
(Preferred Alternative)

- **Intake Facilities**
- **Temporary Access Route**
- **Conveyance Pipeline lined with Cure-in-Place Pipe** (approximately 4,520 feet)
- **Pipeline Replacement**
- **Access Routes**

**Phase I and II**

- **Staging and Storage Site** for Construction Equipment and Materials, and Construction Staff Administration
- **Construction Vehicle Turnaround/ Vehicle Parking**
- **LNFH Production Facilities and Associated Structures**
- **LNFH Sand Settling Basin and Inside and Outside Screen Chambers**

**U.S. Department of the Interior**
**Bureau of Reclamation**
**Columbia Cascades Area Office**
February 26, 2021

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**Forest Service Wilderness Area Kiosk**

**Snow Lakes Trailhead**

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**Source:** Reclamation GIS 2020

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Map 2-6
Alternative C
(Preferred Alternative): Intake

Phase I
- Intake Facilities
- Gravity Bypass Outlet
- Gravity Bypass Pipeline
- Temporary Access Route

Phase II
- Conveyance Pipeline lined with Cure-in-Place Pipe

Flow >
Flow >

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021

L_SWISP_alts_AltCproposedIntake.mxd

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Map 3-2
Noise and Vibration Analysis Area

Noise and Vibration Analysis Area
*Houses, farms, and other occupied buildings within the Visual Analysis Area are also sensitive noise receptors.

Intake Facilities
Conveyance Pipeline
LNFH Production Facilities
Contractor Use Area (CUA)
Road
LNFH Sand Settling Basin and Inside and Outside Screen Chambers

Intake Facilities
Ambient Noise Point
Sensitive Noise Receptor

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 25, 2021

L_SWISP_AE_Noise_SensitiveReceptors.mxd

No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aide only and does not represent actual survey data.
Noise Attenuation Distances for Pneumatic Tool at Intake Construction Area - Alternatives B and C

Noise Level
- 50 ft. - 85 dBA
- 51-399 ft. - 85-67 dBA
- 400 ft. - 67 dBA
- 401-3,199 ft. - 67-49 dBA
- 3,200 ft. - 49 dBA
- 3,201-6,399 ft. - 49-43 dBA
- 6,400 ft. - 43 dBA

Map 3-3

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021
L_SWISP_AE_Noise_IntakeBuffer_AltBC.mxd

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Map 3-4
Noise Attenuation Distances for Pneumatic Tool at Intake Construction Area - Alternative D

- **Ambient Noise Point**
- **Sensitive Noise Receptor**
- **Intake Facilities**
- **Conveyance Pipeline**
- **Road**

---

**Source:** Reclamation GIS 2020

U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascade Area Office
February 26, 2021

L_SWISP_AE_Noise_IntakeBuffer_AltD.mxd

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- **Noise Level**
  - 50 ft. - 85 dBA
  - 51-399 ft. - 85-67 dBA
  - 400 ft. - 67 dBA
  - 401-799 ft. - 67-61 dBA
  - 800 ft. - 61 dBA
  - 801-1,599 ft. - 61-55 dBA
  - 1,600 ft. - 55 dBA

- **Noise Levels**
  - 50 ft. to 85 ft.
  - 85 ft. to 67 ft.
  - 67 ft. to 61 ft.
  - 61 ft. to 55 ft.
  - 55 ft.

---

- **Map Legend**
  - **Noise Levels**
  - **Intake Facilities**
  - **Conveyance Pipeline**
  - **Road**

---

**Map Details**

- **Intake Facilities**
- **Conveyance Pipeline**
- **Road**

---

**Map Notes**

- **Source:** Reclamation GIS 2020
- **U.S. Department of the Interior**
- **Bureau of Reclamation**
- **Columbia Cascade Area Office**
- **February 26, 2021**

L_SWISP_AE_Noise_IntakeBuffer_AltD.mxd

No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aide only and does not represent actual survey data.
Map 3-5
Noise Attenuation Distances for Hot Air Blower at Contractor Use Areas - Alternatives B and D

- Sensitive Noise Receptor
- Ambient Noise Point
- Intake Facilities
- Contractor Use Area (CUA)
- Conveyance pipeline
- Road
- LNFH Production Facilities
- LNFH Sand Settling Basin and Inside and Outside Screen Chambers

---

Noise Level
- 40 ft. - 97 dB
- 41-319 ft. - 97-79 dB
- 320 ft. - 79 dB
- 321-2,559 ft. - 79-61 dB
- 2,560 ft. - 61 dB
- 2,561-5,119 ft. - 61-55 dB
- 5,120 ft. - 55 dB

---

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021

L_SWISP_AE_Noise_CUABuffer_AltBD.mxd
No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aide only and does not represent actual survey data.
Map 3-6
Noise Attenuation Distances for Hot Air Blower at Contractor Use Areas - Alternative C

Noise Level
- 40 ft. - 97 dB
- 41-319 ft. - 97-79 dB
- 320 ft. - 79 dB
- 321-2,559 ft. - 79-61 dB
- 2,560 ft. - 61 dB
- 2,561-5,119 ft. - 61-55 dB
- 5,120 ft. - 55 dB

- Sensitive Noise Receptor
- Ambient Noise Point
- Pipeline Intake/Sluice Management Area (PISMA)
- Intake Facilities
- Contractor Use Area (CUA)
- Conveyance pipeline
- Road
- LNFH Production Facilities
- LNFH Sand Settling Basin and Inside and Outside Screen Chambers

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021
L_SWISP_AE_Noise_CUABuffer_AltC.mxd

No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aide only and does not represent actual survey data.
Map 3-7
Noise Attenuation Distances for a Truck along Icicle Road and Icicle Creek Road – Alternatives B and C

Noise Level
- 100 ft. - 82 dBA
- 101-1,599 ft. - 85-58 dBA
- 1,600 ft. - 58 dBA
- 1,601-6,399 ft. - 58-46 dBA
- 6,400 ft. - 46 dBA
- 6,401-12,799 ft. - 46-40 dBA
- 12,800 ft. - 40 dBA

- Sensitive Noise Receptor
- Ambient Noise Point
- Intake Facilities
- Contractor Use Area (CUA)
- Construction Vehicle Turnaround
- Conveyance Pipeline
- Road
- LNFH Production Facilities
- LNFH Sand Settling Basin and Inside and Outside Screen Chambers

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021
L_SWISP_AE_Noise_RoadBuffers_Icicle_AltBC.mxd
No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aide only and does not represent actual survey data.
Map 3-8
Noise Attenuation Distances for a Truck along Icicle Road and Icicle Creek Road – Alternative D

- **Sensitive Noise Receptor**
- **Ambient Noise Point**
- **Intake Facilities**
- **Contractor Use Area (CUA)**
- **Construction Vehicle Turnaround**
- **Conveyance Pipeline**
- **Road**
- **LNFH Production Facilities**
- **LNFH Sand Settling Basin and Inside and Outside Screen Chambers**

Noise Level

- 100 ft. - 82 dBA
- 101-799 ft. - 82-64 dBA
- 800 ft. - 64 dBA
- 801-1,599 ft. - 64-58 dBA
- 1,600 ft. - 58 dBA
- 1,601-3,199 ft. - 58-52 dBA
- 3,200 ft. - 52 dBA

---

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021

L_SWISP_AE_Noise_RoadBuffers_Icicle_AltD.mxd

No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aide only and does not represent actual survey data.

---

Noise Level

- Intake Facilities
- Contractor Use Area (CUA)
- Construction Vehicle Turnaround
- Conveyance Pipeline
- Road
- LNFH Production Facilities
- LNFH Sand Settling Basin and Inside and Outside Screen Chambers

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Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
February 26, 2021

L_SWISP_AE_Noise_RoadBuffers_Icicle_AltD.mxd

No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aide only and does not represent actual survey data.
Figure A-1. Conceptual Drawing of the Proposed Intake Facilities for the Action Alternatives
NOTES

1. Elevations shown are NAVD88 datum.
2. NAD83 Washington State Planes, North Zone, US Feet. WA83-NF coordinate system.
Table of Boulder Locations:

<table>
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<tr>
<th>Label</th>
<th>Easting (ft)</th>
<th>Northing (ft)</th>
<th>Height Above Bed (ft)</th>
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</tbody>
</table>

**NOTES**

1. Elevations shown are NAVD88 datum.
2. Inclination = elevation
3. sta. = station
4. NAVD equals North American Vertical Datum
5. LWS equals live water surface

**ABBREVIATIONS**

1. El. equals elevation
2. q equals centimeter
3. sta. equals station
4. NAVD equals North American Vertical Datum
5. LWS equals live water surface

**ROUGHENED CHANNEL AND BOULDER PLACEMENT**

**PLAN**

**NEW WEIR CRESCENT**

**ROUGHENED CHANNEL BOULDER LOCATIONS**

**EXISTING BOULDER**

**ROUGHENED CHANNEL AND LOW FLOW BOULDER WEIR FISHWAY - OVERVIEW**
Figure A-5. Intake Area Demolition Plan

---

LEGEND

- Removes completely
- Partial removal

NOTES

1. Drawing shows existing conditions.
2. New facility design is not shown.
3. Boulders may be repositioned for construction material loading advantage.
Figure A-8. Site Plans - CUAs 2, 3, and 4

NOTES

1. Class IV: Structural Emergence Plans (SEP) will be placed next to existing Emergence Emergence Plans (CEP), following the CEP. Existing CEPs shall be removed as required by the CEP and the Specifications.

2. CEPs will be placed on a separate page between Contractor Use Area and other areas.

3. Contractor Use Area 3 is a single area enclosed with the existing CEP and adjacent to the existing CEP. The area is approximately 2,000 ft². The area is required as such to install CEPs in accordance with the Specifications. The project shall be completed to align with the CEP.

4. Contractor Use Area 2 is a single area enclosed with the existing CEP and adjacent to the existing CEP. The area is approximately 2,000 ft². The area is required as such to install CEPs in accordance with the Specifications. The project shall be completed to align with the CEP.

5. Contractor Use Area 1 is a single area enclosed with the existing CEP and adjacent to the existing CEP. The area is approximately 2,000 ft². The area is required as such to install CEPs in accordance with the Specifications. The project shall be completed to align with the CEP.

6. Contractor Use Area 4 is a single area enclosed with the existing CEP and adjacent to the existing CEP. The area is approximately 2,000 ft². The area is required as such to install CEPs in accordance with the Specifications.
Figure A-9. Temporary Access Routes - CUAs 1 and 2

ACCESS ROAD COORDINATES:

<table>
<thead>
<tr>
<th>Part</th>
<th>Station</th>
<th>Elevation</th>
</tr>
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NOTES:

1. Roads to be constructed, maintained, and removed in accordance with the specifications.
2. Roads shall be straight between points shown.
3. Flags and/or stakes of any existing buried utility lines will be removed.
4. See (10043630) for Contractor Use Area Guidelines.
Figure A-11. Typical Cross Section - Parallel Conveyance Pipeline Trench

NOTES
1. Slope of backfill as required for safety, in accordance with Specifications.
2. Warning tape and tracer wire not shown for HORE pipe types, but are required. See Specifications for details.
3. Existing pipe shall remain intact during work, and be protected in accordance with Specifications.
4. Distance between pipes as shown on Plans and Profiles.
Figure A-12. Options for Temporary Pump Location

- **Pipeline path**
- **Fish Ladder**
- **Flow**
- **Location 1**
- **Location 2**
- **Pump screen boxes**
- **Water depth at time of photo ~2 ft**
- **Water depth at time of photo ~10 ft**

Photo from late July 2015. Water level in April / May should be significantly higher. Water could be coming down spillway. Depending on water depth screen locations could be moved to the concrete apron.
NOTES:
1. Temporary bypass pumping, designed by Contractor, shall be in accordance with Specifications and optional routes shown, unless otherwise approved by COR.
2. Existing parking lot to be shared with the general public and remain open at all times. All necessary safety devices, signage, traffic controls, or other features to protect the general public shall be installed and maintained in and around the Contractor Parking Area to the satisfaction of the COR.
3. For LNPH Phase II Water Supply Pipeline plan and profile, see (60354).
Appendix B

Environmental Commitments and Best Management Practices
Appendix B. Environmental Commitments and Best Management Practices

B.1 Best Management Practices

To minimize impacts on resources from the proposed action, the Best Management Practices (BMPs) described in Table B-1 would be implemented. BMPs are drawn from the following sources:

- Biological opinions for LNFH operations, issued by the USFWS (addressing threatened Bull Trout; USFWS 2011, 2021) and by NMFS (addressing endangered spring Chinook Salmon and threatened Steelhead; NMFS 2015, 2017a).
- General Conservation Measures (GCMs) for ESA-listed salmonids in the programmatic biological opinion for USACE permitting of fish passage and restoration actions in Washington State (FPRPIII; NMFS 2017a).
- GCMs for Bull Trout and other ESA-listed salmonids in the programmatic biological opinion for the Washington State fish passage and habitat enhancement and restoration program (NMFS and USFWS 2008)\(^{50}\).
- Measures described in the construction specifications, including measures associated with site layout, temporary access, staging and stockpile areas, equipment use, erosion control, dust abatement, timing of in-water work and worksite isolation, and spill prevention and control.

Reclamation would also obtain required regulatory permits and implement terms and conditions contained therein. If permit requirements, BMPs, or other measures contradict each other, the contract specification requires that the contractor abide by the most stringent of requirements. A list of general, applicable permit conditions is included following Table B-1.

\(^{50}\) This combined agency programmatic biological opinion expired on December 31, 2013. The USACE and NMFS reinitiated consultation and NMFS has issued subsequent biological opinions for the nationwide permit program. However, the USACE has been operating under consultation extensions from USFWS, with the most recent extension expiring June 15, 2021. The USFWS SWISP Biological Opinion includes similar conservation measures as those contained in the expired programmatic biological opinion.
### Table B-1. Best Management Practices

<table>
<thead>
<tr>
<th>Resource Topic</th>
<th>Best Management Practice</th>
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</thead>
<tbody>
<tr>
<td>General</td>
<td>• Heavy equipment use will be limited to that with the least adverse effects on the environment (e.g., minimally sized, low ground pressure equipment, use of matting, etc.; NMFS 2017a).</td>
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<tr>
<td></td>
<td>• Conduct operations to prevent unnecessary destruction, scarring, or defacing of natural surroundings in the vicinity of the work.</td>
</tr>
<tr>
<td>Air Quality and Climate</td>
<td>• Dust control and abatement measures will be implemented during construction.</td>
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<tr>
<td></td>
<td>• Vehicle traffic on unpaved surfaces would be limited to 10 miles per hour to minimize dust generation.</td>
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<td>• Vehicle traffic on government rights-of-way, dirt roads, and paved roads through LNFH property would be limited to 10 miles per hour.</td>
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<td></td>
<td>• Prevent, control, and abate dust pollution on government rights-of-way.</td>
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<td>• Provide labor, equipment, and materials, and use efficient methods wherever and whenever required to prevent dust nuisance or damage to persons, property, or activities.</td>
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<td></td>
<td>• Provide means for eliminating atmospheric discharges of dust during mixing, handling, and storing of cement, pozzolan, and concrete aggregate.</td>
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<td>• Use reasonably available methods and devices to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.</td>
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<td>• Do not operate equipment and vehicles that show excessive exhaust gas emissions until corrective repairs or adjustments reduce such emissions to acceptable levels.</td>
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<tr>
<td>Geology and Soils</td>
<td>• The number of temporary access roads will be minimized, and roads will be designed to avoid adverse effects like creating excessive erosion (NMFS 2017a).</td>
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<td>• Temporary roads and trails across slopes greater than 30 percent will be avoided when feasible (NMFS 2017a).</td>
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<td>• Existing roadways or travel paths will be used whenever possible (NMFS 2017a).</td>
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<tr>
<td>Water Resources (Stream Conditions)</td>
<td>• Coffer dam placement will maintain natural stream flow, minus the 40 cfs diversion to the hatchery, within the greatest amount of natural streambed width as possible.</td>
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<td>• Additional flow outage shall require the prior written approval of the COR, and of appropriate federal and state water quality control agencies.</td>
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</table>
B. Environmental Commitments and Best Management Practices

<table>
<thead>
<tr>
<th>Resource Topic</th>
<th>Best Management Practice</th>
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<tr>
<td>Water Resources (Water Quality)</td>
<td><strong>General</strong></td>
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<td></td>
<td>• Perform construction activities by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes into streams, flowing or dry watercourses, lakes, wetlands, reservoirs, or underground water sources.</td>
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<td>• Measures shall be taken to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into waters of the U.S. (NMFS 2017a).</td>
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<td>• The use of acids for cleaning or preparing concrete surfaces for repair will not be permitted.</td>
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<td><strong>In-water work</strong></td>
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<td>• Prepare a Work Area Isolation Plan for all work below the bankfull elevation requiring flow diversion or isolation. Include the sequencing and schedule of dewatering and rewatering activities, plan view of all isolation elements, as well as a list of equipment and materials to adequately provide appropriate redundancy of all key plan functions (e.g., an operational, properly sized backup pump and/or generator) (NMFS 2017a).</td>
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<td>• Use of rapidly deployable prefabricated cofferdam systems would minimize impacts to subgrade and surrounding water.</td>
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<td>• If supersacks are used for the temporary cofferdams or gravity bypass pipeline supports, the fill material must be clean, round river rock (“stream mix”).</td>
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<td>• When conducting in-water or bank work, machine hydraulic lines will be filled with vegetable oil for the duration of the Project to minimize impacts of potential spills and leaks.</td>
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<td>• Spill prevention and clean-up kits will be on site when heavy equipment is operating within 25 feet of the water (NMFS 2017a).</td>
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<td>• To the extent feasible, work requiring use of heavy equipment will be completed by working from the top of the bank (i.e., landward of the OHWM or extreme high tide line) (NMFS 2017a).</td>
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<td>• Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities around the water (NMFS 2017a).</td>
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<td>• Equipment will cross the stream in-water only under the following conditions (NMFS 2017a):</td>
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<td>o Equipment is free of external petroleum-based products, soil and debris has been removed from the drive mechanisms and undercarriage;</td>
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<td>o The substrate is bedrock or coarse rock and gravel;</td>
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<td>o Mats or logs are used in soft bottom situations to minimize compaction while driving across streams;</td>
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### Resource Topic: Water Resources (Water Quality, continued)

<table>
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<tr>
<th>Best Management Practice</th>
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<tr>
<td>o Stream crossings will be performed at right angles (90 degrees) to the bank if possible;</td>
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<td>o No stream crossings will be performed at spawning sites when spawners of ESA listed fishes are present or eggs or juvenile fish could be in the gravel;</td>
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<td>o The number of crossings will be minimized.</td>
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</table>

- Project operations will cease under high flow conditions that could inundate the Project Area, except as necessary to avoid or minimize resource damage (NMFS 2017a).
- If high flow or high tide conditions that may cause siltation are encountered during the Project, work shall stop until the flow subsides or the tide falls (NMFS 2017a).
- Where practicable, a turbidity and/or debris containment device shall be installed prior to commencing in-water work (NMFS 2017a).
- When working in-water, some turbidity monitoring may be required, subject to the USACE permit requirements or CWA section 401 certification. Turbidity monitoring generally is required when working in streams with more than 40 percent fines (silt/clay) in the substrate. Turbidity will be monitored only when turbidity generating work takes place, for example, installation of coffer dams, pulling the culvert in-water, reintroducing water. The applicant will measure the duration and extent of the turbidity plume (visible turbidity above background) generated. The data will be submitted to the USACE, NMFS, and the USFWS immediately following Project construction. Turbidity measurements will be taken in NTUs and are used by project proponents to develop procedures to minimize turbidity and estimate take for future projects (NMFS 2017a).
- Equipment used in the instream channel will have containment methods to address possible fuel and oil leaks.

### Erosion and spill prevention and control

- A Temporary Erosion and Sediment Control plan and a Spill Prevention Control and Containment plan, commensurate with the size of the Project, must be prepared and carried out to prevent pollution caused by surveying or construction operations (NMFS 2017a).
- A Spill Prevention, Control, and Clean-Up plan will be prepared prior to construction for every project that utilizes motorized equipment or vehicles (NMFS 2017a).
- A SPCC Plan in accordance with 40 CFR, Part 112 is required where release of oil and oil products could reasonably be expected to enter into or upon navigable waters of the U.S. or adjoining shorelines in quantities that may be harmful (40 CFR, Part 110), and aggregate on site oil storage capacity is over 1,320 gallons. Only containers with capacity of 55 gallons and greater are included in determining on site aggregate storage capacity.
<table>
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<th>Resource Topic</th>
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<tr>
<td>Water Resources</td>
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<td>(Water Quality, continued)</td>
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<tr>
<td></td>
<td><strong>Erosion and spill prevention and control, continued</strong></td>
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<td></td>
<td>o Prevent, stop, and control spills or leaks during construction activities:</td>
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<td>o Stop source of spill or leak.</td>
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<td>o Stop migration of spill or leak.</td>
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<td>o Place berm of sorbent material around perimeter of spill.</td>
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<td>o Solidify free standing oil.</td>
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<td>• A supply of emergency erosion control materials will be on hand and temporary erosion</td>
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<td>controls will be installed and maintained in place until site restoration is complete</td>
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<td>(NMFS 2017a).</td>
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<td>• Landward erosion control methods shall be used to prevent silt-laden water from entering</td>
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<td>waters of the U.S. These may include, but are not limited to, filter fabric, temporary</td>
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<td>sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or</td>
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<td>immediate mulching of exposed areas (NMFS 2017a).</td>
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<td>• Control pollutants by use of sediment and erosion controls, wastewater and stormwater</td>
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<td>management controls, construction site management practices, and other controls including</td>
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<td>State and local control requirements.</td>
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<td>• Sediment and Erosion Controls:</td>
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<td>o Establish methods for controlling sediment and erosion which address vegetative</td>
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<td>practices, structural control, silt fences, straw dikes, sediment controls, and</td>
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<td>operator controls as appropriate.</td>
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<td>o Institute stormwater management measures as required, including velocity dissipators,</td>
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<td>and solid waste controls which address controls for building materials and offsite</td>
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<td>tracking of sediment.</td>
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<td>• Pollution Prevention Measures:</td>
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<td>o Use methods of dewatering, unwatering, excavating, or stockpiling earth and rock</td>
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<td>materials which include prevention measures to control silting and erosion, and which</td>
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<td>will intercept and settle any runoff of sediment-laden waters.</td>
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<td>o Prevent wastewater from general construction activities such as drainwater collection,</td>
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<td>aggregate processing, concrete batching, drilling, grouting, or other construction</td>
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<td>operations, from entering flowing or dry watercourses without the use of approved</td>
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<td>turbidity control methods.</td>
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<td>o Divert stormwater runoff from upslope areas away from disturbed areas.</td>
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### Erosion and spill prevention and control, continued

- **Turbidity Prevention Measures:**
  - Use methods for prevention of excess turbidity which include, but are not restricted to, intercepting ditches, settling ponds, gravel filter entrapment dikes, flocculating processes, recirculation, combinations thereof, or other approved methods that are not harmful to aquatic life.
  - Wastewaters discharged into surface waters shall meet conditions of Clean Water Act section 402, the National Pollutant Discharge Elimination System (NPDES) permit.
  - Do not operate mechanized equipment in waterbodies without having first obtained a Clean Water Act Section 404 permit, and then only as necessary to construct crossings or perform the required construction.
- Clean up spills or leaks in a manner that complies with applicable federal, state, and local laws and regulations.
- Dispose of spilled or leaked materials:
  - Handle and dispose of spilled or leaked materials contaminated with 50 ppm or greater polychlorinated biphenyls.
  - Handle and dispose of spilled or leaked materials not contaminated or contaminated with less than 50 ppm polychlorinated biphenyls in accordance with applicable federal, state, and local regulations.

### Discharge water and wastes

- All discharge water created by construction (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) will be treated to avoid negative water quality and quantity impacts. Removal of fines may be accomplished with bioswales; concrete washout water with an altered pH, may be infiltrated (NMFS 2017a).
- Wastewater from Project activities and water removed from within the work area shall be routed to an upland disposal site (landward of the OHWM or extreme high tide line) to allow removal of fine sediment and other contaminants prior to being discharged to the waters of the U.S. (NMFS 2017a).
- All waste material such as construction debris, silt, excess dirt or overburden resulting from the Project will generally be deposited above the limits of flood water in an upland disposal site. However, material from pushup dikes may be used to restore microtopography (e.g., filling drainage channels) (NMFS 2017a).
- The contractor’s Stormwater Pollution Prevention Plan will address potential pollution generating activities that may be reasonably expected to impact the quality of stormwater discharges from the construction site.
B. Environmental Commitments and Best Management Practices

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<th>Resource Topic</th>
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<tr>
<td>Water Resources (Water Quality, continued)</td>
<td><strong>Storage and staging</strong></td>
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<td>• The contractor will store and protect manufactured products in accordance with manufacturer’s instructions and the Reclamation Safety and Health Standards (available at: <a href="http://www.usbr.gov/safety/rshs/index.html">http://www.usbr.gov/safety/rshs/index.html</a>).</td>
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<td>• The contractor is required to obtain instructions from the manufacturer before delivery of materials to the jobsite and maintain a copy of the instructions at the jobsite; these instructions may include but not be limited to protect materials subject to adverse effects from moisture, sunlight, ultraviolet light, or weather during storage at jobsite.</td>
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<td>• When not in use, vehicles and equipment containing oil, fuel, and/or chemicals will be stored in a staging area located at least 150 feet from the USACE jurisdictional boundary of wetlands and waterbodies. If possible, staging will be located at least 300 feet away from the USACE jurisdictional boundary of wetlands and waterbodies, and on impervious surfaces to prevent spills from reaching groundwater. When moving equipment daily at least 150 feet from waterbodies would create unacceptable levels of disturbance (for example, requiring multiple stream crossings, multiple passes over sensitive vegetation), a closer staging location with an adequate spill prevention plan may be proposed and approved as described in Minor Project Modifications (NMFS 2017a).</td>
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<td>• Equipment will not be stored overnight in the instream channel.</td>
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<td>• Do not stockpile or deposit excavated materials or other construction materials, near or on, stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff or can in any way encroach upon the watercourse.</td>
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<td>• Petroleum Product Storage Tanks Management.</td>
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<td>o Place oil or other petroleum product storage tanks at least 20 feet from streams, flowing or dry watercourses, lakes, wetlands, reservoirs, and any other water source.</td>
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<td>o Do not use underground storage tanks.</td>
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<td>o Construct storage area dikes at least 12 inches high or graded and sloped to permit safe containment of leaks and spills equal to storage tank capacity located in the area plus sufficient freeboard to contain the 25-year rainstorm. Line diked areas with an impermeable barrier at least 50 mils thick.</td>
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<td>o Areas for refueling operations: Lined with impermeable barrier at least 40 mils thick covered with 2 to 4 inches of soil.</td>
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<td><strong>Reclamation of temporary disturbance</strong></td>
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<td>• All temporary access will be removed (including gravel surfaces) and planted after Project completion (NMFS 2017a).</td>
</tr>
</tbody>
</table>
### Resource Topic | Best Management Practice
---|---
**Water Resources**  
*(Water Quality, continued)*  
- Within seven calendar days from Project completion, any disturbed bank and riparian areas shall be protected using native vegetation or other erosion control measures as appropriate. For erosion control, sterile grasses may be used in lieu of native seed mixes. Alternative methods (e.g., spreading timber harvest slash) may be used for erosion control if approved by the USACE (NMFS 2017a).

**Water Resources**  
*(Water Rights)*  
- A total of 40 cfs shall be continuously provided to the LNFH during Phase I construction.
- A total of 20 cfs shall be continuously provided to the LNFH during Phase II construction activities taking place from April 17 to May 13, with provisions of emergency extension to May 20.

**Biological Resources**  
*(Vegetation)*  
- Preserve natural landscape and preserve and protect existing vegetation not required or otherwise authorized to be removed.
- Protect vegetation from damage or injury caused by construction operations, personnel, or equipment using protective barriers or other approved methods.
- Minimize, to the greatest extent practicable, clearings and cuts through vegetation.
- Do not use trees for anchorages except in emergency cases or as approved by Reclamation. Where approved, wrap the trunk with a sufficient thickness of approved protective material before rope, cable, or wire is placed.
- Use safety ropes where tree climbing is necessary; do not use climbing spurs.
- Before bringing construction equipment on site, clean it to remove dirt, vegetation, and other organic material to prevent introduction of noxious weeds, and invasive plant and animal species.
- Contractor cleaning procedures shall result in equipment being cleaned as well or better than the procedures described in Reclamation Cleaning Manual (Reclamation 2010). Reclamation will inspect construction equipment following procedures described in Reclamation Cleaning Manual before allowing the equipment onsite.
- Restore contractor use areas to pre-construction condition.
- Areas of temporary disturbance must be re-seeded according to a revegetation plan.
### Resource Topic: Biological Resources (Fisheries and Aquatic Ecosystems)

#### Best Management Practice: Riparian areas
- The removal of riparian vegetation for access will be minimized (NMFS 2017a).
- All native, non-invasive organic material (large and small wood) cleared from the action area for access will remain on site (NMFS 2017a).
- Boundaries of clearing limits associated with site access and construction will be marked to avoid or minimize disturbance of riparian vegetation, wetlands, and other sensitive sites (NMFS 2017a).
- If native riparian vegetation is disturbed it will be replanted with native herbaceous and/or woody vegetation after Project completion. Planting will be completed between October 1 and April 15 of the year following construction. Plantings will be maintained as necessary for 3 years to ensure 50 percent herbaceous and/or 70 percent woody cover in year 3, whatever is applicable. For riparian impact areas greater than 0.5 acre, a final monitoring report will be submitted to the USACE in year 3. Failure to achieve the 50 percent herbaceous and 70 percent woody cover in year 3 will require the permittee to submit a plan with contingency measures to achieve standards or reasons to modify standards (NMFS 2017a).
- Per NWP 27, post-planting monitoring may be required for up to 10 years in order to ensure an 80 percent planting survival rate is met.
- Fencing will be installed as necessary to prevent access to revegetated sites by livestock, beavers, or unauthorized persons. Beaver fencing will be installed around individual plants where necessary (NMFS 2017a).

#### Fisheries and aquatic wildlife
- Instream work is limited to July 1 through November 15. July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018). Extending the in-water work window to November 15 would be an exception to the general and approved in-water work window.
- A minimum depth of 0.8 feet shall be maintained within the greatest amount of the natural stream channel width at all times with placement of cofferdams to facilitate fish passage. Fish passage criteria in Icicle Creek Fish Passage Evaluation for the Leavenworth National Fish Hatchery (Anglin et al. 2013, p. 26-28) should be consulted for minimum depth and maximum velocity criteria. The maximum velocity criteria on pages 26-28 (Anglin et al. 2013) are conservative, but attempts should be made to provide fish passage to the greatest extent practical across the natural stream channel width and hydrograph.
- Work site dewatering will follow the Dewatering and Fish Capture Protocol (Appendix D of NMFS and USFWS 2008). Fish removal from dewatered work sites would be overseen by a fisheries biologist. Electrofishing for fish relocation/work area isolation must follow the most recent NMFS guidelines (NMFS 2017a). Record all incidents of listed fish being observed, captured, handled, and released (USFWS 2011).
- Re-watering of the construction site occurs at such a rate as to minimize loss of surface water downstream as the construction site streambed absorbs water (NMFS and USFWS 2008).
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| Biological Resources (Fisheries and Aquatic Ecosystems, continued) | • The design of passage structures will follow the appropriate design standards in the most current version of the NMFS Anadromous Salmonid Fish Facility Design manual (NMFS and USFWS 2008).  
• Roughened channels will be designed to standards contained in the most current version of the NMFS Anadromous Salmonid Fish Facility Design manual (NMFS and USFWS 2008).  
• Post-construction monitoring of the low-flow fishway would be done to ensure effectiveness.  
• Boulder weirs will be low in relation to channel dimensions so that they are completely overtopped during channel-forming, bankfull flow events. Boulder weirs will be placed diagonally across the channel or in more traditional upstream pointing "V" or "U" configurations with the apex oriented upstream (NMFS and USFWS 2008).  
• Boulder weirs will be constructed to allow upstream and downstream passage of all native listed fish species and life stages that occur in the stream at all flows (NMFS and USFWS 2008).  
• Boulder weirs shall be designed and inspected by a multidisciplinary team (including a salmon or trout biologist) that has experience with these types of structures (NMFS and USFWS 2008).  
• Screens, including screens installed in temporary pump intakes, will be designed to meet standards in the most current version of the NMFS Anadromous Salmonid Passage Facility Design manual (NMFS and USFWS 2008).  
• Pumps used to dewater the work isolation area or supply temporary hatchery water during construction, will have a fish screen installed, operated and maintained according to NMFS’ fish screen criteria (NMFS 2017a).  
• All fish screens will be sized to match the water users documented or estimated historic water use or legal water right, whichever is less. Water diversion rates shall not exceed the design capacity of the screen, as calculated by following NMFS Anadromous Salmonid Passage Facility Design manual (NMFS and USFWS 2008).  
• Irrigation diversion intake and return points will be designed (to the greatest degree possible) to prevent all native fish life stages from swimming or being entrained into the irrigation system (NMFS and USFWS 2008).  
• Do not use jackhammers in excess of 30 pounds without Reclamation approval. Blasting is not permitted.  
• Monitor, capture, and release listed fish species in the sand settling basin in accordance with applicable protocol in NMFS (2017a), USFWS (2011), and as identified through consultation for the Project’s Biological Assessment.  
• Schedule annual intake maintenance to avoid the Bull Trout upstream migration period (USFWS 2011).  
• Disturbing natural-origin spawning salmon and Steelhead during hatchery maintenance activities of diversions and instream structures shall be avoided, as shall disturbing salmon and Steelhead redds (NMFS 2017b). |
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| **Biological Resources (Fisheries and Aquatic Ecosystems, continued)** | • Provide complete technical information and material data sheets on all CIPP lining materials, components, resins, catalysts, and all other components used in the work.  
  o Include written confirmation that all products used in the work are “fish friendly” and do not contain chemicals known to be hazardous to fish or aquatic life.  
• Provide a written statement from the CIPP lining manufacturer that all materials, the fabrication process, and all other supplied equipment used in the work is compatible with these Specifications, and minimally meets the referenced standards listed above; including the level and extents of any QA/QC program required for this work.  
  o This statement shall clearly state that all materials provided are known to be “fish friendly” and are not known to have detrimental effects to any fish species or other aquatic life.  
• Contractor shall provide a written statement from the CIPP lining installer that all materials, methods, and equipment used in the installation and testing process of the work is compatible with these Specifications, and minimally meets the referenced standards listed above; including the level and extents of any QA/QC program required for this work.  
  o This statement shall clearly state that all materials, equipment, and methods provided or used are known to be “fish friendly” and are not known to have detrimental effects to aquatic animals.  
  o Include a statement that any water used for the installation, curing and testing of the CIPP lining shall not be provided from Icicle Creek, nor shall it be returned to Icicle Creek, discharged on project lands, or released into the Leavenworth National Fish Hatchery. Include details on the source, transportation, handling, removal, and discharge of this water. |
| **Biological Resources (Terrestrial Wildlife)** | • Schedule all necessary vegetation removal, trimming, and grading of vegetated areas outside of the bird breeding season (generally March 1 to August 31) to the maximum extent practicable.  
• Avoid construction activities during the bird breeding season to the extent practicable. When Project activities cannot occur outside the bird nesting season (March 1 to August 31), conduct surveys prior to scheduled activity to determine if active nests are present within the Wildlife Analysis Area and buffer any active nesting locations found during surveys. Surveys should be conducted by a qualified biologist no more than seven days prior to disturbance activities. If active nests are detected during these surveys a no-activity buffer zone around the nest will be established by a qualified biologist based on species, Project disturbance level, topography, existing disturbance levels, and habitat type until fledging has occurred. During ongoing Project activities if a bird establishes a new nest the nest vegetation will not be removed or modified but no buffer zone will be required. If there is a pause in Project activities greater than seven days an additional nesting bird survey would be needed. |
### B. Environmental Commitments and Best Management Practices

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<td>Biological Resources (Terrestrial Wildlife continued)</td>
<td>• Reclamation would minimize the highest construction noise disturbance to avoid or minimize impacts on mule deer and mountain goat during sensitive periods to the extent practicable. This is between mid-spring to early fall (May 1-September 30).</td>
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| Cultural Resources | • As required by the Washington State Historic Preservation Officer, the *Plan and Procedures for the Inadvertent Discovery of Cultural Resources and Human Remains* (Inadvertent Discovery Plan) will be followed in the case of inadvertent discovery of cultural resources or human remains during construction.  
• A professional archaeological monitor will be present during Phase II pipeline replacement activities on USFWS property. |
| Land Use | • Restore contractor use areas to pre-construction condition. |
| Transportation | • Perform work on rights-of-way established by the government as necessary to construct and maintain any roads, bridges, or drainage structures required for establishment and use of haul routes for construction operations.  
• Use existing available public highways, roads, or bridges as haul routes subject to applicable local regulations.  
• Minimize interference with or congestion of local traffic.  
• Provide barricades, flaggers, and other necessary precautions for safety of the public where haul routes cross public highways or roads.  
• Maintain roadways, parking areas, and haul routes in a sound, smooth condition.  
• Promptly repair ruts, broken pavement, potholes, low areas with standing water, and other deficiencies to maintain road surfacing and drainage in original or specified condition.  
• Provide cones, delineators, concrete safety barriers, barricades, flasher lights, danger signals, signs, temporary fencing, and other temporary traffic control devices as required to protect work, public safety, pedestrians, and other recreationists on public and private property.  
  o Includes access to and within CUAs.  
• Provide flaggers and guards as required to prevent accidents and damage or injury to passing traffic and pedestrians.  
• Do not begin work along public or private roads until traffic control devices for warning, channeling, and protecting motorists are in place in accordance with approved traffic control plan.  
• Provide unobstructed, smooth, and dustless passageway for one lane of traffic through construction operations except at times when vehicles will be turning around at the Forest Service kiosk or backing onto the Intake Access Road.  
• Provide unobstructed, smooth, and dustless passageway for one lane of traffic through construction operations. |
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| Transportation (continued) | - Maintain convenient access to driveways and buildings along line of work.  
- Protect roads closed to traffic with effective barricades and warning signs. Illuminate barricades and obstructions from sunset to sunrise.  
- Remove traffic control devices when no longer needed.  
- Maintain vehicle and pedestrian traffic flow and conduct construction operations to minimize obstruction and inconvenience to public traffic.  
- Vehicular access across the bridge to and from the spillway pool shall be maintained at all times.  
- The contractor will secure the required road use approval from the Forest Service, most likely under a road use permit. |
| Noise | - Daytime construction hours are 7:00 a.m. to 7:00 p.m. for both Phase I and Phase II.  
- Nighttime construction hours are 7:00 p.m. to 7:00 a.m. for Phase I only.  
- Contractor will develop and submit a Noise Reduction Plan for Phase I.  
  o Noise reduction measures are required for both daytime and nighttime work. Nighttime work shall have more restrictions and noise reduction measures than daytime work as per the approved Noise Reduction Plan.  
  o Continuous monitoring of noise (day and night) to occur in at least two locations to be determined by the Government.  
  o Government will determine the baseline noise levels based on daytime measurements during construction.  
  o The hours of 7:00 p.m. to 7:00 a.m. are considered reduced noise hours. Nighttime noise levels, as measured at nearest noise-sensitive areas, should be reduced by 10 dB over the daytime measurement at the same location.  
  o The contractor’s methods and equipment shall include means and methods to reduce noise levels of the contractor’s operation to the extent feasible. Only work acceptable to Reclamation’s COR will be allowed during these hours. Maximum allowable noise level for identified locations adjacent to the work areas shall be established and enforced.  
  o Only construction activities in the approved Noise Reduction Plan are allowed during nighttime hours, unless approved 72 hours in advance by Reclamation.  
- Do not use jackhammers in excess of 30 pounds without Reclamation approval.  
- Blasting is not permitted.  
- Pile driving is not permitted. |
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| Recreation                           | • There are no construction activities (such as parking, storage, or vehicle turnaround) allowed in the Forest Service Snow Lakes Trailhead parking lot.  
• Vehicular access across the bridge to and from the spillway pool shall be maintained at all times.  
• Light Controls  
  o Direct stationary floodlights shall shine downward at an angle less than horizontal.  
  o Shield floodlights so that floodlights will not be a nuisance to surrounding areas.  
  o Direct lighting so that residences are not in direct beam of light.  
  o Direct lighting so that adjacent roadways are not in direct beam of light.  
  o Correct lighting control problems when they occur as approved by Reclamation's COR.                                                                                                                                                                                                 |
| Visual Resources                     | • Minimize, to the greatest extent practicable, clearings and cuts through vegetation. Irregularly shape authorized clearings and cuts to soften undesirable aesthetic impacts.                                                                                                                                                                                                                                                   |
| Socioeconomics and Environmental Justice | • Reclamation policy is to avoid impacts on Indian sacred sites whenever possible. Continued coordination with affected Tribes may result in future identification of sacred sites. If this occurs, Reclamation would further evaluate impacts on these resources. Consultation with the Yakama Nation and Colville Tribes would identify how to protect sacred sites if they were identified and how to provide continued access if any such sites were affected by Project construction.  
• In-water work would not occur in the spillway pool during the Tribal fishing preparations or season.                                                                                                                                                                                                       |
| Hazardous Materials and Public Health and Safety | • Vehicle traffic on government rights-of-way, dirt roads, and paved roads through LNFH property would be limited to 10 miles per hour.  
• Nuisance flows from seepage and leakage through the cofferdams will be managed to maintain a safe working environment.  
• Hazardous Waste Disposal:  
  o Dispose by removal from jobsite.  
  o Recycle hazardous waste whenever possible.  
  o Dispose of hazardous waste materials that are not recycled at appropriately permitted treatment or disposal facilities.  
  o Transport hazardous waste in accordance with 49 CFR 171-179.  
• Any accidental release of hazardous materials would be cleaned up according to the Contractor's SPCC Plan.  
• Provide protection for personnel and existing facilities from harm due to demolition activities. |
### B. Environmental Commitments and Best Management Practices

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| Hazardous Materials and Public Health and Safety (continued) | • Arrange protective installations to permit operation of existing equipment and facilities by the government while work is in progress.  
• Inadvertent discovery of hazardous wastes or materials will be reported to Reclamation and Ecology within 24 hours of discovery. Construction in the vicinity of the discovery would cease until the appropriate disposal procedures were identified and carried out in coordination with Reclamation and Ecology.  
• Provide cones, delineators, concrete safety barriers, barricades, flasher lights, danger signals, signs, temporary fencing, and other temporary traffic control devices as required to protect work, public safety, pedestrians, and other recreationists on public and private property.  
  o Includes access to and within Contractor Use Areas.  
• Provide flaggers and guards as required to prevent accidents and damage or injury to passing traffic and pedestrians.  
• Maintain vehicle and pedestrian traffic flow and conduct construction operations to minimize obstruction and inconvenience to public traffic.  
• A list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard will be developed by the contractor as part of the Fire Protection and Prevention Plan.  
• Contractor will develop a means to educate all construction workers about the risk of starting a wildfire and how to avoid it and who to contact in case a wildfire is started.  
• Create a fire break around and adjacent to offices, shops, and other work areas by clearing away all flammable vegetation or combustible growth.  
• Passenger vehicles and construction machinery requirements.  
  o Passenger vehicles, cars, pickups, light trucks, shall be equipped with one water fire extinguisher or backpack pump 5-pound minimum capacity, excluding personal vehicles parked at Field Office area.  
  o Any internal combustion engine operated on or near forest, brush, grass covered land shall be equipped with a spark arrester or the engine shall be constructed, equipped, and maintained for prevention of fire.  
• Fire tools required in areas where portable tools powered by internal combustion engines are used within 25 feet of any flammable material.  
  o Maintain one serviceable round point shovel, minimum overall length 46 inches, and one 5-pound minimum pressurized fire extinguisher or 5-pound back pump.  
  o Keep required fire tools within 25 feet of operating equipment powered by internal combustion engine.  
• Fire tools and preventative actions required at shops, staging areas, and other stationary work areas where equipment machinery or tools that can cause sparks are used: |
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| Hazardous Materials and Public Health and Safety (continued) | o Clear away flammable materials for 25 feet.  
  o Maintain one serviceable round point shovel overall length not less than 46 inches. Maintain a 5-gallon minimum backpack pump water-type fire extinguisher or one 5-gallon minimum pressurized water fire extinguisher.  
  • Provide water truck equipped with 500 feet of 1.5-inch single jacket hose, nozzle, and pressure pump. Truck with 300-gallon (minimum) water must be on site at each work feature where work is being performed with trained operator during work hours. Water truck may be used for other watering work, such as dust suppression, but must be immediately available for fire suppression duty.  
  • Light Controls  
    o Direct stationary floodlights shall shine downward at an angle less than horizontal.  
    o Shield floodlights so that floodlights will not be a nuisance to surrounding areas.  
    o Direct lighting so that residences are not in direct beam of light.  
    o Direct lighting so that adjacent roadways are not in direct beam of light.  
    o Correct lighting control problems when they occur as approved by Reclamation’s COR.  
  • Lead abatement will be conducted by trained and certified individuals in lead-abatement processes.  
  • Regulations included in CFR 1926.62 for lead removal and 40 CFR 402/404 for the safe removal of lead-based paints shall be followed to limit lead exposure and ensure the health of construction workers.  
  • Vehicular access across the bridge to and from the spillway pool shall be maintained at all times. |
| Tribal Interests                                   | • Reclamation policy is to avoid impacts on Indian sacred sites whenever possible. Continued coordination with affected Tribes may result in future identification of sacred sites. If this occurs, Reclamation would further evaluate impacts on these resources. Consultation with the Yakama Nation and Colville Tribes would identify how to protect sacred sites if they were identified and how to provide continued access if any such sites were affected by Project construction.  
  • Vehicular access across the bridge to and from the spillway pool shall be maintained at all times.  
  • The construction contractor would be required to submit a pumping plan. To reduce potential impacts to Tribal fisheries, location of the temporary Hatchery water supply pumps and pump screen boxes in the spillway pool and temporary pipeline route shall be coordinated with Reclamation, USFWS, and the Tribes, as part of the contractor submittal review process. |

Sources: As noted in table.
B.2 Regulatory Permit Terms and Conditions

Reclamation will obtain required regulatory permits and comply with the general, regional, and permit-specific terms and conditions contained therein. A general list of terms and conditions is included in the sections below. Regulating agencies may also impose additional conditions on a project-by-project basis.

B.2.1 U.S. Army Corps of Engineers Section 404 Nationwide Permits

USACE General Conditions for all NWPs

- Aquatic Life Movements. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.
- Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable.
- Suitable Material. Material used for construction or discharged must be free from toxic pollutants in toxic amounts.
- Fills Within 100-Year Floodplains. The activity must comply with applicable Federal Emergency Management Agency-approved state or local floodplain management requirements.
- Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
- Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.
- Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable nationwide permit general conditions, as well as any activity-specific conditions added by the district engineer to a nationwide permit authorization.
- Tribal Rights. No nationwide permit activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.
- Endangered Species. (a) No activity is authorized under any nationwide permit which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the ESA, or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any nationwide permit which “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed.
• Endangered Species. (d) As a result of formal or informal consultation with the USFWS or NMFS the district engineer may add species-specific permit conditions to the nationwide permits.

• Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

• Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

• Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed.

• Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)).

• Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the USACE or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification.

**USACE Seattle District NWP Regional Conditions**

• Construction Boundaries: Permittees must clearly mark all construction area boundaries before beginning work on projects that involve grading or placement of fill. Boundary markers and/or construction fencing must be maintained and clearly visible for the duration of construction. Permittees should avoid and minimize removal of native vegetation (including submerged aquatic vegetation) to the maximum extent possible.

• Temporary Impacts and Site Restoration: Native soils removed from waters of the U.S. for project construction should be stockpiled and used for site restoration. Restoration of temporarily disturbed areas must include returning the area to pre-project ground surface contours. If native soil is not available from the project site for restoration, suitable clean soil of the same textural class may be used. The permittee must revegetate disturbed areas with native plant species sufficient in number, spacing, and diversity to restore affected functions. Revegetation must begin as soon as site conditions allow within the same growing season as the disturbance. Temporary erosion and sediment control measures must be removed as soon as the area has established vegetation sufficient to control erosion and sediment.

**NWP 27 (Aquatic Habitat Restoration, Enhancement, and Establishment Activities) Conditions**

• Only native plant species should be planted at the site.
**NWP 33 (Temporary Construction, Access, and Dewatering) Conditions**

- Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding.
- Fill must consist of materials, and be placed in a manner, that will not be eroded by expected high flows.
- The use of dredged material may be allowed if the district engineer determines that it will not cause more than minimal adverse environmental effects. Following completion of construction, temporary fill must be entirely removed to an area that has no waters of the United States, dredged material must be returned to its original location, and the affected areas must be restored to pre-construction elevations. The affected areas must also be revegetated, as appropriate.

**B.2.2 Ecology Section 401 Water Quality Certification**

**General Conditions**

- Stormwater pollution prevention: All projects that involve land disturbance or impervious surfaces must implement stormwater pollution prevention or control measures to avoid discharge of pollutants in stormwater runoff to waters of the State.
  - For land disturbances during construction, the applicant must obtain and implement permits (e.g., Construction Stormwater General Permit) where required and follow Ecology’s current stormwater manual.
  - Following construction, prevention, or treatment of ongoing stormwater runoff from impervious surfaces shall be provided.

**B.3 Potential Contractor Plan Submittals**

The list of plans that would need to be prepared before Project construction could begin may include, but are not limited to the following:

- Cofferdam Construction Plan
- Cofferdam Monitoring Plan
- Concrete Removal and Disposal Plan
- Demolition Plan
- Fire Prevention Plan
- Fire Protection Plan
- Inadvertent Discovery Plan
- Land Use and Landscape Rehabilitation Plan
- Noise Reduction Plan
- Occupational Health Plan
- Personal Protective Equipment Plan
- Pumping Plan
- Seeding Plan
- Spill Prevention, Control, and Countermeasure Plan
- Stormwater Pollution Prevention Plan
- Temporary Erosion and Sediment Control Plan
• Traffic Control Plan
• Tree and Plant Protection Plan
• Waste Handling and Disposal Plan
• Waste Production and Disposal Plan
• Water Control Plan
• Work Area Isolation Plan

B.4 USFWS Biological Opinion

Reasonable and Prudent Measures

The conservation measures negotiated in cooperation with the USFWS and included as part of the proposed action constitute all the RPMs necessary to minimize the impacts of incidental take. On that basis, no RPMs except for monitoring and reporting requirements are included in the Incidental Take Statement (USFWS 2021).

RPM 1: Monitor implementation of the proposed action and report the results of that monitoring to ensure that the level of take exemption provided under this Incidental Take Statement is not exceeded.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the ESA, Reclamation must comply with the following terms and conditions, which implement the RPM described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

To implement RPM 1:

Term and Condition 1. Reclamation shall prepare a report describing the progress of the proposed Project, including implementation of the associated terms and conditions, and impacts to the Bull Trout (50 CFR 402.14(i)(1)(iv) and 402.14(i)(3). The report, which shall be submitted to the Central Washington Field Office on or before April 1 of the year following monitoring, shall list and describe:

1. Results of fish capture and handling for all fish removal events at the intake construction area, and for Bull Trout entrained in the temporary water supply and captured in the sand settling basin. Include number and life stages of affected individuals detected, condition, and release locations.
2. Observations of Bull Trout impinged on the cofferdam walls. Include number and life stages of affected individuals detected, condition, and release locations. Note, all adult migratory Bull Trout will be released upstream of block nets and the construction area at RM 4.5.

Prior to construction, Reclamation will coordinate monitoring activities with USFWS LFC staff tasked with implementing fish exclusion, capture, handling, and electroshocking protocols and standards (USFWS 2021).
3. Any observations of injured and/or dead Bull Trout in the action area, beyond the situations
described above. Include the number, location, and life stages of affected individuals.

4. Results of turbidity monitoring during cofferdam construction and removal.

5. Implementation of any conservation recommendations.

6. Submit reports to USFWS Central Washington Field Office at the address below:

   U.S. Fish and Wildlife Service
   Central Washington Field Office
   Attn: SWISP (01EWF00-2021-F-0063)
   215 Melody Lane, Suite 103
   Wenatchee, WA 98801

The USFWS has determined that no more than 106 Bull Trout and 730 feet of Icicle Creek foraging,
migratory, and overwintering habitat will be incidentally taken as a result of the proposed action.
The RPMs, with their implementing terms and conditions, are designed to minimize the impact of
incidental take that might otherwise result from the proposed action. If, during the course of the
action, this level of incidental take is exceeded, such incidental take represents new information
requiring reinitiation of consultation and review of the RPMs provided. Reclamation must
immediately provide an explanation of the causes of the taking and review with the USFWS need for
possible modification of the RPMs.

The USFWS is to be notified within three working days upon locating a dead, injured, or sick
endangered or threatened species specimen. Initial notification must be made to the nearest U.S.
Fish and Wildlife Service Law Enforcement Office. Notification must include the date, time, precise
location of the injured animal or carcass, and any other pertinent information. Care should be taken
in handling sick or injured specimens to preserve biological materials in the best possible state for
later analysis of cause of death, if that occurs. In conjunction with the care of sick or injured
endangered or threatened species or preservation of biological materials from a dead animal, the
finder has the responsibility to ensure that evidence associated with the specimen is not
unnecessarily disturbed. Contact the U.S. Fish and Wildlife Service Law Enforcement Office at (425)
883-8122, or the USFWS Central Washington Fish and Wildlife Office at (509) 665-3508.

B.5 References

Anglin, D. R., J. J. Skalicky, D. Hines, and N. Jones. 2013. Icicle Creek Fish Passage Evaluation for
The Leavenworth National Fish Hatchery. U.S. Fish and Wildlife Service, Columbia River

Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat (EFH) Consultation; Leavenworth National Fish Hatchery spring
Chinook Salmon Program. National Marine Fisheries Service, West Coast Region, Portland,
Oregon.
B. Environmental Commitments and Best Management Practices


Appendix C

SWISP Project EIS Analysis Assumptions
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Appendix C. SWISP Project EIS Analysis
Assumptions

Reclamation used the following assumptions when analyzing effects from the action alternatives:

- Relocation of the COIC point of diversion on Icicle Creek downstream of the Hatchery, would be complete prior to the start of Phase I Construction. As of February 2021, COIC is in the final design phase of their relocation project and has begun the permitting process for a new point of diversion on Icicle Creek. COIC plans to begin construction in the summer of 2021 and complete the project prior to the irrigation season in the spring of 2022.

- There would be no change to LNFH water rights, its point of diversion, place of use, or the beneficial use designation. No other water rights would be affected.

- Reclamation would obtain required regulatory permits and comply with the general, regional, and permit-specific terms and conditions contained therein (see Appendix B, Section B.2, Regulatory Permit Terms and Conditions). If permit requirements, BMPs, or other measures contradict each other, the contract specification requires that the contractor abide by the most stringent of requirements.

- Trout Unlimited's Icicle Creek Boulder Field Fish Habitat Improvement Project is anticipated to be complete in 2022. Completion of the Project would result in access to more than 20 miles of high-quality aquatic habitat in upper Icicle Creek in the Alpine Lakes Wilderness Area.

- The Icicle Creek in-water work window would include the construction and removal of cofferdams.

- During cofferdam installation and removal no wet crossings or heavy equipment use would occur in Icicle Creek live water. A land-based, long-reach excavator or crane would be used for constructing and removing the cofferdams, either from outside of the Icicle Creek OHWM, or from within a temporarily dewatered work area isolated from Icicle Creek by another cofferdam. Pile driven and earthen cofferdams would not be allowed per the Project construction specifications.

- The LNFH low water needs period is from April 17 to May 13, with provisions of emergency extension to May 20 each year.

- The temporary Hatchery water supply during Phase I construction would be an unscreened gravity-fed bypass pipeline. Surface water would be supplied by pumping from the spillway pool on Icicle Creek.

- Under Alternative D, the temporary Hatchery water supply during Phase I construction would be provided from the spillway pool by using two high-lift 16-inch trailer-mounted pumps with 150 horsepower diesel engines when not being supplied by the gravity bypass pipeline.
• During Phase I construction, while the temporary above-ground, gravity-fed bypass pipeline connected to the conveyance pipeline is in use, USFWS would regularly survey the sand settling basin and capture and release listed fish species in accordance with the procedures outlined in Term and Condition 2g of the NMFS Hatchery Spring Chinook Salmon Program Biological Opinion (NMFS 2017a, p. 214). If listed fish are observed during snorkeling, or the water is too turbid for snorkeling, Hatchery staff would draw down the sand settling basin by redirecting flow to the outside screen chambers, bypassing the sand settling basin, to a point where a shallow (6 to 12-inch) pool of water is left in the basin. Fish would then be removed by seine netting and dip netting the remaining water. Fish would be tallied by species and gross life stage, notes would be made as to any mortalities, and all live fish would be released in the spillway pool to presumably continue migration or movement.

• The control valve vault disturbance area would be approximately 75 feet by 60 feet; the entirety of the disturbance area would be within the footprint of the conveyance pipeline replacement corridor.

• Replacing conveyance pipeline on the Hatchery grounds would occur between May 2022 and April 2023.

• Lining the conveyance pipeline with CIPP between CUA 5 and CUA 4 and between CUA 4 and CUA 3 would occur between April and May 2023.

• Alternative B: Lining the conveyance pipeline with CIPP between CUA 3 and CUA 2 would occur between April and May 2023.

• Alternative B: Replacing the conveyance pipeline on USFWS property at the intake would occur between April and May 2024.

• Alternative C: Lining the conveyance pipeline with CIPP between CUA 3 and CUA 2 would occur between April and May 2024.

• Alternative C: Lining the conveyance pipeline with CIPP on USFWS property at the intake would occur between April and May 2024.

• Between 7 and 10 construction personnel would be required during Phase II construction.

• During construction, unobstructed, smooth, and dustless passageway for one lane of traffic will be provided, except at times when construction vehicles will be turning around at the Forest Service kiosk or backing onto the intake access road.

• Construction material delivery could occur at the bottom of the existing intake access road, or on the Icicle Creek Road shoulder above the intake construction area.

• The headworks would be built to withstand a 100-year flood, so it would be approximately 15 feet higher in elevation than the existing low-head diversion dam crest. Nevertheless, it would not be easily visible to motorists on Icicle Creek Road.

• The gatehouse and stairs to the gatehouse would be demolished. Underground vaults would be in the footprint of the former gatehouse, but these will only be detectable by two manhole covers and valve covers that would be flush with the ground surface.

• IO&MA guardrails would be hot rolled galvanized steel. The IO&MA control panel canopy cover would be painted to match the LNFH roof color.

• A pneumatic tool would be used to conduct Phase I demolition activities.
The original wood stave conveyance pipeline was abandoned in place when it was replaced in the 1960s and may be encountered during conveyance pipeline replacement on USFWS property. In this event, construction would stop and the USFWS Zone Archaeologist would be notified per the LNFH SWISP Project Plan and Procedures for the Inadvertent Discovery of Cultural Resources and Human Remains (also referred to as the Inadvertent Discovery Plan; see Appendix B Potential Contractor Plan Submittals).
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Appendix D
Draft Phase III Riparian Revegetation Plan
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Mission Statements

The Department of the Interior conserves and manages the Nation’s natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation’s trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

The mission of the United States Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.
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## Acronyms and Abbreviations

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<tr>
<td>CIPP</td>
<td>cure-in-place pipe</td>
</tr>
<tr>
<td>CUA</td>
<td>contractor use area</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>ESA</td>
<td>Endangered Species Act</td>
</tr>
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<td>IO&amp;MA</td>
<td>Intake Operations and Maintenance Area</td>
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<tr>
<td>LNFH, Hatchery</td>
<td>Leavenworth National Fish Hatchery</td>
</tr>
<tr>
<td>NMFS</td>
<td>National Marine Fisheries Service</td>
</tr>
<tr>
<td>plan</td>
<td>Phase III Riparian Revegetation Plan</td>
</tr>
<tr>
<td>PISMA</td>
<td>Pipeline Intake and Sediment Management Area</td>
</tr>
<tr>
<td>Reclamation</td>
<td>U.S. Department of the Interior, Bureau of Reclamation</td>
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<td>SWISP</td>
<td>Surface Water Intake Fish Screens and Fish Passage</td>
</tr>
<tr>
<td>USACE</td>
<td>U.S. Department of the Army, Corps of Engineers</td>
</tr>
<tr>
<td>USC</td>
<td>United States Code</td>
</tr>
<tr>
<td>USFWS</td>
<td>U.S. Department of the Interior, Fish and Wildlife Service</td>
</tr>
<tr>
<td>WDFW</td>
<td>Washington Department of Fish and Wildlife</td>
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D.1 Introduction

The Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (USFWS) propose to revegetate areas within the Leavenworth National Fish Hatchery (hereafter, LNFH or Hatchery) Surface Water Intake Fish Screens and Fish Passage (SWISP) Project Phase I Intake Construction Area to offset impacts to upland and riparian vegetation due to replacement and restoration of the LNFH Intake Facilities. Revegetation efforts would occur within the Phase I Intake Construction Area shown in Figure D-1.

Figure D-1. Phase I Intake Construction Area and Riparian Revegetation Zones

Phase I of the SWISP Project will remove native trees and native upland and riparian vegetation during construction of the Intake Facilities. Legacy riparian vegetation removal has reduced the capacity of the riparian zone to provide most of the functions needed to maintain the integrity of aquatic habitats in the action area (USFWS 2021). A detailed description of the affected environment and impacts to vegetation resources from the SWISP Project is found in the SWISP Project Final Environmental Impact Statement (EIS) and the SWISP Project EIS Biological Resource Report (Reclamation 2020). This draft Phase III Riparian Revegetation Plan (plan) has been prepared to describe the riparian and upland revegetation activities for Phase III of the SWISP
D. Riparian Revegetation Plan

Project. This document will remain in draft form until the SWISP Project permitting is complete, as the regulatory agencies may request changes to the plan contents during the permitting process.

**D.1.1 Site Description**

Revegetation efforts would occur within the Phase I Intake Construction Area (Figure D-1). The majority of revegetation efforts would occur in areas of construction ground disturbance, but planting could also take place in undisturbed areas to increase density and supplement species composition.

Specifically, vegetation rehabilitation will occur in directly impacted areas within or adjacent to the intake access road, Intake Operations & Maintenance Area (IO&MA), Pipeline Intake and Sediment Management Area (PISMA) including the outlet channel, the temporary access route to the gravity bypass outlet, and the gravity bypass outlet itself.

**D.1.2 Existing Vegetation Description**

Vegetation at the Phase I Intake Construction Area consists of mixed conifer forest on the steeply-sloping hillsides above Icicle Creek (Reclamation 2020). The Icicle Creek riparian zone is characterized primarily by ponderosa pine (*Pinus ponderosa*) and upland shrub species, though few and scattered willow (*Salix* spp.) and alder (*Alnus* spp.) shrubs are present at the immediate edge of Icicle Creek. In general, the riparian zone at this location lacks diversity in species composition and structure.

Invasive plants are nonnative species that have been introduced into an environment that they did not evolve in. They are capable of establishing free-living populations in areas beyond their natural range of dispersal. Noxious weeds, a subset of invasive plants, are designated and regulated by state and federal laws because they are known to be detrimental to agriculture, commerce, natural resources, and public health. The Revised Code of Washington Section 17.10.010 defines noxious weeds as plants that, when established, are “highly destructive, competitive, or difficult to control by cultural or chemical practices”.

Seven noxious weeds have been identified in the SWISP Project Area considered in the SWISP Project Final EIS: diffuse knapweed (*Centaurea diffusa*), St. Johnswort (*Hypericum perforatum*), Dalmatian toadflax (*Linaria dalmatica* spp. *dalmatica*), Canada thistle (*Cirsium arvense*), kochia (*Kochia scoparia*), reed canarygrass (*Phalaris arundinacea*), and sulfur cinquefoil (*Potentilla recta*) (USFWS 2001; USFWS 2003). In addition, 10 nonnative plant species are also present in the Project Area (USFWS 2001). The SWISP Project Area includes both the Phase I and Phase II construction areas, so not all identified noxious weeds or nonnative plant species occur in the Phase I Intake Construction Area.

In accordance with Section 7 of the Endangered Species Act of 1973, as amended (ESA; 16 United States Code [USC] 1531–1544), the Project Area was evaluated for the potential occurrences of ESA-listed threatened and endangered species. No ESA-listed plant species have the potential to be found in the Project Area because suitable habitat is not present (Reclamation 2020). Wenatchee Mountains checkermallow (*Sidalcea oregana* var. *calva*; Endangered) has final designated critical habitat in Chelan County, although none is in the Project Area (Chelan County and Ecology 2019). Similarly, the vegetation types in the Project Area typically do not provide suitable habitat for most
of the other special status plant species with potential to occur in the Project Area, such as Washington Natural Heritage Program-listed plant species (Reclamation 2020).

For more detailed information regarding site characteristics and conditions, please see the SWISP Project EIS Biological Resources Report (Reclamation 2020).

**D.1.3 Revegetation Goals and Objectives**

Revegetation is integral to the overall success of the SWISP Project. Replanting disturbed areas establishes root systems which will capture sediment, deflect flow and provide flood water retention. These root systems are “risk management” and will become primary components of erosion control. Revegetation is also critical to weed management, water quality, as well as increasing cover and shade for wildlife and healthy ecosystems.

The revegetation goal for the SWISP Project is to restore and enhance salmonid, riparian, and upland habitat by initiating native vegetation succession. The objective is to obtain 50 percent native herbaceous and/or 70 percent native woody cover in revegetation areas within three years (Year 3), with an 80 percent survival success on all 2:1 ratio plantings. Treatments include restoration and preservation of existing native plant species, control of invasive plants (to the extent practicable), and erosion control.

Phase III of the SWISP Project would restore temporarily-disturbed native vegetation communities in the Phase I Intake Construction Area to pre-disturbance conditions or better. The native species selected for planting include a diversity of upland and riparian trees and shrubs. In combination with the interim native grass seedings completed as part construction and supplemented by the USFWS, the upland and riparian vegetation communities at the site would have greater species diversity and structural diversity once the tree and shrub species are reestablished. Replanting with native species would move the area closer to natural historical conditions.

**D.1.4 Responsible Parties**

Implementation of SWISP Project Phase III, including pre-construction site assessment and evaluation, post-construction survey, site preparation, seeding/planting, maintenance (weed removal and watering as necessary), monitoring, adaptive management, and Annual Report preparation (see *Maintenance, Monitoring, and Reporting*, below), is the responsibility of the USFWS. The USFWS may do some or all of the work in-house, or the work may be contracted to others to complete under USFWS oversight.

Reclamation will be responsible for submitting Annual Reports received from the USFWS to the regulatory agencies including Washington Department of Fish and Wildlife (WDFW), National Marine Fisheries Service (NMFS), and U.S. Army Corps of Engineers (USACE).

**D.1.5 Evaluating Baseline Site Conditions**

Prior to Phase I activities, site evaluation will document baseline conditions to support an initial assessment of species composition, structural diversity, and cover. This information will be used to evaluate and quantify success of revegetation efforts during future monitoring (see *Maintenance,
Monitoring, and Reporting, below). Photo monitoring points will be established, and baseline condition photos will be taken at this time.

D.2 Approach

To accomplish the revegetation objective, the overall approach is to establish an understory of native grasses that will outcompete invasive plant populations. Hydroseeding of native grasses by the construction contractor will be completed as soon as Phase I construction activities are completed. Trees and shrubs will be installed as part of Phase III where appropriate to create an overstory. Phase III installation will occur during the early fall or after spring snow melt, after Phase I and II construction is complete.

All disturbed areas will be hydroseeded using the appropriate seed mix for riparian or upland conditions. Some areas will be augmented with trees and shrubs to enhance the riparian habitat buffer. These areas will be augmented with native live plantings. These plantings will increase the rate at which desired species become established. Disturbed or removed trees and shrubs will be replaced at a 2:1 ratio as per WDFW and Reclamation communications. Replacement planting will have an 80 percent survival rate by Year 3.

D.2.1 Revegetation Types

The planting plan is based on riparian planting zones, the capillary fringe, and water tables (Figure D-2, Revegetation Types). Within these different revegetation areas, current and past land use varies and dictates different treatments. All disturbed areas will be revegetated to reduce erosion potential, restore native vegetation communities, and enhance the habitat corridor along Icicle Creek. Revegetation efforts will occur in different planting zones within the Phase I Intake Construction Area (Figure D-1). A visual representation of planting techniques used for trees and shrubs is shown in Figure D-3, Planting Techniques for Trees and Shrubs.
D.2.2 Revegetation Planning

Revegetation will involve several stages of preparation and planning. Specific restoration timelines depend on whether the area is newly disturbed, was disturbed and has rested, or will be enhanced with additional plantings.
Restoration timelines hinge on live plant material grow out, proper site preparation for successful seeding, and development of seeded native grass cover prior to installation of live plant material. As a result, live plantings may occur in stages throughout the course of the Project. Monitoring timelines will also be staged, pushing the SWISP Project out through 2027.

The Phase I construction contractor will have completed interim reclamation of disturbed areas before the initiation of Phase III. Interim reclamation consists of seeding the disturbed construction areas not covered by permanent facilities, with an appropriate seed mix for either riparian or upland application. The seed mix species and ratios presented in this plan were determined by the USFWS (Table D-1). The primary goal of the Phase I and II post-construction interim restoration is to provide erosion control and minimize the opportunity for non-native vegetation, including noxious weeds, to establish. The quality of native grass growth from interim reclamation should be considered during the post-construction survey when final Phase III design is under consideration.

**D.2.3 Project Design**

Successful implementation of Phase III revegetation will be characterized by greater native riparian tree, shrub, and herbaceous species composition and increased structural diversity compared with baseline conditions. As native plants grow larger and outcompete invasive plant species, trees and shrubs will provide shade, cover, and habitat diversity in the riparian corridor along Icicle Creek within the Phase I Intake Construction Area.

Care will be taken to avoid planting woody species (i.e., trees and large shrubs) directly above or immediately adjacent to any pipeline alignments. No trees will be planted within 25 feet of the conveyance pipeline centerline.

**D.2.4 Project Schedule**

Phase III activities are scheduled to occur during early fall (late September through October) after the completion of Phase I and Phase II construction within the Phase I Intake Construction Area¹. Because Phase I construction will be completed in late fall 2023, and Phase II will be completed by summer 2024, the majority of revegetation efforts will take place during fall 2024. The Phase I construction contractor will be responsible for grading, soil stabilization, and interim reclamation (seeding) of disturbed areas prior to demobilizing. However, it is possible that some Phase I sites will be disturbed during Phase II construction. The Phase II contractor will be responsible for any grading, soil stabilization, and invasive species control in areas disturbed by Phase II construction.

**D.2.5 Selection of Plant Species**

Species diversity is an important component of restoration replanting. Riparian plant communities in central Washington typically have willows, alders, cottonwoods (*Populus* spp.), and Douglas-fir (*Pseudotsuga menziesii*) close to the streambank, with other conifers growing higher on the bank away from the frequently flooded zone. Species composition will be determined according to hydrologic zones.

¹ Some Phase II construction will take place within the Phase I construction area when the upper most segment of the conveyance pipeline is rehabilitated with cure-in-place pipe (CIPP). This pipeline segment begins within the Phase I Intake Construction Area at the PISMA and terminates at contractor use area (CUÅ) 2 on private land.
D.2.6 Selection of Plant Materials

Selection of plant species for Phase III revegetation was derived from local reference areas in the nearby Icicle Creek floodplain and Chelan County’s Riparian Plant Guide (Chelan County 2009). Native plant species that are able to form dense stands and out-compete non-native species were selected. A detailed list of species to be utilized is provided in Table D-1.

Table D-1. Plant Materials Schedule – Grass/Herbaceous Seed and Live Plants

<table>
<thead>
<tr>
<th>Planting or Seeding Treatment</th>
<th>Planting Zone</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Planting Composition (Percent)</th>
</tr>
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<tbody>
<tr>
<td><strong>Grass/Herbaceous Seed</strong></td>
<td>Riparian</td>
<td><em>Calamagrostis canadensis</em></td>
<td>Bluejoint Reedgrass</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Carex aquatilis</em></td>
<td>Water Sedge</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Deschampsia cespitosa</em></td>
<td>Tufted Hair Grass</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Juncus balticus</em></td>
<td>Baltic Rush</td>
<td>7</td>
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<tr>
<td></td>
<td>Upland</td>
<td><em>Elymus glaucus</em></td>
<td>Blue Wildrye</td>
<td>26</td>
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<tr>
<td></td>
<td></td>
<td><em>Pseudoroegneria spicata</em></td>
<td>Bluebunch Wheatgrass</td>
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<tr>
<td></td>
<td></td>
<td><em>Festuca idahoensis</em></td>
<td>Idaho Fescue</td>
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<td><em>Bromus marginatus</em></td>
<td>Mountain Brome</td>
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<td><em>Koeleria macrantha</em></td>
<td>Prairie Junegrass</td>
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<tr>
<td></td>
<td></td>
<td><em>Poa secunda</em></td>
<td>Sandberg Bluegrass</td>
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<td><strong>Live Plants</strong></td>
<td>Riparian</td>
<td><em>Salix lasiandra</em></td>
<td>Shinning Willow</td>
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<td><em>Salix exigua</em></td>
<td>Narrow Leaf Willow</td>
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<td><em>Salix scouleriana</em></td>
<td>Scouler’s Willow</td>
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<td><em>Cornus sericea</em></td>
<td>Redosier Dogwood</td>
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<td></td>
<td></td>
<td><em>Populus trichocarpa</em></td>
<td>Black Cottonwood</td>
<td>to be determined¹</td>
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<tr>
<td></td>
<td>Upland</td>
<td><em>Acer circinatum</em></td>
<td>Vine Maple</td>
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<td></td>
<td><em>Rosa woodsii</em></td>
<td>Woods’ Rose</td>
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<td><em>Symphoricarpos albus</em></td>
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<td><em>Amelanchier alnifolia</em></td>
<td>Saskatoon Serviceberry</td>
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<td><em>Philadelphus lewisii</em></td>
<td>Lewis’ Mock-Orange</td>
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<td></td>
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<td><em>Prunus emarginata</em></td>
<td>Bitter Cherry</td>
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Notes:
¹Black Cottonwoods will be replaced at a 2:1 ratio. Construction layout will determine the number of cottonwoods removed and replaced.

D.2.7 Sourcing and Procurement

Proper plant materials are necessary to ensure plantings will survive under local conditions over the long term. Species native to the site are most appropriate for planting. Local species have better health and hardiness, are better able to compete with invasive plant species, and attract local native wildlife (Fitzgerald 2010). Local native plant nurseries will be utilized when possible.

Seed used for Phase III will be locally-adapted to establish self-sustaining populations over time. Live plants will be healthy and in vigorous growing condition. Plants will be nursery grown, well rooted, of normal growth and habit and free from disease, infestation, or damage. Plants are
available in many sizes from small plugs to several gallon containers. Larger containerized plant stock (transplants) are more tolerant of existing local climate conditions because they are less vulnerable to transplant shock and are more capable of moisture retention during the transplanting process. Transplants are thicker, taller, healthier vegetation that can immediately increase groundwater infiltration; reduce suspended solids, erosion, and water temperature; create wildlife habitat; and improve biotic conditions.

D.2.8 Project Implementation
The USFWS will obtain the appropriate number and type of plantings and will be on site to place plants within their proper hydrologic zones and at the spacing dictated by specific project plans for each planting zone.

D.2.9 Site Preparation

Preservation of Native Plants and Salvage Existing Native Plants for Transplanting
All existing native vegetation will be retained and undisturbed to the extent feasible. In addition to protecting streambanks, native vegetation provides wildlife habitat, native seed sources, and microsites for new seedlings. Where native plants are established, the following actions will be followed:

- Design planting prescriptions to incorporate the existing vegetation.
- Map and flag existing native plants to minimize disturbance.
- Inform and educate all construction contractors/crews on native plants prior to site activities.
- Conduct site visits to show examples of the existing native plants and how they are marked for protection.
- If disturbance is unavoidable, consider temporarily transplanting native plants for relocation at a later time.

Grading and Slope Shaping
All areas designated for revegetation will be regraded and sloped to the natural environment as part of the construction contracts.

Site Preparation for Grass Seeding

Weed Control
Invasive species management is a critical component to ensure the success of revegetation efforts. The USFWS will be responsible for reducing the weed seed bank where native seed is to be planted as well as post-planting broadleaf weed control to ensure a healthy vigorous stand. A survey will be conducted in early May of each year to assess new weed populations and a regular maintenance plan and schedule will be developed. Maintenance efforts will continue through 2027. Noxious weeds will be managed by hand pulling, weed whacking, or mowing.
Erosion and Sediment Control
The Phase I construction contractor will have provided temporary site stabilization with the performance of interim reclamation via hydro-seeding. The Phase II construction area will likely disturb some areas that were seeded at the end of Phase I. If this occurs, the Phase II construction contractor will have provided temporary site stabilization and interim reclamation via hydro-seeding. Additional erosion and sediment controls may be necessary but will be monitored and adaptively managed by the USFWS.

Soil Decompaction
The interim reclamation efforts may or may not be successful or may be disrupted in subsequent construction seasons. Decompaction of the soils may be necessary. Decompaction may occur by the utilization of a straight ripper shank attached to an excavator or bulldozer after construction is completed and prior to revegetation. Other decompacting methods which may be utilized include standard mounding or rough and loose mounding.

Seed Bed Preparation
Continued weed control efforts will take place throughout the monitoring period to reduce the weed seed bank and ensure a successful grass stand. In addition to decompaction, the following may be necessary: hand pulling, weed whacking, or mowing of noxious weeds.

Grass Seeding Method
Seed mixes and seeding rates are listed in the Plant Materials Schedule in Table D-1. Hydroseeding will be implemented at 20 pounds per acre in the appropriate seeding window in late fall, if possible, or after spring snow melt.

Site Preparation for Live Plant Installation
Weed Control
Reducing weed populations where live plants are installed is beneficial. If possible, a native grass understory will be established prior to planting live materials. Weed treatment prescriptions are the same as those under Site Preparation for Grass Seeding. Live plant holes will be protected with a 3 foot by 3 foot weed mat (VisPore Tree Mats) stapled into the ground.

Soil Amendments
Woodchip mulch will be applied during planting.

Installation of Live Plant Materials
Planting will occur in the early fall (late September through October).

D.2.10 Planting Specifications

Planting Density
Plant layout is designed to reflect natural conditions to the greatest extent possible. Plants will be distributed to allow adequate spacing for root development. Tree and shrub and species will be
replaced at a 2:1 ratio with the same species as per WDFW Hydraulic Project Approval specifications (Reclamation 2021).

**Planting Sequence**
1. Auger holes approximately 2 feet deep on 10 foot centers.
2. Protect hole with 3 foot by 3 foot weed mat (VisPore Tree Mats) stapled into the ground.
3. Plant stem ensuring all roots properly covered.
4. Cover planting surface with 3 to 4 inches deep chip mulch.
5. Install Rigid Seedling Protectors (5 inches by 48 inches) with bamboo supports.
6. Water as needed².

### D.3 Maintenance, Monitoring, and Reporting

#### D.3.1 Maintenance

Maintenance of native plant revegetation projects is critical to project success and often requires an equal or greater expenditure of labor and resources than the installation phase. Sites will be visited on a regular basis, as determined by final planning, to assess effectiveness of ongoing maintenance and make changes to the site plan as needed.

Maintenance will include invasive plant control and replacement of failed plantings. Scheduled maintenance tasks will occur in the timeline outlined below. Additional maintenance may take place as prescribed by routine monitoring reports:

- **Year 1**: New plants will be irrigated as needed.
- **Years 1-3**: Invasive plants will be managed by mowing, hand pulling, or weed whacking within the project site as required.
- **Years 4-20**: Maintenance will be reduced after site has achieved free-to-grow conditions. Free-to-grow is defined as a project with healthy trees, taller than competing vegetation and well distributed across the project area (Elefritz et al. 2006).

#### D.3.2 Irrigation

Vegetation will be watered one to two times weekly as needed. Watering will occur by hand either utilizing a portable pump and associated hoses or buckets or a temporary surface irrigation system.

#### D.3.3 Monitoring

Monitoring of completed projects includes both pre- and post-seeding/planting. The goal of monitoring is to document seeding and planting success and to identify maintenance needs including additional seeding and planting. Monitoring schedules will be more critical during the establishment period for plants and then will decrease as the plants become established.

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² Manual watering may be needed once or twice a week during the dry period (July-September) for the first two years after installation. Supplemental watering is dependent on the water year and air temperature. Watering can be accomplished with a portable pump and hose or setting up a temporary above ground watering system with timers.
**Pre-planting surveys**

A pre-planting survey will be conducted for potential planting sites. The survey will evaluate planting area size, planting conditions, soil moisture, and existing vegetative cover. Other factors evaluated will include potential for site erosion and flooding. The presence of wildlife, wildlife habitat, and human disturbance will also be recorded.

**Post-planting surveys**

Post-planting monitoring will record survival, species composition, invasive species, animal damage, watering needs, maintenance intensity, and other factors. Monitoring reports for Years 1 through 3 will include the following components:

- Updated map of restoration site identifying areas of plant mortality or damage and other issues.
- Census of planted species, including survival and mortality. Ensure at least an 80 percent survival rate for 2:1 ratio plantings by the end of Year 3.
- A summary of needed corrective measures or future maintenance needs and a schedule of when those actions will take place.
- Photo-point monitoring: Permanent post-construction photo points will be established within each revegetation type and permanently monumented after construction is complete in the fall of 2023 or 2024. Photo monitoring will take place each year in the spring (using the same view, distance and focal length for comparison purposes) through the performance period to determine whether performance criteria is met.

**Quantitative Monitoring**

Three years post planting, the USFWS will measure percent plant cover within each revegetation zone (Riparian and Upland). The following monitoring methodology is recommended:

A transect should be randomly located within the zone, and at regularly spaced intervals along a transect, a random number generator should be used to determine the direction perpendicular to the transect and the distance from the transect to the sampling location. A circular, 100 square-foot area (macro-plot) will be examined at each sampling location. A minimum of 5 macro-plots should be read per transect, and 1 transect should be established per zone. Data collected from within each macro-plot will include absolute vegetation cover, bare ground or mulch cover, native woody cover, native herbaceous vegetation cover, and nonnative herbaceous vegetation cover. Cover classes (Daubenmire 1970 or similar) may be utilized to group coverage estimates. Visual estimates of vegetation cover are based on the “Sampling Vegetation Attributes Cover Method” (Bureau of Land Management 1999).

The final monitoring report (Year 4) will include components identified in the first 3 years in addition to the following requirements:

- The site has reached a free-to-grow state.
- The site has an appropriate number of stems per acre of woody plants.
- The site has 80 percent survival for 2:1 ratio plantings.
• Neither trees nor shrubs represent less than twenty percent of the total stems per acre.

**Performance Criteria**

Revegetation will be considered successful if treatment areas meet the USACE’s Biological Opinion from NMFS monitoring criteria (i.e., quantitative monitoring). Quantitative monitoring will take place three years after plantings take place and indicate 50 percent native herbaceous and/or 70 percent native woody cover in Year 3. Performance criteria will be measured separately for each revegetation type. Additionally, because of the stratified timeline of the SWISP Project, performance criteria associated with the different treatment areas and revegetation types will be measured in stages throughout the contract period. Once this performance criteria has been met for all treatment areas, the contract will be complete. In addition, revegetation will be considered successful if all 2:1 ratio plantings achieve 80 percent survival.

**D.3.4 Reporting**

Annual reports will be prepared throughout the performance period to the Reclamation Project Manager. The first annual report will be provided by December 1 after the first Phase III actions are undertaken by USFWS, and will outline initial revegetation activities detailing revegetation site locations, methods, species planted and photos of work in progress. Follow up reports will include qualitative monitoring data as well as photographs for each site monitored accompanied by geographic information systems shapefiles and maps of all areas monitored. Quantitative data will be submitted beginning in 2026 or 2027 (three years after the initial staged planting). Each annual report will include a “recommendations” section that will explain any problems encountered and options for potential solutions for adaptive management. If it appears that performance criteria will not be met and additional planting is needed, recommendations will be made.

**D.4 References**


_____. 2021. Draft Biological Opinion - Formal Consultation for the Leavenworth National Fish Hatchery Surface Water Intake Fish Screens and Fish Passage (SWISP) Project in Chelan County, Washington (HUC #170200110402, Icicle Creek). Consultation Number 01EWFW00-2021-F-0063. USFWS, Lacey, Washington.
Appendix E
Public Comment and Response Report
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### Appendix E. Public Comment and Response Report

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<td>Pete</td>
<td>Olson</td>
<td>Noise and Vibration</td>
<td>108.0300.00</td>
<td>1</td>
<td>1</td>
<td>All noise levels from ingress and egress for construction equipment through the RV Park to access CUA 2, to the Hot Air Blower will be above the maximum allowed noise an EDNA class A property can receive through the entire RV Park. And will greatly impact the RV Parks full time residents and visitors. I believe the entire RV Park will have a huge noise impact during the construction period at CUA 1, CUA 2 and CUA 3.</td>
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<tr>
<td>Pete</td>
<td>Olson</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>1</td>
<td>2</td>
<td>No one will want to stay at the RV Park during these times that CUA 1, CUA 2 and CUA 3 are active. Full time seasonal residents, visitors and staff stay at the RV Park for peace and quite relaxation in the mountains. I am requesting steps to be taken to offset the damage to the RV Parks revenue loss during Phase I and Phase II construction time lines.</td>
</tr>
<tr>
<td>Maureen</td>
<td>Mitchell</td>
<td>Fox Rothschild, LLP</td>
<td>Direct/Indirect Impacts</td>
<td>103.0500.00</td>
<td>2</td>
<td>Reclamation should include the Hatchery's entire infrastructure needs in its evaluation of environmental impacts. By limiting its evaluation to the environmental impacts associated with replacement and repair of just one component, the surface water intake and pipeline, Reclamation’s work is incomplete and misleading.</td>
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<td>Mitchell</td>
<td>Fox Rothschild, LLP</td>
<td>Alternatives</td>
<td>103.0500.00</td>
<td>2</td>
<td>Of paramount concern to the Stakeholders is the lack of due consideration given to the possibility of relocating the surface water intake location, as well as whether the LNFH’s future should look just like its 80 year past.</td>
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<td>Maureen</td>
<td>Mitchell</td>
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<td>Public Outreach</td>
<td>103.0100.00</td>
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<td>Public scoping began in April 2020, just one month after the COVID-19 pandemic shutdowns occurred. During this scoping period Reclamation requested and received comments on the scope of the analysis and four alternatives to be considered. The DEIS states that comments related to alternatives were carried forward into alternatives development (p. 8). However by that time, according to the Project Design Schedule set forth in the Alternatives Development Report (Reclamation, 2020c), the cooperating agencies had already progressed to the 90 percent Design, Permitting, and ESA Meeting. Any consideration of alternatives was already constrained by the screening of alternatives performed in the SWISP Project design process starting March 2019 without any public input. This is a major and fatal flaw.</td>
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Figure 2-1 and Table 2-1 (Alternatives B and C) and Figure 2-2 and Table 2-2 (Alternative D) have been added in Chapter 2 to provide visual depictions of construction activities and general timing. Construction hours for Phase II are 7:00 am to 7:00 pm. BMPs and measures to offset SWISP Project impacts are listed in Appendix B. Additionally, as noted in Section 3.5.2, Noise and Vibration Affected Environment, baseline noise data collection indicates peak season noise levels are in exceedence of EDNA Class A levels. More information can be found in the Noise and Vibration Resource Report, which can be found at [https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html](https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html). Figure 2-1 and Table 2-1 (Alternatives B and C) and Figure 2-2 and Table 2-2 (Alternative D) have been added in Chapter 2 to provide visual depictions of construction activities and general timing. BMPs related to noise and access are included in Appendix B. As noted in Table 2-1 and Table 2-2, the CUA’s may be occupied for up to one month; however, actual noise disturbances associated with construction activities would be intermittent and vary in magnitude and intensity. Including the Hatchery’s entire infrastructure in the analysis is out of scope for this EIS. The USFWS has an LNFH Planning Report (2016) where upcoming infrastructure projects are described in detail; these projects will also be required to comply with NEPA. Report available: [https://www.fws.gov/leavenworthfisheriescomplex/pdfs/LFC%20Planning%20Report%20Volume%201.pdf](https://www.fws.gov/leavenworthfisheriescomplex/pdfs/LFC%20Planning%20Report%20Volume%201.pdf) For this reason, no text edits have been made to the FEIS in direct response to this comment. Relocation of the surface water intake location was reconsidered during the preparation of this EIS. Please see Section 2.5.1 Alternatives and Alternative Elements Considered but Eliminated from Detailed Study, specifically the subsection titled “New Gravity-fed Surface Water Intake Location Alternatives” for the consideration given to and reason for elimination from further analysis. The SWISP Project’s purpose is to ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek. Water intake from the alternative locations considered would not meet this purpose. Additionally, 40 Code of Federal Regulations (CFR) Section 1502.14(a) states that agencies shall evaluate reasonable alternatives to the proposed action, and does not imply that all alternatives need to be considered (see also 40 CFR Section 1502.14(b)). For these reasons, no text edits have been made to the FEIS in direct response to this comment. The SWISP Project scoping period ran from April 24, 2020 to May 26, 2020. During that time, Reclamation sought public comments to determine relevant issues that could influence the scope of the environmental analysis, including alternative development, and guide the process for developing the SWISP Project EIS. In addition to these public outreach efforts, Reclamation met with representatives of private landowners on July 8, 2020 and on July 21, 2020. These meeting records are part of the SWISP Project decision file. The advanced design of the Proposed Action prior to scoping did not preclude opportunities for modification or development of additional action alternatives. Alternative C was created in response to comments raised during the scoping period (see SWISP Project Alternatives Development Report). Alternative D was also created after the end of the scoping period, in response to concerns raised. For these reasons, no text edits have been made to the FEIS in direct response to this comment.
Maureen Mitchell
Fox Rothschild, LLP
Best available science and baseline data
103.0600.00 2 4
Section 2.5 of the DEIS lists alternatives considered but eliminated from further consideration. Three of the alternatives: New Gravity-Fed Surface Water Intake Location Alternatives, Surface Water Pumping, Alternatives, and Groundwater Pumping Alternatives, were rejected on the basis of a 2003 USFWS Hatchery Water Supply System Rehabilitation Final Environmental Assessment (“EA”). The Stakeholders were unable to locate a publicly-available copy of this document. We therefore were unable to critically evaluate its assumptions and conclusions. Given its significant role in the decisionmaking process, Reclamation should have posted this document for public review.

Maureen Mitchell
Fox Rothschild, LLP
Alternatives
103.0503.00 2 5
we are particularly concerned by the stated reason for rejecting a new surface water intake location. Reclamation considered relocating a new surface water intake facility to areas further downstream on Icicle Creek, at Structure 2 or Structure 5. According to the DEIS, this would eliminate the need for rehabilitating the existing pipeline, which would be decommissioned. The DEIS states that these “options were dismissed in 2003” because the USFWS determined that a pumped groundwater supply did not provide a reliable water supply for the Hatchery. This rationale is illogical. How would reliance on a pumped groundwater supply be relevant to evaluation of a new, gravity-fed surface water intake location? A gravity-fed system needs no pumping. And a surface water intake facility by definition would use surface water, not groundwater.

Maureen Mitchell
Fox Rothschild, LLP
Alternatives
103.0503.00 2 6
This section (p. 21) goes on to conclude that adjunct private landowner acceptability is anticipated to be low due to O&M noises associated with pumping and pump maintenance. Again, this is illogical and irrelevant to a gravity-fed system. Furthermore, even if pumps are used (whether to extract surface water or groundwater), fresh consideration of system design, potential O&M noise, redundancy, and backup power options should have occurred. If pumps are acceptable for the temporary Hatchery water supply contemplated during Phase I activities, there should be engineering evaluation of the viability of using pumps (including backup power supply) to convey water to the Hatchery in the long term. The assumption regarding adjacent private landowner acceptability is also unfounded as USFWS appears to own the lands where a gravity-fed surface water system could be potentially located. See Map 3-11. This cursory analysis of unacceptability is particularly odd when inadequate consideration has been given to the disruptions (noise, traffic, recreation, economic, future O&M, discussed below) of rehabilitating the existing intake and pipeline.

Maureen Mitchell
Fox Rothschild, LLP
Alternatives
103.0503.00 2 7
We also note the absence of cost information in the DEIS, apart from the hypothetical new hatchery. In the past, proposals to source water for the Hatchery included water intake from the Wenatchee River. Value Engineering Study Final Report, Leavenworth National Fish Hatchery Surface Water Supply (Reclamation, 2012). The costs of relocating the intake water to this area was estimated at approximately $2.5 million. The DEIS does not identify this alternative as one that was ever considered, or its potential costs or feasibility. A more comprehensive analysis of alternatives, and their costs and viability, should have been performed.

Maureen Mitchell
Fox Rothschild, LLP
Noise and Vibration
108.0100.00 2 8
Map 3-6 of the DEIS purports to show noise attenuation distances along the 4,100 feet of pipeline where the CIPP will occur, however no noise level gradations are visible. Even if they had been visible on the map, it appears that Reclamation has vastly underestimated the noise impacts. The maximum noise levels for Class A property, such as the cultural and resort properties directly impacted by the SWISP Project, are 55 decibels.

Maureen Mitchell
Fox Rothschild, LLP
Noise and Vibration
108.0100.00 2 8
Map 3-6 in the DEIS does show noise attenuation distances; however, the attenuation distances at the map’s scale did not provide high contrast to the background imagery. Maps 3-3 to 3-9 have been revised to better depict the noise attenuation distances associated with SWISP Project construction activities. Additionally, as noted in Section 3.5.2, Noise and Vibration Affected Environment, baseline noise data collection indicates peak season noise levels are in excess of EDNA Class A levels. Furthermore, Table 3-3 is Maximum Permissible Noise Levels for Nonexempt Activities, and the note below Table 3-3 says: “Exemptions to WAC 173-60-040 are listed in WAC 173-60-050 and include construction noise generated between 7:00 a.m. and 10:00 p.m.” More information can be found in the Noise and Vibration Resource Report, which can be found at https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html.
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Reclamation has included in the specification that the contractor must develop and submit a Fire Protection Plan that addresses hot work (e.g., welding) and fire prevention as well as a Fire Prevention Plan that addresses Industrial Fire Protection Levels (IFPL) and state regulations applied by WDNDR, Wildfire Division. These plans have been added to section B.3 and additional text has been added to Section 3.9, Public Health and Safety, and Appendix B related to BMPs. Additional Noise BMPs have been added to Appendix B that would help address potential impacts to artists, instructors, students, guests, and visitors at the Icicle Creek Center for the Arts and the Sleeping Lady Mountain Resort. Text has been added to Section 3.7, Recreation and Section 3.9, Public Health and Safety that provides additional qualitative analysis. The SWISP Project scoping period ran from April 24, 2020 to May 26, 2020. During that time, Reclamation sought public comments to determine relevant issues that could influence the scope of the environmental analysis, including alternative development, and guide the process for developing the SWISP Project EIS. A virtual public meeting website was available 24 hours a day between April 24 and May 26, 2020 to provide project information, allow stakeholders to ask questions, and also provide a space to submit comments. Reclamation also hosted a live question and answer video teleconference on May 18, 2020 from 4pm-6pm Pacific Daylight Time. Reclamation did not receive any formal or informal scoping comments from the Sleeping Lady Mountain Resort/Sleeping Lady, Inc., Icicle Creek Center for the Arts, Icicle Properties, LLC, ICCA Properties, LLC, Icicle Fund, or Sleeping Lady Foundation. In addition to these public outreach efforts, Reclamation met with representatives of private landowners on July 8, 2020 and on July 21, 2020. 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Reclamation has moved away from cut and fill option for the conveyance pipeline on these properties to minimize the disturbance, both intensity and duration, by utilizing a lining design. Restoring the pipe with lining should provide 50-plus years of operation with very little maintenance. Approximately one month of disturbance, mid-April to mid-May, was analyzed in the Draft EIS but the new information Reclamation has received, as the designs have been refined, is that actual construction activity at each CUA may be limited to half of the four weeks analyzed, thus reducing the duration of impacts to staff and guests at these properties.
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<td>18</td>
<td>The DEIS drafters also do not appear to understand that the ICCA presents programs targeted at minors and underserved communities. The DEIS assumes no environmental justice or socioeconomic impacts, but this is incorrect. ICCA’s arts education, grant programs, and other outreach activities provide meaningful opportunities to expand access to the arts. The loss or impairment of these programs could affect low-income and minority populations, as well as youth.</td>
<td>The SWISP Project scoping period ran from April 24, 2020 to May 26, 2020. During that time, Reclamation sought public comments to determine relevant issues that could influence the scope of the environmental analysis, including alternative development, and guide the process for developing the SWISP Project EIS. A virtual public meeting website was available 24 hours a day between April 24 and May 26, 2020 to provide project information, allow stakeholders to ask questions, and also provide a place to submit scoping comments. Reclamation also hosted a live question and answer video teleconference on May 18, 2020 from 4pm-6pm Pacific Daylight Time. In addition to these public outreach efforts, Reclamation met with representatives of private landowners on July 8, 2020 and on July 21, 2020. These meeting records are part of the SWISP Project decision file. During scoping and subsequent meetings with private landowner representatives, there were no potential environmental justice issues identified. As noted in the EIS (Section 3.8.2), under the definitions of minority and low-income populations in the CEQ guidance (CEQ 1997), Chelan County and the City of Leavenworth do not meet the criteria for these populations. Further, although there is the potential for minors and underserved individuals to be impacted if a program or event referenced in your comment were to be cancelled because of construction, this does not meet the threshold of an environmental justice issue. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Maureen</td>
<td>Mitchell</td>
<td>Fox Rothschild, LLP</td>
<td>Alternatives</td>
<td>103.0502.00</td>
<td>2</td>
<td>19</td>
<td>Future operation and maintenance of the pipeline across property is also not addressed in the DEIS. These activities could also impact recreation and cultural events and programs, but it is not possible to evaluate these impacts without information about the future operational and maintenance needs of the rehabilitated pipeline. To the extent there will be periodic inspections and maintenance of the pipeline, they should be described in detail, including their estimated duration and frequency, and the estimated lifespan of the rehabilitated pipeline.</td>
<td>This DEIS is analyzing whether or not to rehabilitate, replace, and modernize the LNFH surface water intake facilities on Icicle Creek and the 1.1-mile surface water conveyance pipeline form the intake facilities on Icicle Creek to the LNFH Fish production facilities. The current LNFH operations require up to their full water right, 42 cfs, to meet fish production goals established by U.S. v. Oregon Management Agreement. The proposed intake has been designed to accommodate a range of flows up to 42 cfs. Evaluation of all facets of the LNFH is outside the scope of this EIS, including water conservation-specific measures or projects. For this reason, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Maureen</td>
<td>Mitchell</td>
<td>Fox Rothschild, LLP</td>
<td>Surface Water</td>
<td>108.0102.00</td>
<td>2</td>
<td>20</td>
<td>The DEIS addresses water resources, however in a manner that focuses primarily upon short-term, water quality consequences of building the intake structure. It ignores more fundamental issues associated with protecting in-stream flows and the impact of the SWISP Project on the health of the Icicle Creek ecosystem. The current configuration of the Intake Facilities, Hatchery Channel, and natural (a/k/a Historical) channel of Icicle Creek represents a major man-made reconfiguration of the original Icicle Creek watershed. The DEIS cites safety, water conservation, sediment management, and maintaining and prolonging a dependable surface water intake and delivery system as LNFH priorities. To accomplish these goals, the LNFH water usage and needs should be critically assessed. The DEIS fails to do this.</td>
<td>This DEIS is analyzing whether or not to rehabilitate, replace, and modernize the LNFH surface water intake facilities on Icicle Creek and the 1.1-mile surface water conveyance pipeline form the intake facilities on Icicle Creek to the LNFH Fish production facilities. The current LNFH operations require up to their full water right, 42 cfs, to meet fish production goals established by U.S. v. Oregon Management Agreement. The proposed intake has been designed to accommodate a range of flows up to 42 cfs. Evaluation of all facets of the LNFH is outside the scope of this EIS, including water conservation-specific measures or projects. For this reason, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Maureen</td>
<td>Mitchell</td>
<td>Fox Rothschild, LLP</td>
<td>Water Rights</td>
<td>108.0105.00</td>
<td>2</td>
<td>21</td>
<td>The LNFH surface water right is 42 cfs. The DEIS assumes that no change in this water right will occur. This assumption needs to be analyzed in light of the LNFH goals. The first step should be an analysis of the LNFH’s actual water needs. Is the surface water right being used to its maximum efficiency? Outdated and inefficient technologies used in the Hatchery operations result in greater consumption of water than is necessary for fish production, which is already hampered by a poor cost-benefit ratio. Those inefficiencies in turn result in greater release of pollutants to Icicle Creek than is necessary. The DEIS does not indicate that the Hatchery’s surface water rights are being used in a manner consistent with maximum efficiency and minimum loss. The next step is then to evaluate whether alternatives using lower consumption of surface water rights could be implemented. Reducing the LNFH’s water could benefit in-stream flows and other water users that are likewise attempting to improve efficiencies and maximize environmental protection.</td>
<td>The analysis proposed in this comment is outside of the scope of the SWISP EIS. The purpose of the SWISP Project is to provide the Hatchery with their full water right of 42 cfs; the EIS does not evaluate how that water right is being utilized. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
</tbody>
</table>
A corollary to the emphasis on protecting, without change, the full surface water right afforded to the LNFH is the impact of the SWISP Project on the water rights of other stakeholders. Reliance on the full 42 cfs water right increases the likelihood that in times of water shortage, other water users will see impairment of their water rights. Ecology recently announced it was initiating an environmental study of options for the Eight Mile Lake Dam. How does this, and other projects within the purview of the Icicle Workgroup, affect the LNFH water needs? It is no longer acceptable to view water usage for a single facility in isolation, unaffected by watershed user needs and other requirements. This is another deficiency in the DEIS analysis.

The following analysis assumptions were used in the water resources analysis: An application for a water right is not needed for this Project, nor will there be a change in the point of diversion, and no water rights held for the LNFH or its neighbors will be impacted by any action under the alternatives. Please see the Water Resources Report, available at https://www.usbr.gov/pn/programs/waenworth/swisp/deis.html, for additional information.

This DEIS is analyzing whether or not to rehabilitate, replace, and modernize the LNFH surface water intake facilities on Icicle Creek and the 1.1 mile surface water conveyance pipeline form the intake facilities on Icicle Creek to the LNFH Fish production facilities. The current LNFH operations require up to their full water right, 42 cfs, to meet fish production goals established by U.S. v. Oregon Management Agreement. The proposed intake has been designed to accommodate a range of flows up to 42 cfs. Evaluation of all facets of the LNFH is outside the scope of this EIS, including water conservation-specific measures or projects.

The Final Programmatic Environmental Impact Statement (PEIS) for the Icicle Creek Water Resource Management Strategy (Icicle Strategy), prepared jointly by Chelan County and Washington State Department of Ecology, evaluated the potential environmental impacts of implementing a comprehensive water resources management strategy in the Icicle Creek Subbasin. The SWISP Project is identified in Alternative 1 (the PEIS Preferred Alternative), under Fish Screen Compliance. Future, proposed LNFH conservation and water quality improvements are also included in the PEIS Preferred Alternative. Any projects proposed in the PEIS are still subject to federal processes, including but not limited to: project design and reviews, including under the National Environmental Policy Act (NEPA). For these reasons, no text edits have been made to the EIS in direct response to this comment.

The proposed Alternatives all have the effect of prolonging the Hatchery’s reliance on maintaining flow in the Hatchery channel, when the stream flow that should be prioritized is in the native/Historical channel. Bifurcation of the flow between the Hatchery and native channels is not the best means of maximizing natural habitat for the ESA-listed fish and anadromous salmonids. An additional concern is the fact that the Hatchery relies upon maintaining continuous flow in the Hatchery channel to ensure recharge of the shallow aquifer where LNFH maintains existing groundwater wells. LNFH is effectively augmenting its surface water rights by using the Hatchery channel to convert surface water to groundwater. As mentioned above, alternate water intake locations, such as the Wenatchee River, have been under consideration in the past. They were not considered here. The public should know whether fish passage as a whole would be enhanced by allowing more of Icicle Creek’s natural flow to remain in-stream, including the native channel, instead of diverting it to a mile-long section of pipeline.

Current LNFH operations require up to their full water right, 42 cfs, to meet fish production goals established by U.S. v. Oregon Management Agreement. There is no change in the amount of water that would be taken under any of the action alternatives. Additionally, please see EIS Section 2.5, Alternatives and Alternative Elements Considered but Eliminated from Detailed Study, and specifically Section 2.5.1, New Gravity-fed Surface Water Intake Locations for a discussion of why a new intake location was not analyzed in detail as an alternative. The SWISP Project’s purpose is to ensure safe, efficient, and reliable delivery of LNFH’s full surface water rights from Icicle Creek. Water intake from the Wenatchee River would not meet this purpose. Additionally, 40 CFR Section 1502.14(a) states that agencies shall evaluate reasonable alternatives to the proposed action, and does not imply that all alternatives need to be considered (see also 40 CFR Section 1502.14(f)). For these reasons, no text edits have been made to the EIS in direct response to this comment. Additional information on the alternative development process can be found in the Alternatives Compilation Report (available at https://www.usbr.gov/pn/programs/waenworth/swisp/deis.html).

If you plan to use water for dust suppression at your project site, be sure that you have a legal right. In Washington State, prospective water users must obtain authorization from the Department of Ecology before diverting surface water or withdrawing ground water, with one exception. Ground water withdrawals of up to 5,000 gallons per day used for single or group domestic supply, industrial purposes, stock watering or for the irrigation of up to one-half acre of lawn and garden are exempt from the permitting process. Water use under the RCW 90.44.050 exemption establishes a water right that is subject to the same privileges, restrictions, laws and regulations as a water right permit or certificate obtained directly from Ecology. Temporary permits may be obtainable in a short time-period. The concern of Water Resources is for existing water rights. In some instances water may need to be obtained from a different area and hauled in or from an existing water right holder.

The Phase I and II specifications prohibit the withdrawal of water from Icicle Creek for dust suppression or any construction activities. For this reason, no test edits have been made to the FBS in direct response to this comment.
<table>
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<tr>
<th>Name</th>
<th>Name</th>
<th>Organization</th>
<th>Code</th>
<th>Letter</th>
<th>Number</th>
<th>Comment</th>
<th>Text</th>
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</thead>
<tbody>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Consultation and Coordination</td>
<td>115.0000.00</td>
<td>4</td>
<td>1</td>
<td>[water resources report - Page ES 3]: Given the time it often takes to get an NPDES permit, shouldn't Reclamation start the process and hand it off to the contractor down the road? Is this really a reference to the stormwater permit the contractor normally gets? Table 2-4 has been added to the EIS to show the amount of temporary (construction) and permanent disturbance by alternative. Given the amount of construction disturbance, Reclamation has determined that the SWISP Project would be subject to Washington Department of Ecology's Construction Stormwater General Permit (CSWGP), and the contractor will be responsible for securing this permit prior to construction (see Section 8.1.2). The contractor will also be required to complete a SWPPP that complies with Ecology's Stormwater Management Manual for Eastern Washington (2019).</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Consultation and Coordination</td>
<td>115.0000.00</td>
<td>4</td>
<td>2</td>
<td>Page 7, Permitting: Will also need stormwater permit, access permit from Chelan County to modify access to Icicle Road; something from Chelan County allowing work outside their normal, permitted work times, the potential NPDES permit mentioned in the summary and likely biological opinions from USFWS and NMFS covering construction activities. Coordination with Chelan County has taken place throughout the SWISP Project development. There is no permit available for work outside of normal business hours. The contractor will be responsible for the CSWGP (which is part of NPDES), and for the access permit needed for Icicle Creek Road. ESA consultation with NMFS is complete, and ESA consultation with USFWS is ongoing. For these reasons, no text edits have been made to the EIS in direct response to this comment. However, Figure 2-1 and Table 2-1 (Alternatives B and C) and Figure 2-2 and Table 2-2 (Alternative D) have been added in Chapter 2 to provide visual depictions of construction activities and general timing. Additionally, the SWISP Record of Decision will contain the final synopsis of the USFWS consultation and Biological Opinion.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0103.00</td>
<td>4</td>
<td>3</td>
<td>Page 6, bullet 7 (Phase I): What about the potential of periodic flushing of the stilling basin by diverting water down the hatchery channel to help with water quality issues? This comment is out of scope for the SWISP Project. Periodic flushing of the spillway pool by diverting water down the Hatchery channel to help with water quality issues will not provide temporary water to the Hatchery when the intake is shut down. For this reason, no text edits have been made to the EIS in direct response to this comment.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>4</td>
<td>Page vs. ROW: Shouldn't this be rights-of-way? Test has been revised as suggested.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Purpose and Need</td>
<td>103.0400.00</td>
<td>4</td>
<td>5</td>
<td>Page ES-1, par 1: Suggest emphasizing that the project includes NMFS compliant fish screens. Test has been revised throughout the EIS to specify NMFS compliant screens will be used.</td>
<td></td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Purpose and Need</td>
<td>103.0400.00</td>
<td>4</td>
<td>6</td>
<td>Page ES-1, last par: The project also provides for safe and efficient diversion of stored water from the Snow Lake complex. This comment also applies elsewhere in this document. The suggestion is out of scope for the SWISP Project. The SWISP project focuses on intake and delivery of water from Icicle Creek regardless of where it originates. For this reason, no text edits have been made to the EIS in direct response to this comment.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Cooperating Agency Relationships</td>
<td>103.0200.00</td>
<td>4</td>
<td>7</td>
<td>Page ES-2, par 2: Will USACE also be signing the ES (for coverage under the 404 permit/ARPA process)? The USACE has determined they will not be signing the SWISP Project ROD. The USACE will be issuing Nationwide Permits for the SWISP Project. No text edits have been made to the EIS in direct response to this comment.</td>
<td></td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>8</td>
<td>Page ES-2, par 5: Shouldn't item 1 read, &quot;Intake and Fish Screens?&quot; This comment also applies elsewhere in this document. Test has been revised globally as suggested.</td>
<td></td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0502.00</td>
<td>4</td>
<td>9</td>
<td>Page ES-4, Temporary Water Supply: If you construct the temporary water supply intake, would you also need the spillway stilling basin pumps as a backup in case the intake is damaged by flooding? This comment applies here and elsewhere in the document. The pumps at the spillway pool will remain in place as a redundancy or emergency backup if some type of clogging/gravity bypass/conveyance pipeline failure occurs that hails water delivery to the Hatchery. For this reason, no text edits have been made to the EIS in direct response to this comment.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>NEPA</td>
<td>103.1300.00</td>
<td>4</td>
<td>10</td>
<td>Page ES-6, par 2: The proposed construction seasons are quite specific. What happens if there is a delay due to funding issues or some other event that affects schedule? Will a new NEPA document be required? If the proposed schedule is delayed, new or additional NEPA documentation would not be required so long as impacts remain the same. However, if the overall duration of impacts is exceed from what was analyzed in the EIS, then new or additional NEPA documentation potentially could be required. Schedule coordination would occur with regulatory agencies. For these reasons, no text edits have been made to the EIS in direct response to this comment.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Consultation and Coordination</td>
<td>115.0000.00</td>
<td>4</td>
<td>11</td>
<td>Page ES-6, par 5: You will likely need a permit from Chelan County to modify the headworks access to Icicle Road. The construction contractor will be responsible for acquiring the access permit. For this reason, no text edits have been made to the EIS in direct response to this comment.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Endangered Species Act (ESA)</td>
<td>105.0000.00</td>
<td>4</td>
<td>12</td>
<td>Page ES-6, par 5: Will you need to get biological opinions from USFWS and NMFS covering construction activities? This comment applies here and elsewhere in this document. A Biological Opinion is not needed from NMFS because the SWISP Project will be certified under the NMFS/USACE Programmatic ESA Section 7a(2) Biological Opinion and the Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Seattle District Corps of Engineers Permitting of Fish Passage and Restoration Action in Washington State (FFRP II) as part of Section 7(a)(2) of the ESA. Reclamation has prepared a USFWS biological assessment to determine the potential impacts of the agency preferred action on the threatened Bull Trout and its designated critical habitat and the gray wolf. Reclamation expects a Biological Opinion from the USFWS in the first quarter of 2021. Additional clarification has been added to the Executive Summary and Section 4.2.5 in the EIS.</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>4</td>
<td>13</td>
<td>Page ES-9, Alternative B: I suggest you consider use of biodegradable lubricants (typically vegetable oil-based) where possible to minimize pollution. In Appendix B, under In-water work for Water Resources, a BMP is included related to the use of vegetable oil in construction equipment. For this reason, no text edits have been made to the EIS in direct response to this comment.</td>
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<td>Robert</td>
<td>Hamilton</td>
<td>Fisheries, including Special Status Species and Aquatic Ecosystems</td>
<td>108.0200.00</td>
<td>4</td>
<td>14</td>
<td>Page 10, All Alternatives: Wouldn’t the new screens minimize take when compared to the current condition (rather than just reduce take)?</td>
<td>Text has been revised to indicate that entrainment of fish species under all action alternatives would be reduced in comparison to the No Action alternative. Take will not be eliminated as it may occur during icing/frazil events when the screens are temporarily removed (under special conditions and with authorization in the USFWS BiOp).</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Purpose and Need</td>
<td>103.0400.00</td>
<td>4</td>
<td>15</td>
<td>Page 1, par 1: The new fish screens should be mentioned here.</td>
<td>Text has been revised as suggested.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Purpose and Need</td>
<td>103.0400.00</td>
<td>4</td>
<td>16</td>
<td>Page 2, par 3: Please clarify how the project will facilitate water conservation. This comment also applies elsewhere in this document.</td>
<td>Text has been revised as suggested.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>17</td>
<td>Page 2, last par, lines 2-3: Suggest wording to read, “Tons of sediment have moved . . .”</td>
<td>Text has been revised as suggested.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Purpose and Need</td>
<td>103.0400.00</td>
<td>4</td>
<td>18</td>
<td>Page 3, par 1: What happens if COIC doesn’t relocate their intake?</td>
<td>Please see Section 1.2, Project Background, the description of the No Action alternative in Section 2.4.1, and Appendix C for the analysis assumption that the COIC is in the final design phase of their project to relocate their point of diversion on Icicle Creek downstream of the Hatchery. As of January 2021, COIC plans to begin construction in the summer of 2021 and complete the project prior to the irrigation season in the spring of 2022. The FEIS has been revised to describe that, in the event that the COIC has not completed the project as planned, the USFWS would provide COIC with 4-7 cfs of surface water beginning May 2022 and throughout the 2022 irrigation season as necessary and that this would not affect LNFH or Tribal fish production. Starting in July 2022, the 4-7 cfs of surface water provided to COIC would be a portion of the Hatchery’s 40 cfs provided by the temporary gravity bypass pipeline.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>19</td>
<td>Page 9, last par, last line: Please clarify if “The road” is the same as Icicle Road.</td>
<td>Text has been revised as suggested.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0100.00</td>
<td>4</td>
<td>20</td>
<td>Page 10, par 3, lines 1-2: No action presumably would also include conveyance of water to COIC until such time as they relocate their intake.</td>
<td>Please see Section 1.2, Project Background, the description of the No Action alternative in Section 2.4.1, and Appendix C for the analysis assumption that the COIC is in the final design phase of their project to relocate their point of diversion on Icicle Creek downstream of the Hatchery. As of January 2021, COIC plans to begin construction in the summer of 2021 and complete the project prior to the irrigation season in the spring of 2022. The FEIS has been revised to describe that, in the event that the COIC has not completed the project as planned, the USFWS would provide COIC with 4-7 cfs of surface water beginning May 2022 and throughout the 2022 irrigation season as necessary and that this would not affect LNFH or Tribal fish production. Starting in July 2022, the 4-7 cfs of surface water provided to COIC would be a portion of the Hatchery’s 40 cfs provided by the temporary gravity bypass pipeline.</td>
</tr>
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<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0100.00</td>
<td>4</td>
<td>21</td>
<td>Page 11, Conveyance pipeline: Would the bifurcation currently serving the Cascade Orchards Irrigation Company be retained or deleted as part of the pipeline rehabilitation? This comment also applies elsewhere in this document.</td>
<td>The bifurcation facilities will remain in place and will not be modified as part of any action alternative of the SWISP project. Additional clarification of this point has been added to Chapter 2, Alternative B.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>22</td>
<td>Page 12, par 2: Just a caution, based on anecdotal information, the original wood stave pipe may have been abandoned in place and could be encountered during construction.</td>
<td>Text has been revised to include information about the original wood stave pipe. An assumption related to the wood stave pipe has been added to Appendix C.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Consultation and Coordination</td>
<td>115.0000.00</td>
<td>4</td>
<td>23</td>
<td>Page 13, par 2: You will likely need a waiver/permit from Chelan County to work outside their normal, permitted work times.</td>
<td>Coordination with Chelan County has taken place throughout the SWISP Project development. There is no permit available for work outside of normal business hours. For this reason, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0500.00</td>
<td>4</td>
<td>24</td>
<td>Page 13, par 2: Please clarify if the July 1 to Nov 15 period is the standard in-water work period or an exception to the standard period. This comment also applies elsewhere in this document.</td>
<td>Text has been edited throughout the EIS to clarify that July 1 to August 15 is the approved in-water work window for Icicle Creek (USACE 2018), and that extending the window out to November 15 is an exception to the general approved work window period.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>NEPA</td>
<td>103.1300.00</td>
<td>4</td>
<td>25</td>
<td>Pages 13 and 14: The proposed construction seasons are quite specific. What happens if there is a delay due to funding issues or some other event that affects schedule? Will a new NEPA document be required?</td>
<td>If the proposed schedule is delayed, new or additional NEPA documentation would not be required so long as impacts remain the same. However, if the overall duration of impacts is exceed from what was analyzed in the EIS, then new or additional NEPA documentation potentially could be required. Schedule coordination would occur with regulatory agencies. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0500.00</td>
<td>4</td>
<td>26</td>
<td>Page 14, Phase 8, bullet 1: How close to the pipeline would trees be planted?</td>
<td>Additional information has been provided in an updated Riparian Vegetation Plan (Appendix D).</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>27</td>
<td>Page 14, last par: Is Icicle Road or Icicle Creek Road the correct name? Previous references in this document referred solely to Icicle Road. I suggest this be clarified up front rather than waiting until Section 3.6.1.</td>
<td>The text specifically referenced in the comment is correct in mentioning Icicle Creek Road. Text has been reviewed for consistency of use of Icicle Road/Icicle Creek Road and revised when applicable. Clarification has also been added discussing the two roads earlier in the EIS to help avoid reader confusion.</td>
</tr>
<tr>
<td>First Name</td>
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<td>Organization Name</td>
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<td>Comment Code Number</td>
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<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0103.00</td>
<td>4</td>
<td>28</td>
<td>Page 16, par 3: Suggest clarifying that the pumps would be diesel-powered to match verbiage elsewhere in this document. Was consideration given to using electrically powered pumps with diesel generator backup to reduce noise and exhaust?</td>
<td>Where not made explicit in the EIS, text has been clarified to indicate that pumps would be diesel-powered. Consideration was given to electric pumps (see EIS Section 2.5, Alternatives and Alternative Elements Considered but Eliminated from Detailed Study). Electric pumps would require electrical system upgrades that would not be necessary in the long-term, especially considering the temporary need for the pumps.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>29</td>
<td>Page 21, last par, line 21: Would it be more correct to say that the alternative would require more extensive modification of features within the ordinary high water mark?</td>
<td>Text has been revised as appropriate.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>30</td>
<td>Page 24 par 3: The phrase “Under this alternative” is confusing. Please clarify if it’s referring to the alternative in the previous paragraph or a different alternative</td>
<td>The text is specific to the section header above the referenced text. For this reason, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Resource topics analyzed but not considered for further analysis</td>
<td>103.0700.00</td>
<td>4</td>
<td>31</td>
<td>Page 48, Vegetation: Are there any wetlands in the impact area?</td>
<td>There are no wetlands in the SWISP Project Area. A clarifying sentence has been added to Table 3-1. Please see the Biological Resources Report for additional discussion (available: <a href="https://www.usbr.gov/pn/progams/swisp/feas.html">https://www.usbr.gov/pn/progams/swisp/feas.html</a>)</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Resource topics analyzed but not considered for further analysis</td>
<td>103.0700.00</td>
<td>4</td>
<td>32</td>
<td>Page 49, Biological Resources, par 1: You may wish to add bears to the list of animals in the last line.</td>
<td>Text has been revised as suggested.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>33</td>
<td>Page 52, Section 3.3.2, par 1: The intake pipeline was replaced in the 1960’s so it’s not as old as the rest of the facilities.</td>
<td>Text has been revised as appropriate.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Water Management Facilities</td>
<td>108.0103.00</td>
<td>4</td>
<td>34</td>
<td>Page 52, Section 3.3.2, par 1: Doesn’t the ice build-up sometimes extend upstream or downstream of the intake racks? (or both)</td>
<td>Text has been revised for clarity.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Water Rights</td>
<td>108.0105.00</td>
<td>4</td>
<td>35</td>
<td>Page 54, Bulletin 3: If there is a delay in Cascade Orchards Irrigation Company moving its point of diversion, the new intake would not have capacity available to divert their water right during peak hatchery diversions.</td>
<td>Please see Section 1.2, Project Background, the description of the No Action alternative in Section 2.4.1, and Appendix C for the analysis assumption that the COIC is in the final design phase of their project to relocate their point of diversion on Icicle Creek downstream of the Hatchery. As of January 2021, COIC plans to begin construction in the summer of 2021 and complete the project prior to the irrigation season in the spring of 2022. The FEIS has been revised to describe that, in the event that the COIC has not completed the project as planned, the USFWS would allocate COIC with 4-7 cfs of surface water beginning May 2022 and throughout the 2022 irrigation season as necessary and that this would not affect LNFH or Tribal fish production. Starting in July 2022, the 4-7 cfs of surface water provided to COIC would be a portion of the Hatchery’s 40 cfs provided by the temporary gravity bypass pipeline.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Stream Geomorphology</td>
<td>108.0101.00</td>
<td>4</td>
<td>36</td>
<td>Page 57, par 3, last 2 lines: Please clarify how these projects would “improve stream geomorphology and water quality parameters”? As an alternative, I suggest deleting this sentence</td>
<td>The analysis for Alternative B for Water Resources has been revised to provide additional clarification on impacts and trends related to water resources.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>37</td>
<td>Page 60, par 3, lines 7 - 9: The sentence appears to imply that river miles apply to the Pacific Ocean. I suggest dropping “and the Pacific Ocean” from the sentence</td>
<td>Text has been revised as suggested.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Stream Geomorphology</td>
<td>108.0101.00</td>
<td>4</td>
<td>38</td>
<td>Page 66, par 4, line 11: Please clarify how these projects would “improve stream geomorphology and water quality parameters”? As an alternative, I suggest deleting this portion of the sentence</td>
<td>The analysis for Alternative B for Fisheries and Aquatic Habitat has been revised to provide additional clarification on impacts and trends related to water resources.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>4</td>
<td>39</td>
<td>Page 69, par 5: Unless the specifications mandate the use of pneumatic tools, the contractor may choose some other method of rock demolition.</td>
<td>The construction contractor could utilize other methods of rock demolition, with the exception of blasting which the specifications prohibit. A pneumatic tool was used in the analysis of alternatives because it was assumed to be the most impactful method possible. An assumption has been added to Appendix C that a pneumatic tool would be used.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Alternatives</td>
<td>103.0103.00</td>
<td>4</td>
<td>40</td>
<td>Page 98, par 2: Was consideration given to using electrically powered pumps with diesel generator backup to reduce noise and exhaust?</td>
<td>Where not previously made explicit in the Draft EIS, text has been clarified to indicate that pumps would be diesel-powered. Consideration was given to electric pumps (see EIS Section 2.5, Alternatives and Alternative Elements Considered but Eliminated from Detailed Study). Electric pumps would require electrical system upgrades that would not be necessary in the long-term, especially considering the temporary need for the pumps.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Editorial Comments</td>
<td>117.0000.00</td>
<td>4</td>
<td>41</td>
<td>Chapter 6: I suggest you add “container planting” to clarify what that is.</td>
<td>The term “container planting” has been added to the Glossary.</td>
</tr>
<tr>
<td>Robert</td>
<td>Hamilton</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>4</td>
<td>42</td>
<td>The issue of water measurement should be addressed. Specifically, how will diversions from Icicle Creek into the hatchery be measured in future.</td>
<td>Text has been revised in Chapter 2 to clarify that the USFWS would, independent of the SWISP Project, install a flowmeter as part of the ongoing operations and maintenance at LNH.</td>
</tr>
</tbody>
</table>
While it is noted in the DEIS (Table 4-1) that WDFW participated in a 100% Design Meeting, the meeting on September 9, 2020 was titled the “Final Design Update” meeting, though the 100% designs were not available at that time.  WDFW has yet to be provided the 100% design.  We welcome the opportunity for review in advance of the HPA application submission, as our pre-application review has proven to help streamline the HPA process.

A WDFW HPA is required for the repositioning of streambed material, including fine sediment, and large woody debris associated with O&M needs for a surface water intake.  WDFW recommends a Standard HPA, which can be authorized for up to five years, be sought by USFWS for the maintenance of this structure and the protection of fish life and fish habitat.

A WDFW Emergency HPA should be requested in circumstances where there is an immediate threat to life or property expected to occur and declared an emergency by the governor, WDFW, or county legislative authority (RCW 77.55.021 (12)) if there is a need for work that is not covered by an existing HPA.

The Riparian Revegetation Plan has been updated and revised to include the three year monitoring and eighty percent survival requirements, and is included in the EIS as Appendix D.

The USFWS is responsible for the O&M of the facility post-construction. The development of an O&M Plan and permitting considerations are at the discretion of the USFWS. For this reason, no text edits have been made to the FES in direct response to this comment.

Additional contractor specification requirement has been added to develop a Cofferdam Monitoring Plan that monitors weather and creek flow before pouring concrete as well as during the four-day curing period.  The Cofferdam Monitoring Plan has been added to Appendix B, Section B.3.

A BMP has been added to Appendix B stating if supersacks are used for the temporary cofferdams or gravity type pipe line supports, the FR material must be clean, round river rock ("stream mix"). Corresponding text has been added to Chapter 2, and "stream mix" has been added to the Glossary.

The Riparian Revegetation Plan was provided as Appendix C of the Biological Resources Report, which is available at https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html. The Riparian Revegetation Plan has been updated and revised, and is included in the EIS as Appendix D, and will be provided to WDFW as part of the JARPA submittal.

The text in Table 4-1 has been revised to reflect the name of the September 9, 2020 meeting as “Final Design Update.”

The USPWS continues to coordinate with WDFW, as necessary and as they have previously, during an emergency situation.  No text edits have been made to the FES in direct response to this comment.

Under Fish and Aquatic Species on page 60, steelhead and redband trout are included but rainbow trout are missing from the species listed in Icicle Creek.  Rainbow trout are also considered a Priority Species by WDFW.  While steelhead and rainbow trout are the same species, Oncorhyncrus mykiss, it is worth noting the differences as steelhead are anadromous, and rainbow trout are freshwater only.

WDFW recommends some revision to the proposed revegetation plan for consistency with the requirements of the USFWS, which can be authorized for up to five years, be sought by USFWS for the maintenance of this structure and the protection of fish life and fish habitat.

While it is noted in the DEIS (Table 4-1) that WDFW participated in a 100% Design Meeting, the meeting on September 9, 2020 was titled the “Final Design Update” meeting, though the 100% designs were not available at that time.  WDFW has yet to be provided the 100% design.  We welcome the opportunity for review in advance of the HPA application submission, as our pre-application review has proven to help streamline the HPA process.

The USPWS is responsible for the O&M of the facility post-construction. The development of an O&M Plan and permitting considerations are at the discretion of the USPWS. For this reason, no text edits have been made to the FES in response to this comment.

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<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Organization Name</th>
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<th>Comment Code</th>
<th>Letter</th>
<th>Comment Number</th>
<th>Comment Text</th>
<th>Response</th>
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<tbody>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103:05:02.00</td>
<td>6</td>
<td>1</td>
<td>Provide an accurate and consistent description of Alternative C (Preferred Alternative) regarding the replacement and/or lining of the water conveyance pipeline, which should also be reflected in the summary tables.</td>
<td>Text has been revised in Chapter 2 to provide additional detail on how Each II differs between Alternatives B and C. Table ES-1 and Table 2-3 have been revised to reconcile any inconsistencies.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103:05:01.00</td>
<td>6</td>
<td>2</td>
<td>Evaluate a preferred alternative that implements the CPP method to the entire length of the water conveyance pipeline.</td>
<td>CIPP lining for the entire length of the conveyance pipeline was considered under Section 2.5.2 under the heading “Conveyance Pipeline Component.” For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103:09:00.00</td>
<td>6</td>
<td>3</td>
<td>Provide quantitative estimates of the project impacts for the Proposed Action, Alternatives, and each construction activity and phase.</td>
<td>The amount of permanent disturbance was disclosed in the Draft EIS. The Final EIS has been updated to include temporary/construction disturbance (see Table 2-4).</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103:05:03.00</td>
<td>6</td>
<td>4</td>
<td>Provide a visual display for each construction activity and phase (e.g., I, II, and III) using a bar or Gantt chart.</td>
<td>Figure 2-1 and Table 2-1 (Alternatives B and D) and Figures 2-2 and Table 2-2 (Alternative D) have been added in Chapter 2 to provide visual depictions of construction activities and construction phase timing.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103:12:00.00</td>
<td>6</td>
<td>5</td>
<td>Maintain a minimum 50-ft set back area as measured from the ordinary high water mark of the Icicle Creek Riparian Zone.</td>
<td>Reclamation has performed analysis based on a conservative 200-foot buffer zone which includes the riparian zone from Icicle Creek. Because of the location of the existing pipeline and intake, and because this is a water-dependent project, the DHWM line covers the majority of the Phase I work. This work is being permitted with the USACE and WDFW. Reclamation will enroach on the 50-foot core zone during Phase II because of the existing conveyance pipe alignment at CUA 2. A Riparian Revetment Plan (Appendix D) will be implemented as Phase III of the Project to compensate for impacts as a result of both phases. BMPs in Appendix B and the contractor specification require minimizing impacts within the shoreline buffer, including maintaining as much buffer between the work area and Icicle Creek as possible, while safely conducting work.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Public Health and Safety</td>
<td>108:07:00.00</td>
<td>6</td>
<td>6</td>
<td>Evaluate the lead abatement process for the demolition of the existing Hatchery infrastructure, including the gatehouse and intake access pad.</td>
<td>Hazardous Materials and Public Health and Safety are not identified for detailed analysis in the ES. Please refer to the Hazardous Materials and Public Health and Safety Resource Report, which can be found at <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a> for more information on lead abatement. The means and methods the contractor will use for demolition of the gatehouse and removal of other lead-containing materials are unknown; however, lead-containing materials on Hatchery infrastructure will be removed and disposed of in accordance with CFRs and associated safety regulations. Adherence to the CFRs and other regulations would offset potential impacts from the removal of lead. Therefore, no edits have been made to the FEIS.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103:05:03.00</td>
<td>6</td>
<td>7</td>
<td>Evaluate alternatives/options for the proposed construction methods/techniques for the water conveyance pipeline and the cofferdam that would be cost effective and minimizes impacts to Icicle Creek and ESA-listed fish species.</td>
<td>Please see EIS Section 2.5. Alternatives and Alternative Elements Considered but Eliminated from Detailed Study, and the SWISP Project Alternatives Compilation Report (available: <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>). 40 CFR Section 1502.14(j) states that agencies shall evaluate reasonable alternatives to the proposed action, and does not imply that all alternatives need to be considered (see also 40 CFR Section 1502.14(f)). For this reason, no text edits have been made to the FEIS in response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Noise and Vibration</td>
<td>108:03:00.00</td>
<td>6</td>
<td>8</td>
<td>Evaluate underwater sound/noise and vibration levels in Icicle Creek associated with construction equipment, activities, and phases, and their impacts on ESA-listed fish species.</td>
<td>The cofferdams for the SWISP Project will be placed using land-based equipment. Pile driving will not be allowed per contractor specifications. Blasting is not allowed for breaking rock. A pneumatic tool was used in the analysis as a conservative estimate for a tool used for rock breaking that would produce vibration. The use of a pneumatic tool is expected to keep sound pressure waves in Icicle Creek at relatively low levels compared with pile driving and blasting. Thus, even though juvenile ESA-listed anadromous and resident fish species are likely to be in the action area while rocks are being broken in the dry/wet/confines of the cofferdam, the sound pressure levels from the SWISP Project are not expected to reach levels that would have injurious or lethal direct or indirect effects to listed fish. Temporary behavioral effects, including displacement from the immediate work area, are expected, and Reclamation is consulting with the USFWS and NMFS for anticipated effects on ESA-listed fish. Additional text has been added to Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems; BMPs to offset impacts from vibration are included in Appendix B.</td>
</tr>
</tbody>
</table>
### SWISP Project Final Environmental Impact Statement

#### Table 2-4

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Organization Name</th>
<th>Comment Code Name</th>
<th>Comment Code Number</th>
<th>Letter</th>
<th>Comment #</th>
<th>Comment Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>6</td>
<td>9</td>
<td>Evaluate mitigation and monitoring measures that minimizes (1) construction stormwater runoff resulting in additional pollutant discharges from sediments, petroleum products, etc. entering Icicle Creek and (2) fugitive dust associated with construction activities and phases.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Consultation and Coordination</td>
<td>115.0000.00</td>
<td>6</td>
<td>10</td>
<td>Determine the applicability of the Washington Department of Ecology’s Construction Stormwater General Permit (CSWGPG) based on the overall project land disturbance.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>NEPA</td>
<td>103.1300.00</td>
<td>6</td>
<td>11</td>
<td>Based on our review of the DEIS, the absence of a cumulative effects analysis would suggest that Reclamation has applied the updated regulations to this project. Recommendations for the EIS: (1) Provide public disclosure that Reclamation has applied CEQ’s Updated Regulations Implementing the Procedural Provision of NEPA to this EIS effective September 14, 2020; or (2) Otherwise, include a cumulative impacts analysis consistent with the NEPA regulations promulgated by CEQ in 1978, as amended.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Public Outreach</td>
<td>103.0100.00</td>
<td>6</td>
<td>12</td>
<td>Provide public disclosure regarding the Federal Infrastructure Permitting Dashboard and how the public can access the information to track the status of the SWISP project on its public website.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>NEPA</td>
<td>103.1000.00</td>
<td>6</td>
<td>13</td>
<td>CEQ’s updated NEPA regulations require federal agencies to consider environmental effects that are reasonably foreseeable (e.g. environmental trends and planned actions) and have a reasonably close causal relationship to the proposed action and action alternatives, including those effects that occur at the same time and place as the proposed action or alternatives and may include effects that are later in time or further removed in distance from the proposed action or alternatives. Recommendations for the FEIS: (1) Identify the reasonably foreseeable environmental effects, both temporal and spatial, to the proposed action and action alternatives; (2) Evaluate the reasonably foreseeable environmental effects to resources; and (3) Identify and evaluate environmental trends, such as changes in climate resulting from greenhouse gas emissions, construction activities, and other reasonably foreseeable environmental effects.</td>
</tr>
</tbody>
</table>

BMPs and measures to offset SWISP Project impacts are listed in Appendix B. Given the amount of construction disturbance, Reclamation has determined that the SWISP Project would be subject to Washington Department of Ecology’s Construction Stormwater General Permit (CSWGPG), and the contractor will be responsible for securing this permit prior to construction (see Section B.1.2). The contractor will also be required to complete a SWPPP that complies with Ecology’s Stormwater Management Manual for Eastern Washington (2019), which includes more BMPs than included in Appendix B. Text has been revised in Appendix B.

Table 2-4 has been added to the EIS to show the amount of temporary (construction) and permanent disturbance by alternative. Given the amount of construction disturbance, Reclamation has determined that the SWISP Project would be subject to Washington Department of Ecology’s Construction Stormwater General Permit (CSWGPG), and the contractor will be responsible for securing this permit prior to construction (see Section B.1.2). The contractor will also be required to complete a SWPPP that complies with Ecology’s Stormwater Management Manual for Eastern Washington (2019).

Per the July 16, 2020 CEQ Memorandum for Heads of Departments and Agencies re: the subject of implementing updated NEPA regulations, “Agencies may apply these regulations to ongoing activities and environmental documents begun before September 14, 2020” (40 CFR 1506.13.3). Reclamation chose to apply the updated NEPA regulations to the EIS, even though the Notice of Intent was released prior to the September 14, 2020 implementation date. Therefore, per the updated regulations, “cumulative impacts,” as defined in the former CEQ NEPA regulations were not considered in the Draft EIS. Reclamation disclosed that they were applying the updated regulations in Section 1.1 of the DEIS where it states that “This EIS complies with the National Environmental Policy Act of 1969, as amended (NEPA; 42 United States Code (USC), Section 4321 et seq.), the Council on Environmental Quality’s (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR, Parts 1500-1508, as updated July 16, 2020)...” To further clarify, a footnote was added to this section of the Final EIS.

Text has been added as suggested.

Effects that are reasonably foreseeable and have a reasonably close causal relationship to the action alternatives (per 40 CFR Section 1508.1(g)), are discussed under the Environmental Consequences headings for applicable resources in Chapter 3. Additional descriptions of reasonably foreseeable actions considered have been added to Section 3.1. Under the final rule for updating the CEQs Procedural Provisions of NEPA, agencies are to “consider predictable environmental trends in the area in the baseline analysis of the affected environment. Trends determined to be a consequence of climate change would be characterized in the baseline analysis of the affected environment rather than as an effect of the action...”. Reclamation therefore did not speculate on any changes to the climate from the proposed action. Climatic trends of the Pacific Northwest and projections for the Wenatchee River Watershed and Icicle Creek as well as trends in greenhouse emissions were addressed in the Affected Environment section of the Air Quality and Climate Resource Report prepared for this project and summarized and referenced in the Draft EIS. Further, greenhouse gases emitted from project construction activities were used as a indicator for the climate analysis in the Environmental Consequences section of the Air Quality and Climate Resource Report which was cited and summarized in the Draft EIS.

Reclamation has applied the updated regulations to this project. Recommendations for the FEIS: (1) Provide public disclosure that Reclamation has applied CEQ’s Updated Regulations Implementing the Procedural Provision of NEPA to this EIS effective September 14, 2020; or (2) Otherwise, include a cumulative impacts analysis consistent with the NEPA regulations promulgated by CEQ in 1978, as amended.

Reclamation therefore did not speculate on any changes to the climate from the proposed action. Climatic trends of the Pacific Northwest and projections for the Wenatchee River Watershed and Icicle Creek as well as trends in greenhouse emissions were addressed in the Affected Environment section of the Air Quality and Climate Resource Report prepared for this project and summarized and referenced in the Draft EIS. Further, greenhouse gases emitted from project construction activities were used as an indicator for the climate analysis in the Environmental Consequences section of the Air Quality and Climate Resource Report which was cited and summarized in the Draft EIS. Estimated combustion-related emissions would be below 25,000 metric tons per year and reduced with application of BMPs. (Report available: https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html)
The DEIS does not quantify the impacts associated with the road, fish ladder/sediment sluice, gatehouse, outlet channel, conveyance pipeline, and sand settling basin, mentioned above. For meaningful public understanding, these inconsistencies and inaccuracies in the description in the DEIS above. However, Table 2-1 (Comparison of Key Differences Between Action Alternatives) indicates that 2,080 feet of conveyance pipeline would be replaced under Alternative B, and 1,560 feet would be replaced under Alternative C, which is inconsistent with the proposed 520-ft of CIPP mentioned above. For meaningful public understanding, these inconsistencies and inaccuracies in the description of Alternative C and summary tables should be updated in the FEIS.

For Alternative C: Evaluate an option to line the entire 1.1 mile surface water conveyance pipeline from the intake facilities to the LNFH fish production facilities using CIPP (the DEIS page 9 is describing the No Action alternative. These features are already existing, comment.

Reclamation has performed analysis based on a conservative 200-foot buffer zone (which includes the riparian zone) from Icicle Creek. Because of the location of the existing pipe and intake, and because this is a water dependent project, a majority of the Phase I work occurs below the OHWM. This work is being permitted with the USACE and WDFW. Phase II construction at CUA 2 will be partially within the 50-foot core zone but Reclamation has developed a Riparian Revegetation Plan (Appendix D) to offset impacts resulting from both phases. Text has been revised to include temporary/construction disturbance (see Table 2-4) and a comparison of the acres of the Icicle Creek riparian zone that would be maintained under Alternative C relative to Alternatives B and D (see Section 2.4.3). A general estimate of the number of mature riparian trees to be removed was added to the water resources analysis in Section 3.3.3 and fisheries analysis in Section 2.4.3.

Reclamation has performed analysis based on a conservative 200-foot buffer zone from Icicle Creek. Because of the location of the existing pipe and intake, and because this is a water dependent project, a majority of the Phase I work occurs below the OHWM. This work is being permitted with the USACE and WDFW. Phase II construction at CUA 2 will be partially within the 50-foot core zone but Reclamation has developed a Riparian Revegetation Plan (Appendix D) to offset impacts resulting from both phases. Text has been revised to include temporary/construction disturbance (see Table 2-4) and a general estimate of the number of mature riparian trees to be removed was added to the analysis under Water Resources in Section 3.3.3 and Fisheries and Aquatic Ecosystems in Section 3.4.3.
The proposed construction activities and timing of each phase may result in environmental impacts that could be minimized by reevaluating the phases and sequence/timing of the construction schedule and activities. Recommendations for the FEIS: Include a table/figure, bar graph, or Gantt Chart identifying each construction activity and the date range/schedule for each phase. A visual depiction of the construction schedule would provide for meaningful public understanding and an opportunity to improve efficiency for each construction activity and phase.

Alternative: Alternatives 1 and Table 2-1 (Alternatives B and C) and Figure 2-2 and Table 2-2 (Alternative D) have been added in Chapter 2 to provide visual depictions of construction activities and general timing. The work windows for various construction elements are fixed. An example of fixed timing is the Icicle Creek in-water work window (IWWW) that was established by USACE and WDFW to minimize impacts to aquatic species and habitats. Reclamation has requested an extended IWWW, from August 15 to November 15, to minimize impacts that additional IWWNs would impart, and has completed consultation with both NMFS and USFWS on this IWWW extension.

Alternative: The market for trenchless water pipelines is growing. Several methods can be used for trenchless water pipeline renewal, such as cure-in-place pipe (CIPP), close-fit pipe (CFP), slip lining (SL), pipe bursting (PB), spray-in-place pipe (SIPP), and Pipe-in-Liner (PIL). Trenchless water pipe renewal may result in less environmental impacts than the cut and cover trenching methods. These options should be further evaluated.

Alternative: Evaluate and disclose the construction impacts resulting from the cut and cover trenching method and provide preliminary design drawings (overview and cross-section) for each construction method design.

Alternative: Figures have been added to Appendix A to provide visual representations and additional information regarding the proposed components and elements, and construction methods of the project.

Alternative: We note that this may be interpreted as the demolition of the existing intake trash rack and gatehouse is "complete." Recommendations for the FEIS: Clarify whether these demolition activities have been completed prior to the FEIS/ROD and discuss the reason for taking these actions prior to the ROD. As mentioned above, a visual display of the construction schedule would clarify for each construction activity the length of time to complete and any overlap with other activities.

Alternative: Additional text has been added to Section 2.4.2, Alternative B - Proposed Action to provide more detailed descriptions in the sections noted.

Alternative: Additional text has been added to Section 2.4.2, Alternative B - Proposed Action to provide more detailed descriptions and quantitative estimates of impacts related to cut and cover trenching and CIPP lining.

Alternative: We note that the DEIS does not provide details regarding the cost effectiveness and their impacts to Icicle Creek as compared to the proposed geo-bag design. Cofferdams types and designs may be characterized as braced, cellular, single and double-walled sheet pile, earthen, and rock filled. A portable water inflatable polyethylene cofferdam should also be evaluated. Accessible at https://www.researchgate.net/publication/331429700_Design_and_Installation_of_Water_Pipeline_Renewals. Additional text has been added in Appendix A to provide visual representations and additional information regarding the proposed components and elements, and construction methods of the project.

Alternative: Additional text has been added to Section 2.4.2, Alternative B - Proposed Action to provide more detailed descriptions and additional detail on cofferdam construction and placement.

Alternative: We note that the DEIS does not provide details regarding the cost effectiveness and their impacts to Icicle Creek as compared to the proposed geo-bag design. Cofferdams types and designs may be characterized as braced, cellular, single and double-walled sheet pile, earthen, and rock filled. A portable water inflatable polyethylene cofferdam should also be evaluated. Accessible at https://www.aquadam.net/water-filled-cofferdams/?gclid=EAIaIQobChMIqqf-...
A figure depicting possible cofferdam locations and sequencing is provided in Appendix A. Using this cofferdam configuration or methodology of construction is not a requirement of the contractor. This configuration and methodology was determined by the Design Team to be a most likely option that the contractor might use, and would also be the most impactful of the remaining cofferdam options (pile driving and earthen cofferdams are not allowed methodologies per the specifications); therefore, it was analyzed in the EIS.

For the proposed cofferdam scenario (a new figure depicting possible cofferdam locations and sequencing is provided in Appendix A), each cofferdam would be approximately 12 feet wide at the base with a tapered width as it rises to approximately 9 feet. The number of geo-bags needed for each cofferdam would vary depending on the specific bag design, which would be chosen by the construction contractor. Cofferdam A would total approximately 1,890 cubic yards, Cofferdam B would total approximately 2,142 cubic yards, and Cofferdam C would total approximately 1,890 cubic yards. The fill would be a washed/clean gravel stream mix, and the source of fill would be determined by the construction contractor, but would likely be locally sourced so the rock is like that existing in the surrounding area. As mentioned previously, this is one cofferdam approach and may or may not be the type or methodology chosen by the contractor. This design was considered the most likely and most environmentally impacting, since earthen cofferdams and pile driving are not allowed in the specification; therefore, this configuration and methodology was used for computing the fill and removal volumes that informed the analysis.

Identify and evaluate alternative types and designs of cofferdams, including a portable water inflatable construction.

Under the proposed cofferdam scenario (a new figure depicting possible cofferdam locations and sequencing is provided in Appendix A), each cofferdam would be approximately 12 feet wide at the base with a tapered width as it rises to approximately 9 feet. The number of geo-bags needed for each cofferdam would vary depending on the specific bag design, which would be chosen by the construction contractor. Cofferdam A would total approximately 1,890 cubic yards, Cofferdam B would total approximately 2,142 cubic yards, and Cofferdam C would total approximately 1,890 cubic yards. The fill would be a washed/clean gravel stream mix, and the source of fill would be determined by the construction contractor, but would likely be locally sourced so the rock is like that existing in the surrounding area. As mentioned previously, this is one cofferdam approach and may or may not be the type or methodology chosen by the contractor. This design was considered the most likely and most environmentally impacting, since earthen cofferdams and pile driving are not allowed in the specification; therefore, this configuration and methodology was used for computing the fill and removal volumes that informed the analysis.

Under the proposed cofferdam scenario (a new figure depicting possible cofferdam locations and sequencing is provided in Appendix A), each cofferdam would be approximately 12 feet wide at the base with a tapered width as it rises to approximately 9 feet. The number of geo-bags needed for each cofferdam would vary depending on the specific bag design, which would be chosen by the construction contractor. Cofferdam A would total approximately 1,890 cubic yards, Cofferdam B would total approximately 2,142 cubic yards, and Cofferdam C would total approximately 1,890 cubic yards. The fill would be a washed/clean gravel stream mix, and the source of fill would be determined by the construction contractor, but would likely be locally sourced so the rock is like that existing in the surrounding area. As mentioned previously, this is one cofferdam approach and may or may not be the type or methodology chosen by the contractor. This design was considered the most likely and most environmentally impacting, since earthen cofferdams and pile driving are not allowed in the specification; therefore, this configuration and methodology was used for computing the fill and removal volumes that informed the analysis.
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<th>First Name</th>
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<th>Organization Name</th>
<th>Comment Code Name</th>
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<th>Letter</th>
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<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103.0501.00</td>
<td>6</td>
<td>40</td>
<td>Evaluate other cofferdam types/designs that would avoid and minimize releasing sand, rock or other material into Icicle Creek from a rupture in the geo-bag cofferdam. An alternative that should be considered is a water inflatable polyethylene cofferdam or other similar types and designs</td>
<td>40 CFR Section 152.14(a) states that agencies shall evaluate reasonable alternatives to the proposed action, and does not imply that all alternatives need to be considered (see also 40 CFR Section 152.14(f)). Reclamation has considered a reasonable range of alternatives, including alternatives for types of cofferdams. The specific method mentioned in the comment was not raised during the scoping period, and thus was not analyzed in detail in the Draft EIS. Reclamation's engineers determined that the most likely, which also happens to be the most potentially impactful, cofferdam scenario was geo-bags. Therefore, Reclamation has analyzed the worst case scenario in the EIS. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Consultation and Coordination</td>
<td>115.0000.00</td>
<td>6</td>
<td>41</td>
<td>Evaluate the requirements and applicability of the CSWGP for this project by providing an estimate of the total area (acres) of land disturbed resulting from construction activities</td>
<td>Table 2-4 has been added to the EIS to show the amount of temporary (construction) and permanent disturbance by alternative. Given the amount of construction disturbance, Reclamation has determined that the SWISP Project would be subject to Washington Department of Ecology’s Construction Stormwater General Permit (CSWGP), and the contractor will be responsible for securing this permit prior to construction (see Section 8.1.2). The contractor will also be required to complete a SWPPP that complies with Ecology’s Stormwater Management Manual for Eastern Washington (2019). For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>6</td>
<td>42</td>
<td>Identify mitigation and monitoring measures/plans, BMPs, and conditions to minimize construction stormwater discharges into Icicle Creek</td>
<td>BMPs and measures to offset SWISP Project impacts are listed in Appendix B. Given the amount of construction disturbance, Reclamation has determined that the SWISP Project would be subject to Washington Department of Ecology’s Construction Stormwater General Permit (CSWGP), and the contractor will be responsible for securing this permit prior to construction (see Section 8.1.2). The contractor will also be required to complete a SWPPP that complies with Ecology’s Stormwater Management Manual for Eastern Washington (2019); which includes more BMPs then included in Appendix B. Text has been revised in Appendix B.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Appendices B - Best Management</td>
<td>116.0200.00</td>
<td>6</td>
<td>43</td>
<td>Specify that the contractor(s)/operator(s) would be developing and implementing a Stormwater Pollution Prevention Plan (SWPPP), if applicable (Appendix B3. Potential Contractor Plan Submittals)</td>
<td>This information will be included in the contractor’s SPCC Plan. The clean-up of accidental spills is also a requirement in USACE’s Programmatic Biological Opinion with NMFS. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Public Health and Safety</td>
<td>108.0700.00</td>
<td>6</td>
<td>44</td>
<td>The emergency response capabilities to address the clean-up of accidental spills of hazardous materials in and adjacent to Icicle Creek, the types of clean-up equipment/supplies that would be available, and the location of the pre-deployed equipment/supplies placed adjacent to the creek should also be disclosed in the FEIS</td>
<td>Text has been revised as suggested.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103.0505.00</td>
<td>6</td>
<td>45</td>
<td>Identify all lubricants, fuel, and other chemicals that would be stored in the project area</td>
<td>A list of all lubricants, fuel, and other chemicals is not available at this time. The contractor will have to provide a list of all materials used and their Safety Data Sheets (SDS) for approval by Reclamation’s COR before use or storage onsite. For this reason, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>6</td>
<td>46</td>
<td>Include a mitigation measure to restrict the storage of all hazardous chemicals to within 50-ft of the OHWM of Icicle Creek</td>
<td>Per USACE’s Programmatic BiOp with NMFS, which must be conformed with to utilize the 40 CFR Section 152.14(f)). Reclamation has considered a reasonable range of alternatives, including alternatives for types of cofferdams. The specific method mentioned in the comment was not raised during the scoping period, and thus was not analyzed in detail in the Draft EIS. Reclamation’s engineers determined that the most likely, which also happens to be the most potentially impactful, cofferdam scenario was geo-bags. Therefore, Reclamation has analyzed the worst case scenario in the EIS. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Mitigation &amp; Monitoring</td>
<td>103.1200.00</td>
<td>6</td>
<td>47</td>
<td>Identify monitoring measures/plan to address accidental spills of hazardous materials and to respond to such spills</td>
<td>These measures will be included in the contractor’s SPCC plan. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives</td>
<td>103.0503.00</td>
<td>6</td>
<td>48</td>
<td>Identify the types of clean-up equipment/supplies that would be available and the locations they would be pre-deployed adjacent to the creek during construction activities</td>
<td>The types of clean-up equipment/supplies that would be available and the locations they would be pre-deployed adjacent to Icicle Creek during construction activities is unknown at this time. This information will be part of the contractor’s required submittals that include a Spill Prevention, Control, and Countermeasure (SPCC) Plan and Stormwater Pollution Prevention Plan (SWPPP). For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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</tbody>
</table>
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SWISP Project Final Environmental Impact Statement

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<thead>
<tr>
<th>First Name</th>
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<th>Comment Code Number</th>
<th>Comment Text</th>
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<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Appendix B - Best Management 116.0200.00 6 49</td>
<td>Specify that the contractor(s)/operator(s) would be developing and implementing a Chemical Storage, Management, Transportation, and Response Plan (Appendix B3. Potential Contractor Plan Submittals) The specification require numerous submittals from the contractor. Reclamation does not require a Chemical Storage, Management, Transportation, and Response Plan by that name; however, the various components of the suggested plan are found in other required submittals. The list of Potential Contractor Plan Submittals, from Appendix B, Section B3, is not comprehensive but, rather, a list of plans that would need to be prepared before Project construction could begin. Reclamation has edited the list to include a wider range of submittals that will be required; however, it is still not a comprehensive list.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Mitigation &amp; Monitoring 103.1200.00 6 50</td>
<td>Avoid and/or minimize in-water work during periods that would conflict with the migration and rearing of Bull Trout, other special status fish species, and their critical life stages Reclamation has included measures to offset SWISP Project impacts in the BMPs included in Appendix B, and is formally consulting with the USFWS for impacts to Bull Trout, since work is being proposed in Icicle Creek outside of the approved in-water work window.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Alternatives 103.0502.00 6 51</td>
<td>Install cofferdams that do not include geo-sacks filled with sand, gravel and other materials that could be released when ruptured. As mentioned above, evaluate the use of a water inflatable cofferdam design 40 CFR Section 1502.14(a) states that agencies shall evaluate reasonable alternatives to the proposed action, and does not imply that all alternatives need to be considered (see also 40 CFR Section 1502.14(f)). Reclamation has considered a reasonable range of alternatives, including alternatives for types of cofferdams. The specific method mentioned in the comment was not raised during the scoping period, and thus was not analyzed in detail in the Draft EIS. Reclamation’s engineers determined that the most likely, which also happens to be the most potentially impactful, cofferdam scenario was geo-bags. Therefore, Reclamation analyzed the worst case scenario. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
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<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Mitigation &amp; Monitoring 103.1200.00 6 52</td>
<td>Evaluate mitigation and monitoring measures to ensure that ESA-listed species, such as Bull Trout, are provided protection during construction activities Reclamation has included measures to offset SWISP Project impacts in the BMPs included in Appendix B, and is formally consulting with the USFWS for impacts to Bull Trout, since work is being proposed in Icicle Creek outside of the approved in-water work window. NMFS approved coverage for the SWISP Project under the 2017 Programmatic Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Seattle District Corps of Engineers Permitting of Fish Passage and Restoration Action in Washington State (FPRP III), on November 18, 2020. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Consistency with Federal/State/Local Plans 103.1100.00 6 53</td>
<td>Discuss how construction activities would be consistent with the USFWS Bull Trout Recovery Plan.9 Evaluate mitigation and monitoring measures to ensure that ESA-listed species, such as Bull Trout, are provided protection during construction activities. Reclamation has included measures to offset SWISP Project impacts in the BMPs included in Appendix B, and is formally consulting with the USFWS for impacts to Bull Trout, since work is being proposed in Icicle Creek outside of the approved in-water work window. NMFS approved coverage for the SWISP Project under the 2017 Programmatic Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Seattle District Corps of Engineers Permitting of Fish Passage and Restoration Action in Washington State (FPRP III), on November 18, 2020. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
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<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Fisheries, including Special Status Species and Aquatic Ecosystems 108.0200.00 6 54</td>
<td>We note that the DEIS does not evaluate underwater noise and vibration impacts of underwater noise and vibration to ESA-listed, anadromous, and resident fish species in Icicle Creek. The cofferdams for the SWISP Project will be placed using land-based equipment. Pile driving will not be allowed per contractor specifications. Blasting will not be allowed for breaking rock. A pneumatic tool was used in the analysis as a conservative estimate for a tool used for rock breaking that would produce vibration. The use of a pneumatic tool is expected to keep sound pressure waves at a low enough level that they will not adversely affect fish in Icicle Creek. Thus, even though juvenile ESA-listed anadromous and resident fish species are likely to be in the action area while rocks are being broken in the dry within the confines of the cofferdam, the sound pressure levels from the SWISP Project are not expected to reach levels that would have any direct or indirect effects to listed fish. Additional text has been added to Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems. BMPs to offset impacts from vibration are included in Appendix B.</td>
</tr>
<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td>Noise and Vibration 108.0300.00 6 55</td>
<td>Quantify the underwater sound/noise and vibration levels in Icicle Creek associated with construction equipment, activities, and phases; Include the quantitative results in a table similar Table 3-5, 3-6, 3-7 and 3-8 The cofferdams for the SWISP Project will be placed using land-based equipment. Pile driving will not be allowed per contractor specifications. Blasting is not allowed for breaking rock. A pneumatic tool was used in the analysis as a conservative estimate for a tool used for rock breaking that would produce vibration. The use of a pneumatic tool is expected to keep sound pressure waves in Icicle Creek at relatively low levels compared with pile driving and blasting. Thus, even though juvenile ESA-listed anadromous and resident fish species are likely to be in the action area while rocks are being broken in the dry within the confines of the cofferdam, the sound pressure levels from the SWISP Project are not expected to reach levels that would have injurious or lethal direct or indirect effects to listed fish. Temporary behavioral effects, including displacement from the immediate work area, are expected, and Reclamation is consulting with the USFWS and NMFS for anticipated effects on ESA-listed fish. Additional text has been added to Section 3.4, Fisheries, including Special Status Species and Aquatic Ecosystems. BMPs to offset impacts from vibration are included in Appendix B.</td>
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**Table 1: Public Comments and Response Report**

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<td>6</td>
<td>Karl Pepple</td>
<td>Region 10</td>
<td>US EPA</td>
<td>104.0000.00</td>
<td>6</td>
<td>Evaluate the impacts to ESA-listed, anadromous, and resident fish species in Icicle Creek. Impacts to ESA-listed, anadromous, and resident fish species are discussed in Section 3.4 of the EIS, the Biological Resources Report, and the SWISP Project Biological Assessment.</td>
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<td>57</td>
<td>Karl Pepple</td>
<td>Region 10</td>
<td>US EPA</td>
<td>104.0000.00</td>
<td>6</td>
<td>Evaluate mitigation and monitoring measures to ensure that ESA-listed, anadromous, and resident fish species receive protection from noise and vibration during construction activities. The cofferdams for the SWISP Project will be placed using land-based equipment. Pile driving will not be allowed per contractor specifications. Blasting is not allowed for breaking rock. A pneumatic tool was used in the analysis as a conservative estimate for a tool used for rock breaking that would produce vibration. The use of a pneumatic tool is expected to keep sound pressure waves in Icicle Creek at relatively low levels compared with pile driving and blasting. Thus, even though juvenile ESA-listed anadromous and resident fish species are likely to be in the action area while rocks are being broken in the dry/within the confines of the cofferdam, the sound pressure levels from the SWISP Project are not expected to reach levels that would have injurious or lethal direct or indirect effects to listed fish. Temporary behavioral effects, including displacement from the immediate work area, are expected, and Reclamation is consulting with the USFWS and NMFS for anticipated impacts on ESA-listed fish. Additional text has been added to Section 3.4. Fishes, including Special Status Species and Aquatic Ecosystems; BMPs to offset impacts from vibration are included in Appendix B.</td>
</tr>
<tr>
<td>58</td>
<td>Karl Pepple</td>
<td>Region 10</td>
<td>US EPA</td>
<td>104.0000.00</td>
<td>6</td>
<td>Specify the contractor(s)/operation(s) to develop and implement a Noise and Vibration Abatement Plan (B3. Potential Contractor Plan Submittals). Reclamation has added a Noise Reduction Plan to the Project specifications list of required contractor submittals. The Noise Reduction Plan has also been added to B.3 Potential Contractor Plan Submittals, and additional BMPs from the specification have been added in Appendix B of the EIS.</td>
</tr>
<tr>
<td>59</td>
<td>Karl Pepple</td>
<td>Region 10</td>
<td>US EPA</td>
<td>104.0000.00</td>
<td>6</td>
<td>Identify the criteria pollutants and HAPs under the national and state air quality standards. Criteria pollutants and HAPs are identified in the Air Quality and Climate Resource Report (available: <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>). For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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<td>60</td>
<td>Karl Pepple</td>
<td>Region 10</td>
<td>US EPA</td>
<td>104.0000.00</td>
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<td>Evaluate the current air quality baseline conditions for the project area. Baseline information is established in the Air Quality and Climate Resource Report. There have been no exceedences in the three most recent years of monitoring data. Information is included in the Air Quality and Climate Resource Report (available: <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>). For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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<td>61</td>
<td>Karl Pepple</td>
<td>Region 10</td>
<td>US EPA</td>
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<td>6</td>
<td>Provide the 5-year quality trends in Chelan County and/or provide a reference/station or website for public access to this information. Baseline information is established in the Air Quality and Climate Resource Report. Information is included in the Air Quality and Climate Resource Report (available: <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>). For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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<td>62</td>
<td>Karl Pepple</td>
<td>Region 10</td>
<td>US EPA</td>
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<td>6</td>
<td>Identify the sources of air emissions from construction equipment. Refer to Table 3-5 (p. 79) for a list of example construction equipment. Please see Appendix D of the Air Quality and Climate Resources Report, which can be found at <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>, for the calculations of emissions by types of equipment and vehicles likely to be used for construction of the SWISP Project. The types of equipment for which calculations were made in the Air Quality and Climate Resources Report Appendix D, and the types of equipment listed in the Draft EIS Table 3-5 are not exactly the same. The types of equipment in these two sources cannot be made consistent with each other, as this would corrupt the Air Quality and Climate Resources Report calculations, and/or be inconsistent with the data source for the equipment listed in Table 3-5. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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<td>Region 10</td>
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<td>Evaluate the air quality emissions for criteria pollutants and HAPs associated with each construction equipment and estimate the total emissions during each construction phase (e.g., I, II, and III). Information on criteria pollutants and HAPs is included in the Air Quality and Climate Resource Report, which can be found at <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>. See Appendix D in the resource report for the calculations for criteria pollutants. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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<td>64</td>
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<td>Region 10</td>
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<td>Compare these emissions with the national and state ambient air quality standards. The estimated combustion emissions from the SWISP Project would be well below the 25,000 metric ton of carbon dioxide equivalent per year threshold (greenhouse gas reporting requirement threshold under 40 CFR 98). Additional information is included in the Air Quality and Climate Resource Report, which is available at <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>. For these reasons, no text edits have been made to the FEIS in direct response to this comment.</td>
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fish would not disperse into the atmosphere, on land, or in surface waters of Icicle Creek resulting in impacts to

**E. Public Comment and Response Report**

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<td>75</td>
<td>Specify the contractor(s)/operator(s) to develop and implement a Fugitive Dust Management Plan (B3. Potential Contractor Plan Submittal)</td>
<td>Because the majority of deliveries will be conducted on paved surfaces, this plan is not a requirement in the Specification. BMPs to address emissions are included in Appendix B. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
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<td>76</td>
<td>The Washington State Department of Commerce should be consulted regarding proper lead abatement for the hatchery infrastructure and certified lead-based abatement companies in the project area. Accessible at <a href="https://www.commerce.wa.gov/building-infrastructure/housing/lead-based-paint/">https://www.commerce.wa.gov/building-infrastructure/housing/lead-based-paint/</a>.</td>
<td>The existing gatehouse is not a residence. Lead abatement will be conducted by trained and certified individuals in lead-abatement processes. Reclamation would require the contractor to follow the regulations included in CFR 1926.62 for lead removal and 40 CFR 402/404 for the safe removal of lead-based paints to limit lead exposure and ensure the health of construction workers. Adherence to CFR 1926.62 and associated lead removal regulations would minimize the risk of lead exposure during removal of these structures and maintain the health of construction workers. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
</tr>
<tr>
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<td>Discuss the lead abatement process and demolition of the existing gatehouse, intake access pad, and any other lead-based infrastructure associated with this project</td>
<td>Hazardous materials was not identified as a resource included for detailed analysis in the EIS. Please refer to the Hazardous Materials and Public Health and Safety Resource Report, which can be found at <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>, for more information on lead abatement. The means and methods the contractor will use for demolition of the gatehouse and removal of other lead-containing materials are unknown; however, lead-containing materials on Hatchery infrastructure will be removed and disposed of in accordance with CFRs and associated safety regulations. Adherence to the CFRs and other regulations would offset potential impacts from the removal of lead. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
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<tr>
<td>Karl</td>
<td>Pepple</td>
<td>US EPA Region 10</td>
<td></td>
<td>Alternatives</td>
<td>103.0103.00</td>
<td>6</td>
<td>78</td>
<td>Specify that demolition would be handled by certified lead-based abatement companies</td>
<td>Lead abatement will be conducted by trained and certified individuals in lead-abatement processes. Reclamation would require the contractor to follow the regulations included in CFR 1926.62 for lead removal and 40 CFR 402/404 for the safe removal of lead-based paints to limit lead exposure and ensure the health of construction workers. Adherence to CFR 1926.62 and associated lead removal regulations would minimize the risk of lead exposure during removal of these structures and maintain the health of construction workers. Please refer to the Hazardous Materials and Public Health and Safety Resource Report, which can be found at <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>, for more information. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
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<td>79</td>
<td>Discuss the process for the proper and safe handling, storage, transportation, and disposal of the lead-based materials at approved/certified facilities</td>
<td>Lead abatement will be conducted by trained and certified individuals in lead-abatement processes. Reclamation would require the contractor to follow the regulations included in CFR 1926.62 for lead removal and 40 CFR 402/404 for the safe removal of lead-based paints to limit lead exposure and ensure the health of construction workers. Adherence to CFR 1926.62 and associated lead removal regulations would minimize the risk of lead exposure during removal of these structures and maintain the health of construction workers. Please refer to the Hazardous Materials and Public Health and Safety Resource Report, which can be found at <a href="https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html">https://www.usbr.gov/pn/programs/leavenworth/swisp/deis.html</a>, for more information. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
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<td>Mitigation &amp; Monitoring</td>
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<td>80</td>
<td>Identify mitigation and monitoring measures to ensure that lead-based material or lead-contaminated dust would not disperse into the atmosphere, on land, or in surface waters of Icicle Creek resulting in impacts to fish</td>
<td>BMPs and measures to offset SWISP Project impacts associated with lead abatement are included in Appendix B. Lead abatement will be conducted by trained and certified individuals in lead-abatement processes. Reclamation would require the contractor to follow the regulations included in CFR 1926.62 for lead removal and 40 CFR 402/404 for the safe removal of lead-based paints to limit lead exposure and ensure the health of construction workers. Adherence to CFR 1926.62 and associated lead removal regulations would minimize the risk of lead exposure during removal of these structures and maintain the health of construction workers. For these reasons, no test edits have been made to the FEIS in direct response to this comment.</td>
</tr>
</tbody>
</table>
The BMPs, general list of anticipated regulatory permit terms and conditions, and contractor plan submittals discussed in Appendix D are designed to minimize impacts to the natural and human environment and therefore fall within the CEQ definition of mitigation. Additional mitigation, conditions, or plans may be required as part of the Corps Nationwide Permits and USFWS and NMFS Biological Opinions.

Appendix B of the EIS notes the potential need for turbidity monitoring, subject to the US Army Corps of Engineers permit, monitoring of revegetation efforts, and post-construction effectiveness monitoring of the low-flow fishway. Other monitoring may be required, as applicable, according to terms and conditions of such permits and consultation processes. For example, a maintenance and monitoring plan may be required as part of the Nationwide-404 permit for revegetation of temporarily impacted sites. Additional monitoring requirements will become available upon receipt of these permits. For these reasons, no text edits have been made to the FEIS in direct response to this comment.

### Table: Public Comment and Response Report

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<td>Appendix B - Best Management</td>
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<td>81</td>
<td>Specify the contractor(s)/operator(s) to develop and implement a Lead Abatement Plan (B3. Potential Contractor Plan Submittals)</td>
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<tr>
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<td>104.0000.00</td>
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<td>Provide a vegetation list of the existing herbaceous, shrub, and woody vegetation species in the project area</td>
</tr>
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<td>83</td>
<td>Provide a list of the proposed local native plant species to be revegetated post-construction, including container plantings and the riparian cuttings</td>
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<tr>
<td>Karl</td>
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<td>6</td>
<td>84</td>
<td>Provide a rendering/drawing of the post-construction revegetation in the Icicle Creek riparian zone</td>
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<td>Identify mitigation and monitoring measures to ensure successful revegetation post-construction, which could include revegetation performance standards, (e.g., a minimum 75% vegetation cover)</td>
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<td>Identify mitigation and monitoring measures to prevent the propagation of invasive non-native vegetation species</td>
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<td>Specify the contractor(s)/operator(s) to develop and implement a Revegetation Plan and an Invasive Species Management Plan (B3. Potential Contractor Plan Submittals)</td>
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<td>Monitoring measures and plans should also be identified in Appendix B to ensure that mitigation measures and BMPs are being implemented and are effective to minimizing project impacts. Recommendation for the FEIS: In addition to BMPs, identify the mitigation measures and monitoring measures/plans that would be implemented for this project.</td>
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<td>Include the NWP general conditions and regional conditions in Appendix B2(B1.1) after the final rule is published. If the final rule has not been published prior to the FEIS/ROD, then provide a statement that the Corps is in the process of revising and modifying the NWPs and that the general and regional conditions would be subject to change pending the Corps final rule.</td>
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<td>Appendix B2 (B.1.2) identifies the requirements for the Department of Ecology Section 401 Water Quality Certification. As mentioned above, a Construction Stormwater General Permit (CSWGP) issued by Ecology pursuant to CWA Section 402 may be required for stormwater discharges to Icicle Creek, as well as a limited number of non-stormwater discharges, associated with construction activities disturbing one or more acres or more of land, as well as disturbance of less than one acre of total land area that is part of a larger common plan of development or sale, if the larger common plan will ultimately disturb one acre or more. 1) Determine the total area of land proposed to be disturbed by construction activities 2) Determine if this project is part of a larger common plan of development and would impact one acre or more from construction activities 3) Determine if this project is subject to Ecology’s CSWGP</td>
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<td>Specify the contractor(s)/operations to develop and implement a Stormwater Pollution Prevention Plan (B3. Potential Contractor Plan Submittals)</td>
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<td>If a 50-ft core zone cannot be maintained per State requirements, (Washington Administrative Code 222-38-021), then acknowledge and describe the extent of a potential conflict and any possibilities of resolving the conflict (e.g., waiver, exemption, etc.). Possible conflicts between the proposed project and the objectives of State and local land use plans, policies and controls for the area concerned should be disclosed.</td>
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<td>Evaluate the GHG emissions associated with each construction activity and phase (I, II, and III)</td>
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