



— BUREAU OF —
RECLAMATION

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

Socioeconomics and Environmental Justice Report



**U.S. Department of the Interior Bureau of Reclamation
Columbia-Pacific Northwest Regional Office
1150 N. Curtis Road
Boise, ID 83706**

November 2020

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.

Executive Summary

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) has prepared an 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 A-1** in **Appendix A**). The purpose of this specialist report is to provide a comprehensive environmental baseline and analysis of the potential impacts of the SWISP Project under four separate alternatives, including Alternative A, No Action.

The Analysis Area for socioeconomic and environmental justice is shown in **Map A-9** 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.

Indicators for socioeconomic and environmental justice include effects on the following:

- Changes to employment (number of jobs) and income
- Changes to estimated value of change in quality or quantity of recreational opportunities
- Changes to estimated value of the time lost for motorists
- Disproportionate environmental effects on low-income, minority and tribal populations

Affected Environment

Population

The population of the City of Leavenworth (2,030 in 2018) grew by 3 percent between 2010 and 2018, compared with 7 percent growth at the county level (the population of Chelan County was 77,800 in 2018). By comparison, the state of Washington reference population (7,427,570 in 2018) increased at a higher rate than either the county or the city over the same period. The population is expected to increase in the Analysis Area through 2035, with projected growth of 2.3 percent for Leavenworth between 2020 and 2025. Chelan County population growth is projected to follow a similar trend, but with slightly higher growth rates of 4.4 percent between 2020 and 2025, and 7.1 percent between 2025 and 2035.

Housing

The City of Leavenworth and Chelan County have higher percentages of vacant housing units compared with the state of Washington overall, with most vacancies represented by housing units categorized as seasonal, recreational, or occasional use. As of 2016, there were an estimated 1,490 housing units in the City of Leavenworth and its unincorporated growth area, with only 74 percent occupied by full-time residents (City of Leavenworth 2017). Approximately 60 percent of vacant homes in Leavenworth and Chelan County are categorized as “Seasonal/recreation/occasional,” as compared to approximately 35 percent for the state of Washington (U.S. Census 2017).

Income, Employment, and Wages

Between 2014 and 2018, median income increased at both the county level and in Leavenworth, reflecting the general trends of the state of Washington. Median income in Leavenworth (\$51,875 in 2018) is consistently below that of the county (\$56,135 in 2018), and Chelan County has had a consistently lower median household income than the state reference population (\$70,116 in 2018).

Leavenworth is a central part of the region's economy and employment, with a diversity of commercial activities thriving and providing employment opportunities for residents. The three industries employing the highest number of employees in Leavenworth are accommodation and food service, healthcare and social assistance, and retail trade (City of Leavenworth 2017).

Approximately 70 percent of all jobs in 2018 in Chelan County were in five industries: agriculture, health care, local government, accommodation and food services, and retail trade.

Consistent decreasing rates of unemployment characterize the overall trend in unemployment in the analysis area from 2014 to 2018. Unemployment in Leavenworth was at its lowest point in 2018, and it has been notably lower than that of the county and state over the 5-year time period.

In 2018, Chelan County's workers received \$1.82 billion in wages. Although agriculture was the largest job provider in Chelan County in 2018, accounting for 24 percent of total employment, agricultural wages represent only 16 percent of the county's total wage income. The employment sectors with the highest share of total payroll in Chelan County were health care (21 percent), local government (16 percent), and agriculture (16 percent).

Local Recreational Economy

Tourism plays an important part in the local economy in the City of Leavenworth and Chelan County, bringing money in from other regions. Leavenworth hosts an estimated 2.2 million tourists per year, many of whom stay at the city's lodging and transient accommodations, which total 797 units (City of Leavenworth 2017). Leavenworth also serves as a gateway to Okanogan-Wenatchee National Forest, which offers year-round recreation opportunities for visitors to the area. Total estimated national forest visits in fiscal year (FY) 2015 were 1,338,000, of which 214,000, or 16 percent, were visits to designated wilderness. A national forest visit can be composed of multiple site visits; it is defined as the entry of one person on the national forest to participate in recreation for an unspecified period of time. Much of the spending associated with recreational visits to national forests accrues in gateway communities, such as Leavenworth. In FY 2015, spending associated with recreational visits to the forest averaged \$345 per party, per trip (Forest Service 2016b), or \$366 in 2018 dollars. This spending resulted in an estimated \$461 million in spending in FY 2015 (\$489 million in 2018 dollars) associated with visits to Okanogan-Wenatchee National Forest.

Environmental Justice

Low-Income and Minority Populations

Chelan County and the City of Leavenworth do not meet the criteria for low-income and minority environmental justice populations¹. 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 Confederated Tribes of the Colville Reservation. Both Tribes have legally defined fishing rights in the Project Area (per *United States v. Confederated Tribes of the Colville Indian Reservation*, May 27, 2010). These groups represent populations of environmental justice concern. Impacts to tribal fishing and other Tribal interests are discussed in Section 3.10, Tribal Interests in the SWISP Project EIS.

Environmental Consequences

Alternative A – No Action Alternative

Continuation of current operations and maintenance (O&M) of the LNFH surface water intake and delivery system on Icicle Creek would not result in any changes to employment and income, as there would be no need for additional workforce. The quality and quantity of existing recreational opportunities could be affected, however, by decreased fish production due to degraded facilities or, in event of catastrophic infrastructure failure, a complete loss of fish production. This would result in long-term changes to the quality or quantity of recreational fishing opportunities and related recreation values and spending. Roadway capacities and parking availability at recreational destinations such as trailheads would be unaffected. Impacts to socioeconomics under Alternative A would be indirectly related to the potential reduction in recreational fishing opportunities. Such effects would impact all recreational users and there would not be disproportionate environmental

¹ Executive Order (EO) 12898 requires each federal agency to “make achieving environmental justice . . . part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations” (EO 12898, 59 Federal Register 7629). To identify communities of potential environmental justice concern within the Project Area, U.S. Census Bureau data were used to determine whether the populations in each county met at least one of the following criteria:

- The minority population of the affected area exceeds 50 percent or is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997). “Meaningfully greater,” for the purpose of analysis for this Project, is defined as more than 5 percent higher than the comparison population at the state level. Total minority population is defined as the total population minus that portion that is listed in U.S. Census data as White, of non-Hispanic origin. This method includes all individuals who identify as a racial or ethnic minority, or both, without double counting these populations.
- Low-income populations are defined relative to the annual statistical poverty thresholds from the U.S. Census Bureau (CEQ 1997). CEQ guidance does not provide criteria for determining low-income populations as specifically as it does for minority populations; therefore, for this analysis, low-income populations are defined as 50 percent or more of the population in the affected area being below the poverty level, or populations with at least 5 percent more people at or below the poverty level, relative to the state average level in poverty.

effects on low-income, minority and tribal populations. Impacts to Tribal fisheries are discussed in Section 3.10, Tribal Interests in the SWISP Project EIS.

Alternative B – Proposed Action

Employment (Number of Jobs) and Income

Initial construction mobilization through Project completion would occur over a three-year Project timeline. 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. Based on 2018 data for occupational wages in the construction sector in Chelan County, which is \$50,176 annually per individual, the total income contribution from Alternative B resulting from creation of these temporary positions would amount to approximately \$6,773,778. In the context of the entire Chelan County construction labor force, which totaled 1,908 in 2018, job contributions from Alternative B would result in a 2.4 percent increase in annual construction workforce and a 0.1 percent increase in total annual workforce in the county. This relatively small, temporary increase in construction labor would not contribute notably to county employment and income.

Estimated Value of Change in Quality or Quantity of Recreational Opportunities

The anticipated reduction in recreational visits resulting from the Project is 3,636. This reduction would be caused by temporary access constraints on Icicle Creek Road associated with the truck turnaround approximately 1.25 miles southwest of the intake facilities, at the Forest Service and Alpine Lakes Wilderness Area kiosk. To quantify effects with and without Alternative B, the per person per day values were multiplied by the estimated number of visitor days for each activity. Overall, Alternative B would result in an estimated economic value reduction of \$412,000 annually over Project construction. When compared to the “without project” scenario, this represents 0.2 percent of the total economic value of annual recreation benefit forest-wide.

Estimated Value of the Time Lost for Motorists

Assuming Project-related traffic delays to be, on average, 10 minutes for motorists travelling to recreational destinations along Icicle Creek Road/Icicle Road, and a per-vehicle hourly value of travel time savings of \$19 (USDOT 2016), the estimated total cost in terms of value of lost time for motorists due to the Project would be \$29,978 over the total Project construction period. No impacts are expected once normal O&M activities resume.

Disproportionate Environmental Effects on Low-income, Minority and Tribal Populations

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 Project Area. However, there are Tribal populations which use the fishery resource in Icicle Creek to meet subsistence needs. Impacts to Tribal fisheries are discussed in Section 3.10, Tribal Interests in the SWISP Project EIS.

Alternative C

Under Alternative C, Reclamation would line more and replace less of the upper segment of the conveyance pipeline on USFWS lands than described under Alternative B. Impacts to motorists and

recreational visitors from disturbances associated with in-water work occurring from July 1 through November 15 would be the same as described under Alternative B. Rather than pipe replacement, cure-in-place pipe would be used over a larger length of the conveyance. As a result, 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. Impacts to socioeconomics and under Alternative C would be similar to those described under Alternative B, but the intensity of impacts would be reduced. Impacts on environmental justice under Alternative C would be the same as described under Alternative B.

Alternative D

Under Alternative D, 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 Project construction-related impacts would extend over three years, as compared with two years under Alternatives B and C. Alternative D would result in the creation of a temporary construction labor force that would contribute approximately \$9,031,704 to county-level construction wages over the three-year period. The estimated total cost in terms of value of lost time for motorists due to the Project would be \$59,956 over the total Project construction period. Impacts on environmental justice would be the same as described under Alternative B.

This page intentionally left blank.

Table of Contents

Chapter	Page
EXECUTIVE SUMMARY	ES-1
CHAPTER 1. GENERAL PROJECT INFORMATION.....	1
1.1 Project Area	1
1.2 Alternatives	1
1.2.1 Alternative A – No Action	1
1.2.2 Alternative B – Proposed Action.....	3
1.2.3 Alternative C	7
1.2.4 Alternative D	8
CHAPTER 2. RELEVANT LAWS, REGULATIONS, AND POLICY	11
2.1 Federal Laws, Regulations, Statutes, and Orders	11
CHAPTER 3. AFFECTED ENVIRONMENT.....	13
3.1 Analysis Area	13
3.2 Socioeconomic Conditions	13
3.2.1 Population	13
3.2.2 Housing	14
3.2.3 Income, Employment, and Wages	15
3.2.4 Local Recreational Economy.....	17
3.2.5 Ecosystem Services and Non-use Values	18
3.2.6 Environmental Justice	18
CHAPTER 4. ENVIRONMENTAL CONSEQUENCES.....	21
4.1 Methods	21
4.1.1 Analysis Indicators	21
4.1.2 Issue Statements	21
4.1.3 Assumptions	21
4.2 Alternative A – No Action Alternative	21
4.3 Alternative B – Proposed Action	22
4.3.1 Employment (Number of Jobs) and Income	22
4.3.2 Estimated Value of Change in Quality or Quantity of Recreational Opportunities	22
4.3.3 Estimated Value of the Time Lost for Motorists.....	24
4.3.4 Disproportionate Environmental Effects on Low-income, Minority and Tribal Populations	25
4.4 Alternative C.....	25
4.5 Alternative D.....	25
4.6 Short-Term Uses and Long-Term Productivity	26
4.7 Unavoidable Adverse Impacts.....	26
4.8 Irreversible and Irretrievable Commitment of Resources	26
CHAPTER 5. GLOSSARY	27
CHAPTER 6. REFERENCES CITED	29

Tables

	Page
1	Population Estimates 2000–201814
2	Population Projections14
3	Housing Occupancy, 201715
4	Median Household Income, 2014–2018 (2018 \$)15
5	Chelan County Employment by Industry, 2018.....16
6	Unemployment Rates, 2014–2018.....16
7	Chelan County Wages by Industry, 2018.....17
8	Annual Visitation to Okanogan-Wenatchee National Forest (FYs 2010 and 2015).....18
9	Minority and Poverty Percentages (2018).....19
10	Economic Value (Consumer Surplus) for Various Recreational Activities in the Analysis Area (2018 dollars)23
11	Estimated annual visitor days by category, based on 1,483,000 annual visitors23
12	Estimated Loss in Economic Value Based on Visitor Use Category24

Appendices

Appendix A. Maps

Appendix B. Best Management Practices

Acronyms and Abbreviations

Full Phrase

BMP	Best Management Practice
CCD	Census County Division
CEQ	Council on Environmental Quality
cfs	cubic feet per second
CIPP	cure-in-place pipe
COIC	Cascade Orchard Irrigation District
Ecology	Washington Department of Ecology
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
Forest Service	U.S. Department of Agriculture, Forest Service
FTE	full time equivalent
FY	fiscal year
IO&MA	Intake Operations and Maintenance Area
LNFH	Leavenworth National Fish Hatchery
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
O&M	operations and maintenance
PISMA	pipeline intake and sediment management area
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
ROW	right-of-way
RUVD	Recreation Use Value Database
SWISP	Surface Water Intake Fish Screens and Fish Passage
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
VTTS	value of travel time savings
WDFW	Washington Department of Fish and Wildlife

This page intentionally left blank.

Chapter 1. General Project Information

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) has prepared an 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 A-1** in **Appendix A**). The purpose of this specialist report is to provide a comprehensive environmental baseline and analysis of the potential impacts of the SWISP Project under four separate alternatives, including Alternative A, No Action.

1.1 Project Area

The Project Area is on and near the LNFH, near the City of Leavenworth in Chelan County, Washington. The Project Area includes the LNFH's surface water intake and primary point of diversion on Icicle Creek, and conveyance pipeline to the Hatchery. The surface water intake is on U.S. Fish and Wildlife Service (USFWS) property, while the conveyance pipeline crosses several private parcels before re-entering USFWS property. Access to private parcels is via existing easement agreements between the landowner and federal government. The Project Area also includes approximately 1.25 miles of Icicle Creek Road, from the surface water intake to a U.S. Department of Agriculture Forest Service (Forest Service) kiosk to the west, as well as access roads and staging areas on the USFWS property. The Project Area is depicted on **Map A-1** in **Appendix A**.

1.2 Alternatives

Reclamation identified a reasonable range of alternatives for analysis in the EIS through the development of screening criteria, the assessment of Project *components* and *elements* against these criteria, and the consideration of scoping comments received. The major Project components are Intake, 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*.

Chapter 2 of the EIS describes the No Action Alternative and three action alternatives in detail, along with a summary comparison of the differences and common impacts between the alternatives. A summary of the alternatives and component elements considered but eliminated from detailed study is also provided. **Map A-2** through **Map A-8** in **Appendix A** depict the alternatives in detail.

1.2.1 Alternative A – No Action

The No Action Alternative represents continuation of current operation and maintenance (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 likely continue to deteriorate. All existing features listed and summarized below and depicted in **Map A-2** and **Map A-3** 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. 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 road would not be modified or extended and would continue to provide access to the stairs leading to the intake trashrack structure. The existing fish ladder 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 sections 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 cubic feet per second (cfs) from the gatehouse to the Hatchery. No sections would be lined or replaced and introduced sediment would continue to be transported to the Hatchery. Transported sediments would continue to degrade the existing pipeline. 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 would continue to be periodically removed from the sand settling basin in accordance with existing biological opinions (USFWS 2011; NMFS 2017). 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 National Marine Fisheries Service (NMFS) current screening criteria (NMFS 2011)¹. 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 Endangered Species Act (ESA)-listed fish entrained in the intake and delivery system in their annual take report to NMFS and the USFWS.

Hatchery O&M is subject to both the National Pollution Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) and O&M consultations under the ESA Section 7 with NMFS and USFWS (USFWS 2011; NMFS 2017). 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.

The Cascade Orchard Irrigation Company (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.

1.2.2 Alternative B – Proposed Action

Reclamation proposes to rehabilitate the LNFH surface water intake and delivery system on Icicle Creek by constructing new headworks² and 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 of the proposed intake facilities is included as **Map A-4 in Appendix A**. See **Map A-5 and Map A-6 in Appendix A** showing activities proposed under Alternative B.

Intake 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 to facilitate the Hatchery's ability to meet future water conservation goals. 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. The intake trashrack structure would be 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

¹ 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 entrapment, 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.

² 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, gates, and retaining walls.

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. See **Map A-4 in Appendix A** for a conceptual drawing of the proposed intake facilities.

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. See **Map A-4 in Appendix A** for a conceptual drawing of the proposed intake facilities.

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 A-5 in Appendix A**). Construction of several temporary access points (contractor use areas [CUAs]) along the existing conveyance pipeline alignment would be installed to provide ingress and egress for pipe lining on private lands. These areas would be restored to pre-construction conditions following lining activities.

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. 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. 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.

Temporary Hatchery Water Supply

Temporary Hatchery water would primarily be supplied by a gravity-fed diversion. A 40 cfs water supply to LNFH would be maintained during Phase I construction³. Temporary pumping from the spillway pool would supply water while the gravity-fed bypass pipeline and outlet are installed and connected to the existing conveyance pipeline approximately 200-300 feet below the intake construction area. This would occur over an approximately 1-week period. It is likely that multiple pumps would be needed to supply this water.

³ 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.

A 20 cfs water supply to LNFH would be maintained during Phase II construction between April 17 to May 20. This would be needed when pipeline replacement, lining with CIPP, and pipeline interconnections were underway, and would occur through pumping from the spillway pool adjacent to LNFH (**Map A-5** in **Appendix A**).

Access and Staging

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 A-5** and **Map A-6** 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 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).

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., fish screens, 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** in the SWISP Project EIS for additional assumptions). Phase III would include revegetation of upland and riparian areas that are proposed to be disturbed.

Phase I construction activities would occur up to 24 hours per day, 6 days per week, and up to 7 days per week. In addition, the in-water work window would be from July 1 to November 15 each year. Phase II construction activities and Phase III revegetation activities would not include any in-water work and would be limited to workday hours of 7:00 a.m. to 10:00 p.m., 5 days per week, and up to 6 days per week.

Phase I includes:

- Construction activities occurring up to 24 hours a day, up to 7 days a week.
- Construction occurring over two seasons primarily within the in-water work window of July 1 to November 15.
- Construction of intake access road (2022).
- Installation of temporary cofferdams⁴ (2022 and 2023).
- Demolition of existing intake trashrack structure (complete), existing gatehouse (complete) and fish ladder/sediment sluice (partial) (2022).
- Construction of headworks, including the intake structure, retaining walls, and vertical access pipe for sediment management tools (2022).

⁴ Temporary cofferdams would likely consist of geo-bags, or non-woven geotextile bags. These are large bags made of synthetic materials, such as polyester, polypropylene, or polyethylene, which are filled with sand, rock, or other material, fastened shut, and used to protect structures or riverbanks from erosion or scour.

- Placement of new intake pipeline (2022).
- Construction of IO&MA over the headworks, retaining walls, and intake pipeline (2022).
- Placement of guiderails, hydraulic equipment, NMFS-compliant fish screens, slide gates, covered control panel, and safety guardrails around the IO&MA (2022).
- Construction of the PISMA at former gatehouse location (2022).
- Rehabilitation of the outlet channel (2022).
- Construction of roughened channel, including upstream sediment ramp and low-flow boulder weir fishway (2023).
- 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 (2022).
- Post-construction seeding of disturbed areas that do not have a surface treatment (e.g., gravel) with an upland or riparian seed mix, as appropriate (2023).

Phase II includes:

- Construction activities occurring during workday hours of 7:00 a.m. to 10:00 p.m., 5 days per week, and up to 6 days per week.
- The majority of pipeline lining construction occurring over three seasons during a 4- to 5-week period between April and May.
- Pipeline replacement construction occurring year-round where practicable.
- Replacing conveyance pipeline segments on USFWS property (2022, 2023, and 2024).
- Utilizing existing roads and temporary access routes to gain access to CUAs, as coordinated with private landowners. No improvements are needed to existing roads and access routes.
- CIPP lining of the conveyance pipeline on private parcels from CUAs.
- Temporarily pumping Hatchery water out of the spillway pool during pipeline replacement, lining with CIPP, and pipeline interconnections. Pumping would take place between April 17 and May 20 during the Phase II construction period (2022, 2023, and 2024).
- Constructing new control valve vault and system on USFWS property (2022 and 2023).
- Post-construction seeding of disturbed upland areas (2022, 2023, and 2024).

Phase III includes:

- Planting of riparian tree cuttings in the riparian zone within the Phase I construction area (2024).
- Planting of containerized upland shrubs and trees in uplands within the Phase I construction area (2024).

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 Best Management Practices (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 comprehensive list of BMPs is included in this report as **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 form to apply for applicable permits. Permits that would be obtained include:

- U.S. Army Corps of Engineers (USACE) Section 404 Nationwide Permits
- Washington Department of Ecology (Ecology) Section 401 Water Quality Certification
- Washington Department of Fish and Wildlife (WDFW) Hydraulic Project Approval

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, Reclamation would secure the required road use approval from the Forest Service, most likely under a special use permit. The kiosk is approximately 1.25 miles southwest of the intake facilities.

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 the ESA Section 7 with NMFS and USFWS (USFWS 2011; NMFS 2017). Extraordinary maintenance is handled on a case-by-case basis as determined to be necessary by the Hatchery.

1.2.3 Alternative C

Under Alternative C, Reclamation would rehabilitate the LNFH surface water intake and delivery system on Icicle Creek as described under Alternative B. However, 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 A-7** and **Map A-8** in **Appendix A**). As a result, the mature trees in the Icicle Creek riparian zone found in this conveyance pipeline segment would not be removed. Under Alternative C, the length of the conveyance pipeline, from the PISMA to CUA 5 (4,520 feet), would be lined with CIPP. The remaining 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 A-7** in **Appendix A**). A conceptual drawing of the proposed intake facilities is included as **Map A-4** in **Appendix A**.

A 20 cfs water supply to LNFH would be maintained during Phase II construction between April 17 and May 20, as described under Alternative B. No temporary pumping would be necessary for pipeline replacement during Phase II construction because the upper segment of the conveyance pipeline on USFWS property would be lined with CIPP instead. As discussed under Alternative B, temporary pumping would be needed while the conveyance pipeline is lined with CIPP, and when pipeline interconnections were underway.

Hatchery O&M is subject to both the NPDES permit from the EPA and O&M consultations under the ESA Section 7 with NMFS and USFWS (USFWS 2011; NMFS 2017). Extraordinary maintenance is handled on a case-by-case basis as determined to be necessary by the Hatchery.

1.2.4 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 same as Alternative B but would be limited to workday hours of 7:00 a.m. to 10:00 p.m., 5 days per week, and up to 6 days per week. In addition, the in-water work window would be limited to July 1 to October 31 each year. Alternative D was developed to minimize the effects of 24 hours a day construction 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 would occur a year later (2025).

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 below.

During the first in-water work window in 2022, preparation for and installation of cofferdams and the gravity bypass pipeline and gravity bypass outlet, demolition of the intake trashrack structure, gatehouse, fish ladder/sediment sluice (partial), and construction of the PISMA and outlet channel, would be the same as Alternative B (**Map A-6 in Appendix A**). 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 re-mobilization 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 A-5 in Appendix A**). Two high capacity pumps⁵ 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 8-month period; as a result, they would require 24 hour per day, 7 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, 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.

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.

⁵ Pumps are assumed to be high-lift, 16-inch, trailer-mounted with 150 horsepower diesel engines.

This page intentionally left blank.

Chapter 2. Relevant Laws, Regulations, and Policy

2.1 Federal Laws, Regulations, Statutes, and Orders

Columbia Basin Project Act of March 1943—reauthorized the Columbia Basin Project, bringing it under the provisions of the Reclamation Project Act of 1939.

Executive Order (EO) 12898, Environmental Justice, February 11, 1994 (49 *Federal Register* 7629) – This EO requires each federal agency to consider the impacts of its programs on minority and low-income populations.

This page intentionally left blank.

Chapter 3. Affected Environment

3.1 Analysis Area

The Analysis Area for socioeconomic and environmental justice is shown in **Map A-9** of **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.

3.2 Socioeconomic Conditions

Data for this section were collected from publicly available sources, including the United States (U.S.) Department of Commerce, U.S. Census Bureau, the State of Washington Employment Security Department (WESD 2018), and the City of Leavenworth (City of Leavenworth 2017). Dollar amounts have been converted to year 2018 equivalents where necessary to facilitate comparison and analysis.

It should be noted that economic data presented in this discussion include annual averages for the most recent reporting periods. As such, they do not reflect the recent widespread economic effects of the recession brought about by the 2020 COVID-19 pandemic that has affected local and regional economies in the analysis area through severe, short-term reductions in employment and industrial output, the effects of which are still ongoing and not evenly distributed across industries. While it remains to be seen to what level economic effects would be fully incurred, service-oriented activity such as retail and tourism, as well as ancillary support sectors, have been most affected. For the most recent data on economic indicators reflecting the impacts of the 2020 pandemic, please refer to monthly rates of unemployment reported by the U.S. Bureau of Labor Statistics and to personal income and employment by industry data reported by the U.S. Bureau of Economic Analysis.

3.2.1 Population

As shown in **Table 1**, the population in the City of Leavenworth (located within Chelan County) fell by 5 percent between 2000 and 2010, while the population of Chelan County increased by almost 9 percent during the same period. Between 2010 and 2018, the population of Leavenworth grew by 3 percent, compared with 7 percent growth at the county level. By comparison, the state of Washington reference population increased at a higher rate than either the county or the city over the same period.

Table 1
Population Estimates 2000–2018

Geographic Area	Population 2000	Population 2010	2000–2010 Percent Change	Population 2018	2010–2018 Percent Change
City of Leavenworth	2,074	1,965	-5.3	2,030	3.3
Chelan County	66,616	72,453	8.8	77,800	7.4
State of Washington	5,894,143	6,724,540	14.1	7,427,570	10.5

Source: WESD 2018

As shown in **Table 2**, the population is expected to increase in the Analysis Area through 2035, with projected growth of 2.3 percent for the City of Leavenworth between 2020 and 2025. The rate of growth is then projected to increase between 2025 and 2035, resulting in 3.6 percent growth during that time period. Chelan County population growth is projected to follow a similar trend, but with slightly higher growth rates of 4.4 percent between 2020 and 2025 and 7.1 percent between 2025 and 2035.

Table 2
Population Projections

Geographic Area	2020 Population	2025 Population	2020–2025 Percent Change	2035 Population	2025–2035 Percent Change
Leavenworth	2,477	2,534	2.3	2,624	3.6
Chelan County	79,104	82,598	4.4	88,468	7.1
State of Washington	5,894,143	8,129,834	37.9	8,961,158	10.2

Sources: WESD 2018; City of Leavenworth 2017

3.2.2 Housing

As shown in **Table 3**, the City of Leavenworth and Chelan County have higher percentages of vacant housing units compared with the state of Washington overall. Chelan County reports a slightly higher percentage of occupied housing units than Leavenworth, and a lower occupancy compared with the state of Washington.

The City of Leavenworth is currently experiencing housing shortages stemming from competition in the market between vacation and short-term rental homes and full-time resident buyers and renters within the city and surrounding area. As of 2016, only 74 percent of housing units in the City of Leavenworth and its unincorporated growth area were occupied by full-time residents. As shown in **Table 3**, approximately 60 percent of vacant homes in Leavenworth and Chelan County are categorized as “Seasonal/recreation/occasional”, compared to roughly 35 percent for the state of Washington (US Census 2017). Limited vacant and underutilized land suitable for new housing development and the high costs of extending water and sewer service to developable land have contributed to housing constraints. As a result of limitations on supply, Leavenworth is seeing less housing production than in the past (City of Leavenworth 2017).

The most common type of housing within Chelan County is the single-family residence. The county has seen an increase of over 5,500 housing units from 2000 to 2015. The largest increase of housing was in the Leavenworth-Lake Wenatchee Census County Division (CCD; 1,632 units) followed by the Wenatchee CCD (1,465 units) and Manson CCD (806 units). While there is currently adequate land in the county to satisfy future housing needs, the overall number of residential building permits exceeds the creation of new lots (subdivisions), which is expected to affect housing costs, affordability, and availability as demand continues to grow (Chelan County 2017).

Table 3
Housing Occupancy, 2017

	State of Washington		Chelan County		City of Leavenworth	
	Total	Percent	Total	Percent	Total	Percent
<i>Total Occupied Housing Units</i>	2,755,697	91	27,383	74	950	69
Owner-Occupied	1,726,899	63	18,007	66	601	63
Renter-Occupied	1,028,798	37	9,376	34	349	37
<i>Total Vacant Housing units</i>	269,819	9	9,531	26	418	31
For Rent	41,281	15	879	9	78	19
Rented, not occupied	13,094	5	195	2	15	4
Seasonal/recreation/occasional	97,457	36	5,988	63	242	58
For migrant workers	1,605	1	204	2	0	0
Other vacant	80,413	30	1,982	21	83	20
For sale only	25,407	9	177	2	0	0
Sold, not occupied	10,562	4	106	1	0	0

Source: U.S. Census 2017

3.2.3 Income, Employment, and Wages

Between 2014 and 2018, median income increased at both the county level and in the City of Leavenworth, reflecting the general trends of the state of Washington (see **Table 4**). Median income in Leavenworth was \$51,875 in 2018. Median income in Leavenworth is consistently below that of the county, and Chelan County has had a consistently lower median household income than the state reference population.

Table 4
Median Household Income, 2014–2018 (2018 \$)

Geographic Area	2014	2015	2016	2017	2018	Percent (%) Change 2014- 2018
City of Leavenworth	\$39,635	\$46,052	\$47,297	\$49,848	\$51,875	31
Chelan County	\$53,991	\$54,945	\$54,269	\$56,345	\$56,135	4
State of Washington	\$63,985	\$64,724	\$65,787	\$67,823	\$70,116	10

Source: U.S. Census 2018c

Note: Adjusted for inflation to 2018 constant dollars

Leavenworth is a central part of the region's economy and employment, with a diversity of commercial activities thriving and providing employment opportunities for residents. In addition, agricultural endeavors, cottage-based industries, and light industrial operations located within and outside city limits occupy a continuing presence in the region. The three industries employing the highest number of employees in Leavenworth are accommodation and food service, healthcare and social assistance, and retail trade (City of Leavenworth 2017).

Table 5 presents the economic sectors employing the largest segment of the population in Chelan County, compared with the state of Washington. Approximately 70 percent of all jobs in 2018 in Chelan County were in five industries: agriculture, health care, local government, accommodation and food services, and retail trade.

Table 5
Chelan County Employment by Industry, 2018

Sector	Number of Jobs	Share of Employment (percent)
Agriculture, forestry, fishing, and hunting	10,662	24
Health care and social assistance	6,338	14
Local government	5,338	12
Accommodation and food services	4,820	11
Retail trade	4,434	10
Construction	1,908	4
All other industries	13,523	30
Total covered employment	45,115	100

Source: WESD 2018

Within Chelan County, agriculture comprised the highest proportion of employment (24 percent), while health care and social assistance and local government constituted 14 percent and 12 percent, respectively.

Consistent decreasing rates of unemployment characterize the overall trend in unemployment in the Analysis Area from 2014 to 2018 (see **Table 6**). Unemployment in Leavenworth was at its lowest point in 2018 it has been notably lower than that of the county and state over the same 5-year time period.

Table 6
Unemployment Rates, 2014–2018

Geographic Area	2014 (percent)	2015 (percent)	2016 (percent)	2017 (percent)	2018 (percent)
City of Leavenworth	4.3	3.8	3.7	4.3	2.0
Chelan County	9.2	7.5	6.8	5.8	5.3
State of Washington	8.8	7.9	6.8	6.0	5.3

Source: U.S. Census 2018c

In 2018, Chelan County's workers received \$1.82 billion in wages. Although agriculture was the largest job provider in Chelan County in 2018, accounting for 24 percent of total employment (see

Table 5), agricultural wages represent only 16 percent of the county’s total wage income. **Table 7** presents the payroll and the percentage of total wages for each industry in Chelan County.

Table 7
Chelan County Wages by Industry, 2018

Sector	Payroll (\$2018)	Share of Payroll (percent)
Health care and social assistance	\$392,473,189	21
Local government	\$294,325,193	16
Agriculture, forestry, fishing, and hunting	\$293,441,583	16
Retail trade	\$132,275,639	7
Wholesale trade	\$119,689,190	7
Accommodation and food services	\$105,098,171	6
Construction	\$95,736,059	5
All other industries	\$395,810,042	22
Total covered wages	\$1,828,849,066	100

Source: WESD 2018

The employment sectors with the highest share of total payroll in Chelan County were health care (21 percent), local government (16 percent), and agriculture (16 percent).

3.2.4 Local Recreational Economy

Tourism plays an important part in the local economy of the City of Leavenworth and Chelan County, bringing money in from other regions. Leavenworth attracts visitors due to its old-world, Bavarian, alpine theme and abundant recreation and cultural activities. In addition to recreational spending, local tourism activities such as the Wenatchee River Salmon Festival, which occurs at the Hatchery, contribute to the economy of Leavenworth. The City of Leavenworth hosts an estimated 2.2 million tourists per year, many of whom stay at the City’s lodging and transient accommodations, which total 797 units (City of Leavenworth 2017). More detailed information regarding recreation is contained in the SWISP Project EIS **Recreation Resource Report**.

Leavenworth serves as a gateway to Okanogan-Wenatchee National Forest, which offers year-round recreation opportunities for visitors to the area. **Table 8**, below, presents the most recently reported annual visitor statistics. Total estimated national forest visits in fiscal year (FY) 2015, were 1,338,000, of which 214,000, or 16 percent, were visits to designated wilderness. Designated wilderness visits saw a 152 percent increase during the period from 2010 to 2015. Total forest visits during the same period increased by 22 percent. A national forest visit can be composed of multiple site visits; it is defined as the entry of one person on the national forest to participate in recreation for an unspecified period of time.

Much of the spending associated with recreational visits to national forests accrues in gateway communities, such as Leavenworth. In FY 2015, spending associated with recreational visits to the forest averaged \$345 per party, per trip (Forest Service 2016b), or \$366 in 2018 dollars. This spending results in an estimated \$461 million in spending in FY 2015 (\$489 million in 2018 dollars) associated with visits to Okanogan-Wenatchee National Forest.

Table 8
Annual Visitation to Okanogan-Wenatchee National Forest (FYs 2010 and 2015)

Visit Type	FY 2010 Visits (1,000s)	FY 2015 Visits (1,000s)	Percent Change FY 2010 – FY 2015
Total estimated national forest visits*	1,096	1,338	22
Total estimated site visits	1,228	1,483	21
Day-use developed site visits	386	256	-34
Overnight-use developed site visits	229	235	3
General forest area visits	528	778	47
Designated wilderness visits	85	214	152

Source: Forest Service 2010, 2016a

* A forest visit may include one or more site visits.

3.2.5 Ecosystem Services and Non-use Values

A connection between healthy aquatic ecosystems and the economic livelihood of local communities can also be identified, although the concept is difficult to quantify or monetize. For example, the value associated with increased instream flows has been described as a function of how ecological goods and services contribute to human well-being (EPA 2009). Additionally, the “non-use value” or preference for a public good or service that is not derived directly from its use (Mansfield 2012) must also be considered. For instance, some people value recovery of a fish run not because they want to consume the fish, but rather because they value the existence of the fish run itself.

3.2.6 Environmental Justice

EO 12898 requires each federal agency to “make achieving environmental justice...part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations” (59 *Federal Register* 7629).

Reclamation invited all communities, including potential environmental justice communities, to participate in public scoping for the Project, which occurred between April 24 and May 26, 2020. During that time, a virtual public meeting room was established, which allowed the interested public to access scoping materials and submit questions and comments remotely. In addition, a live question and answer video teleconference was held on May 18, 2020. Recent legal precedent supports the use of virtual public meetings in cases where they are warranted. For instance, in *City of Fernley v. USBR* (filed on April 17, 2020) the U.S. District Court of Nevada decision affirmed the agency’s discretion to hold virtual public meetings in lieu of in-person meetings.

Low-Income and Minority Populations

The Council on Environmental Quality (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.

Table 9 presents minority and poverty percentages for Chelan County and the City of Leavenworth compared with the state. Although Chelan County has slightly higher levels of minority and low-income populations than the state, it does not meet the above-described criteria for low-income and minority environmental justice populations. Similarly, Leavenworth does not meet low-income and minority environmental justice populations criteria. As a result, no minority or low-income populations have been identified for further environmental justice consideration at these geographic levels.

Table 9
Minority and Poverty Percentages (2018)

Geography	Percent below Poverty Level	Percent Minority
Washington	11.5	31
Chelan County	11.6	32
City of Leavenworth	7.8	18

Source: US Census 2018a, 2018b

Native American Tribes

As discussed in greater detail in Section 3.10, Tribal Interests in the SWISP Project EIS, potentially affected populations include members of Native American Tribes with subsistence traditions that depend on Tribal fisheries in the Analysis Area. While census data are available for recognized Indian reservations, specific data for Tribal members are not. Tribal members may be affected regardless of whether they reside on their reservations. Tribal affiliated groups with a connection to fishery resources within the Analysis Area include members of the Yakama Nation and Confederated Tribes of the Colville Reservation. Both Tribes have legally defined fishing rights in the Project Area (per *United States v. Confederated Tribes of the Colville Indian Reservation*, May 27, 2010). The Yakama Nation operates a fish-rearing facility nearby, and Wenatchi utilize a small structure on Icicle Creek for fishing⁶. Reclamation is consulting with these Tribal entities regarding the Proposed Action. These groups represent populations of environmental justice concern; potential impacts from the Project on the continued use of Tribal fisheries are analyzed in Section 3.10, Tribal Interests in the SWISP Project EIS.

⁶ Carla Burnside, Zone Archaeologist, U.S. Fish and Wildlife Service, personal communication with Brent Hicks, Matthew Sneddon, and Ron Adams, HRA Associates, on April 15, 2020.

This page intentionally left blank.

Chapter 4. Environmental Consequences

4.1 Methods

4.1.1 Analysis Indicators

Indicators for socioeconomics and environmental justice include effects on the following:

- Changes to employment (number of jobs) and income
- Changes to estimated value of change in quality or quantity of recreational opportunities
- Changes to estimated value of the time lost for motorists
- Disproportionate environmental effects on low-income, minority and tribal populations

4.1.2 Issue Statements

Issues and public concern statements related to socioeconomics and environmental justice identified during the scoping process include the following:

- Commenters noted that the CEQ has developed guidance on how to address Environmental Justice in the environmental review process under NEPA.
- Commenters suggested that the EIS pay particular attention to the dependence of local communities on local and regional subsistence resources, access to those resources, and perception of the quality of those resources.

4.1.3 Assumptions

- The workforce required for Project construction would come from Chelan County.
- It is generally assumed that the vast majority of vehicle trips along Icicle Creek Road/US Highway 2 are recreation-related. As described in **Chapter 3**, Affected Environment, motorists travelling from the City of Leavenworth commonly access the Okanogan-Wenatchee National Forest and Alpine Lakes Wilderness from trailheads located along the highway.
- Estimated visitor spending reported for the Okanogan-Wenatchee National Forest is assumed to be a suitable proxy for area-wide direct recreational spending. Additional indirect (secondary) spending in the region would also occur but is not captured in these amounts. Similarly, spending contributions are not distinguished by local versus regional visitors to the area and do not consider spending related to different forms of recreational activities.

4.2 Alternative A – No Action Alternative

Under Alternative A, continuation of current O&M of the existing intake facilities and delivery system on Icicle Creek would not result in any changes to employment and income, as it would not

result in a need for additional workforce. The quality and quantity of existing recreational opportunities would be affected, however, by decreased fish production due to degraded facilities or, in event of catastrophic infrastructure failure, a complete loss of fish production. This would result in long-term changes to the quality or quantity of recreational fishing opportunities and related recreation values and spending. Roadway capacities and parking availability at recreational destinations such as trailheads would be unaffected. Impacts on socioeconomics under Alternative A would be indirectly related to the potential reduction in recreational fishing opportunities. Such effects would impact all recreational users and 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 in the SWISP Project EIS.

In the absence of improvements to the LNFH surface water intake and delivery system on Icicle Creek, the existing intake facilities 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 opportunities—and, by association, recreation values and visitor spending—by decreasing the quality of the recreation setting from noise and traffic associated with the repairs. However, while some temporary displacement of recreation from the vicinity of the maintenance activities could occur, required repairs would not measurably affect economic activity related to recreation.

4.3 Alternative B – Proposed Action

4.3.1 Employment (Number of Jobs) and Income

Initial mobilization through Project completion would occur over a three-year Project timeline. The workforce required for Project construction would come from Chelan County and is anticipated to number 45 full time equivalent (FTE) construction personnel. 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. Based on 2018 data for occupational wages in the construction sector in Chelan County, which is \$50,176 annually per individual, the total income contribution resulting from creation of these temporary positions would amount to approximately \$6,773,778. In the context of the entire Chelan County construction labor force, which totaled 1,908 in 2018, job contributions from Alternative B would result in a 2.4 percent increase in annual construction workforce and a 0.1 percent increase in total annual workforce in the county. This relatively small, temporary increase in construction labor would not contribute notably to county employment and income. No measurable increase in employment or income is expected to occur from O&M activities once the proposed improvements to the existing intake facilities and delivery system are complete.

4.3.2 Estimated Value of Change in Quality or Quantity of Recreational Opportunities

Recreation Values

The economic value of recreation benefit (i.e., consumer surplus) is the value of a recreational activity that accrues to an individual engaged in that form of recreational activity (USFS 2017). These

economic values that people hold for specific recreational activities, also known as recreation use values, are tracked through periodic updates to the Recreation Use Value Database (RUVD) which compiles metrics from published scientific literature. RUVD provides a regional per person value for a day of various recreational activities in the western U.S. (Rosenberger 2016).

Using these data, the impact of an expected change in the quality or quantity of recreational opportunities can be estimated by applying the regional recreation use values for visitor activities to the expected change in visitation occurring as a result of Alternative B. This analytical approach is standard when there is not an opportunity to conduct a site-specific study as part of the overall evaluation of a proposed project. A subset of various recreational activities which are pertinent to the Project Area is provided in **Table 10** below, along with their regional recreation use values, which are expressed as per person values per day.

Table 10
Economic Value (Consumer Surplus) for Various Recreational Activities in the Analysis Area (2018 dollars)

Activity	Consumer surplus (2018 dollars) per person/activity day
Camping	\$22.71
Freshwater Fishing	\$72.65
Hiking	\$73.80
Sightseeing	\$89.31
Wildlife Viewing	\$70.89

Source: Rosenberger 2016

Table 11 shows the estimated annual visitor days by recreational activity category based on total site visits to Okanogan-Wenatchee NF, which were 1,483,000 in FY 2015 (USFS 2016a), and the percent participation by recreation type (USFS 2016c).

Table 11
Estimated annual visitor days by category, based on 1,483,000 annual visitors

Activity	Percent participation, by category	Estimated annual visitor days by category
Camping	13	198,722
Freshwater Fishing	8	117,157
Hiking	52	769,677
Sightseeing	50	747,432
Wildlife Viewing	30	446,383

Sources: USFS 2016a, 2016c

The recreation use values shown in **Table 10**, when multiplied by the estimated number of visitors engaging in these activities, as shown in **Table 11**, result in the “without project” annual economic value of each visitor activity. To analyze the change in visitation from Alternative B, the change in visitation was applied to the recreation use values. The anticipated annual reduction in recreational

visits resulting from Alternative B (as detailed in the SWISP Project EIS **Recreation Resources Report**) is 3,636 (10,907 visits over the total three-year Project construction timeframe). This reduction would be caused by temporary access constraints on Icicle Creek Road associated with the truck turnaround point at the Forest Service and Alpine Lakes Wilderness Area kiosk, approximately 1.25 miles southwest of the intake facilities. To quantify effects with and without Alternative B, the per person per day values were multiplied by the estimated number of visitor days for each activity, as shown in **Table 12**.

Table 12
Estimated Loss in Economic Value Based on Visitor Use Category

Activity	Consumer surplus (2018 \$) per person/ activity day	Without Project, Annual visitor days, by category	With Project, Annual visitor days, by category	Without Project, Annual Economic Value (\$1,000)	With Project, Annual Economic Value (\$1,000)	Estimated loss in economic value (\$1,000)
Camping	\$22.71	198,722	198,235	\$4,513	\$4,502	\$11
Freshwater Fishing	\$72.65	117,157	116,870	\$8,511	\$8,491	\$21
Hiking	\$73.80	769,677	767,790	\$56,802	\$56,663	\$139
Sightseeing	\$89.31	747,432	745,600	\$66,753	\$66,590	\$164
Wildlife Viewing	\$70.89	446,383	445,289	\$31,644	\$31,567	\$78
Total for all Categories:				\$168,224	\$167,812	\$412

Sources: Rosenberger 2016; Forest Service 2016a, 2016c

Overall, the proposed action would result in an estimated economic value reduction of \$412,000 annually over Project construction (\$1,237,000 over the total Project construction timeframe of three years). When compared to the “without project” scenario, this represents 0.2 percent of the total economic value of annual recreation benefit forest-wide.

4.3.3 Estimated Value of the Time Lost for Motorists

Based on a valuation of travel delays and time savings provided in U.S. Department of Transportation (USDOT) guidance for conducting economic evaluations (USDOT 2016), the recommended hourly value of travel time savings (VITS) for intercity personal surface travel is \$19. USDOT utilizes this value of travel time as a critical factor in evaluating the benefits of transportation infrastructure investment and rulemaking initiatives.

As detailed in the SWISP Project EIS **Recreation Resources Report**, Project-related traffic delays are anticipated to be, on average, 10 minutes⁷ for motorists travelling to recreational destinations along Icicle Creek Road/Icicle Road. These delays would be caused by the need for construction vehicles to access the intake construction area as well as a truck turnaround point at the Forest

⁷ Outbound vehicles heading to Forest Service lands from U.S. Highway 2 could encounter delays where traffic flaggers would be present at the Wenatchee Bridge and at the truck turnaround point. It is also possible for delays to occur when trucks are backing into the intake access road. It is expected that these delays would result in a combined possible delay of 10 minutes.

Service and Alpine Lakes Wilderness Area kiosk located approximately 1.25 miles southwest of the intake facilities. Traffic delays on motorists would be intermittent, and the combined time of traffic stoppages would not accrue to more than 1 hour each day throughout the Phase I construction period. The greatest intensity of Project activities, and associated disturbances, would occur from July 1 through November 15 during the Phase I in-water work window.

Vehicle counts for the month of June 2020 taken on Icicle Creek Road near the Snow Lakes Trailhead indicate an average of 34.3 vehicles per hour at this location (Moscoso 2020). Given the assumed wait time and duration of Phase I construction activity described for Alternative B above, and the per-vehicle hourly value of travel time savings of \$19 (USDOT 2016), the estimated total cost in terms of value of lost time for motorists due to Alternative B would be \$29,978 over the total Project construction duration. No impacts are expected once normal O&M activities resume.

4.3.4 Disproportionate Environmental Effects on Low-income, Minority and Tribal Populations

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 Project 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 in the SWISP Project EIS.

4.4 Alternative C

Under Alternative C, Reclamation would line more and replace less of the upper segment of the conveyance pipeline on USFWS lands than described under Alternative B. Impacts to motorists and recreational visitors from disturbances associated with in-water work occurring from July 1 through November 15 would be the same as described under Alternative B. Rather than pipe replacement, CIPP lining would be used over a larger length of the conveyance pipeline (see **Map A-7** in **Appendix A**). As a result, 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. Impacts to socioeconomics under Alternative C would be similar to those described under Alternative B, but the intensity of impacts would be slightly reduced due to decreased length of conveyance pipeline replacement and increased length of CIPP-lining. Impacts on employment and estimated value of time lost for motorists would be as described under Alternative B. Impacts on low-income, minority, and Tribal populations under Alternative C would not be disproportionate, as described under Alternative B.

4.5 Alternative D

Under Alternative D, types of impacts on socioeconomics would be the same as described under Alternative B, but the impacts would be experienced over a longer total time period, as Phase I construction-related impacts would extend over four in-water construction seasons, as compared with two in-water construction seasons under Alternatives B and C. Alternative D would result in the creation of a temporary construction labor force that would contribute approximately \$9,031,704

to county-level construction wages over the total four-year Project construction duration period. The estimated annual cost of lost recreational opportunities under Alternative D would be the same as described under Alternative B. Economic impacts from time lost for motorists would be greater as a result of two additional in-water work periods under this alternative, resulting in an estimated value of \$59,956 representing the time lost for motorists over the total Project construction period. Impacts on low-income, minority, and Tribal populations under Alternative C would not be disproportionate, as described under Alternative B.

4.6 Short-Term Uses and Long-Term Productivity

No relationships between short-term uses and long-term productivity have been identified for this socioeconomics or environmental justice.

4.7 Unavoidable Adverse Impacts

No unavoidable adverse effects have been identified for this socioeconomics or environmental justice.

4.8 Irreversible and Irretrievable Commitment of Resources

No irreversible and irretrievable commitment of resources has been identified for this socioeconomics or environmental justice.

Chapter 5. Glossary

No glossary terms are defined.

This page intentionally left blank.

Chapter 6. References Cited

- Chelan County. 2017. 2017–2027 Comprehensive Plan. Internet website: <https://www.co.chelan.wa.us/community-development/pages/comprehensive-plan-2017-2037>.
- City of Leavenworth. 2017. Comprehensive Plan. Internet website: <https://cityofleavenworth.com/col-assets/uploads/2018/12/2017-Comp-Plan-Appendices-12.13.18.pdf>.
- Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance Under the National Environmental Policy Act. Executive Office of the President. December 10, 1997. Internet website: https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-EJGuidance.pdf.
- EPA (U.S. Environmental Protection Agency). 2009. Valuing the Protection of Ecological Systems and Services: A Report of the EPA Science Advisory Board (EPA-SAB-09-012). Internet website: <https://yosemite.epa.gov/sab/sabproduct.nsf/WebBOARD/ValProtEcolSys%26Serv>.
- Forest Service. 2010. Wenatchee Visitor Use Report, National Visitor Use Monitoring, Data collected FY 2010. Online: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5348736.pdf
- _____. 2016a. National Visitor Use Monitoring Data for Okanogan-Wenatchee National Forest. Annual Visitation Estimate. Internet website: <https://www.fs.usda.gov/about-agency/nvum>.
- _____. 2016b. National Visitor Use Monitoring Data for Okanogan-Wenatchee National Forest. Trip Spending and Lodging Usage. Internet website: <https://www.fs.usda.gov/about-agency/nvum>.
- _____. 2016c. National Visitor Use Monitoring Data for Okanogan-Wenatchee National Forest. Activity Participation. Internet website: <https://www.fs.usda.gov/about-agency/nvum>.
- _____. 2016d. National Visitor Use Monitoring Data for Okanogan-Wenatchee National Forest. Group Characteristics. Internet website: <https://www.fs.usda.gov/about-agency/nvum>.
- _____. 2017. Recreation Economic Values for Estimating Outdoor Recreation Economic Benefits from the National Forest System. Pacific Northwest Research Station. General Technical Report PNW-GTR-957. August, 2017. Online: https://www.fs.fed.us/pnw/pubs/pnw_gtr957.pdf

- HHS (US Department of Health and Human Services). 2018. 2018 Poverty Guidelines for the 48 Contiguous States and the District of Columbia. Internet website: <https://aspe.hhs.gov/2018-poverty-guidelines>.
- Mansfield, C. 2012. Klamath River Basin Restoration Nonuse Value Survey. Final Report. January 19, 2012. Internet website: <https://kbifrm.psmfc.org/file/klamath-river-basin-restoration-nonuse-value-survey-final-report/>.
- Moscoco, Leslie. 2020. Email from Leslie Moscoco, District Recreation Program Manager, US Forest Service, Okanogan-Wenatchee National Forest. RE: annual traffic count for Icicle Creek Road. Sent to Elizabeth Heether, Environmental Protection Specialist, Bureau of Reclamation, Columbia-Cascades Area Office, on Tuesday, July 14, 2020.
- NMFS (National Marine Fisheries Service). 1997. Fish Screening Criteria for Anadromous Salmonids. National Marine Fisheries Service, Southwest Region, Long Beach, California.
- _____. 2011. Anadromous Salmonid Passage Facility Design. National Marine Fisheries Service, Northwest Region, Portland, Oregon.
- _____. 2017. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, Leavenworth National Fish Hatchery Spring Chinook Salmon Program (Reinitiation 2016). National Marine Fisheries Service, West Coast Region, Portland, Oregon.
- Rosenberger, Randall S. 2016. Recreation Use Values Database. Corvallis, Oregon: Oregon State University, College of Forestry. Online: <http://recvaluation.forestry.oregonstate.edu/>.
- U.S. Census. 2017. American Community Survey 5-Year Estimates Data Profiles, 2012–2017. Demographic and Housing Estimates Tables 2501 and B25004. Internet website: <https://www.census.gov/acs/www/data/data-tables-and-tools/>.
- _____. 2018a. American Community Survey 5-Year Estimates Data Profiles, 2013–2018. Hispanic or Latino Origin by Race. Table B03002. Internet website: <https://www.census.gov/acs/www/data/data-tables-and-tools/>.
- _____. 2018b. American Community Survey 5-Year Estimates Data Profiles, 2013–2018. Poverty Status in the Past 12 Months. Table S1701. Internet website: <https://www.census.gov/acs/www/data/data-tables-and-tools/>.
- _____. 2018c. American Community Survey 5-Year Estimates Data Profiles, 2013–2018. Selected Economic Characteristics. Table DP03. Internet website: <https://www.census.gov/acs/www/data/data-tables-and-tools/>.
- USFWS (U.S. Fish and Wildlife Service). 2011. Biological Assessment for the Operation and Maintenance of Leavenworth National Fish Hatchery. Leavenworth, Washington.

U.S. Department of Transportation (USDOT). 2016. The Value of Travel Time Savings: Departmental Guidance for Conducting Economic Evaluations Revision 2 (2016 Update). September 27, 2016. Online: <https://www.transportation.gov/sites/dot.gov/files/docs/2016%20Revised%20Value%20of%20Travel%20Time%20Guidance.pdf>

WESD (Washington Employment Security Department). 2018. Chelan County Data Tables. Covered Employment and Payroll. Internet website: <https://www.esd.wa.gov/labormarketinfo/county-profiles/chelan-douglas>.

This page intentionally left blank.

Appendix A

Maps

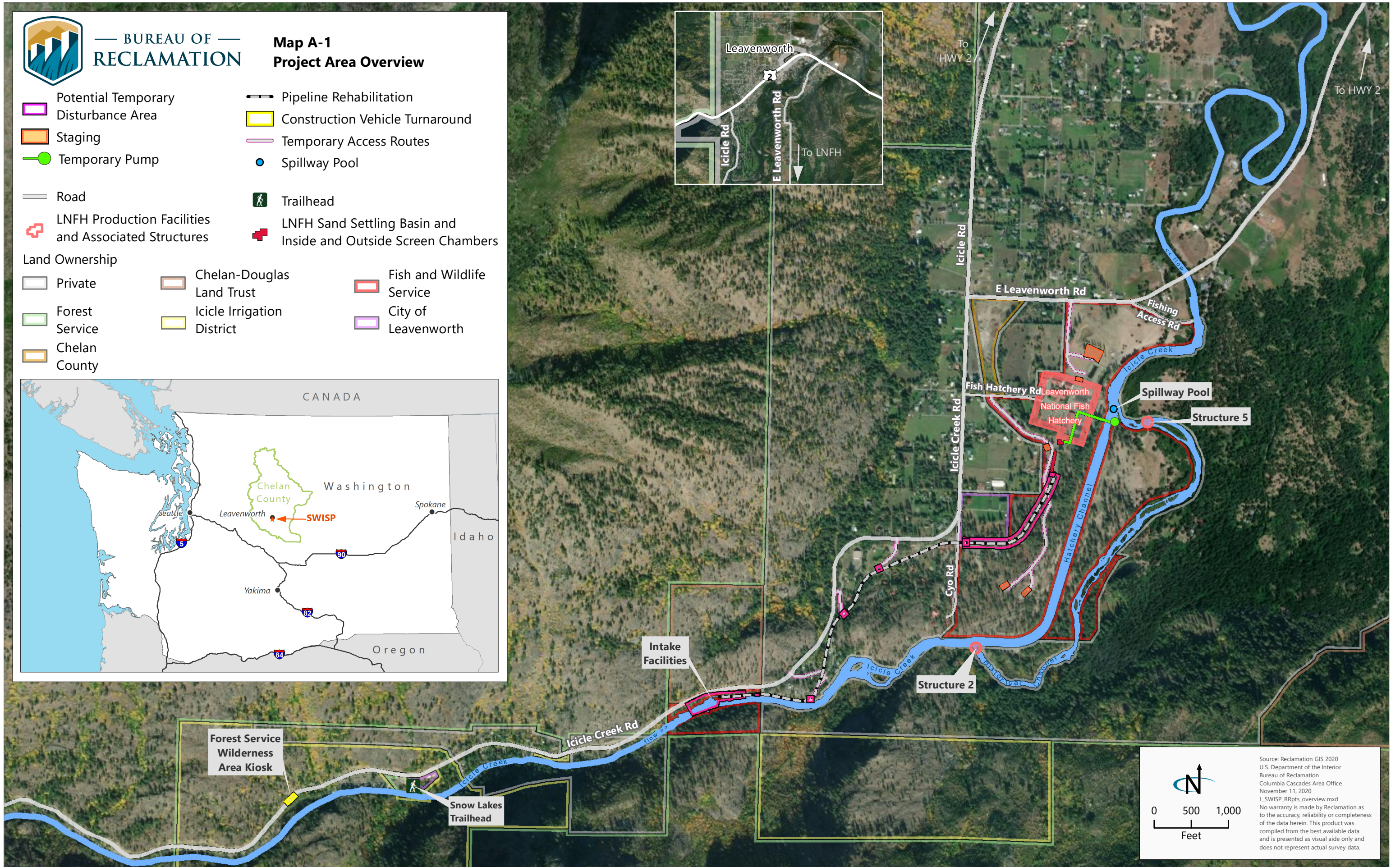
This page intentionally left blank.



BUREAU OF RECLAMATION

Map A-1 Project Area Overview

- Potential Temporary Disturbance Area
- Staging
- Temporary Pump
- Road
- LNFH Production Facilities and Associated Structures
- Private
- Forest Service
- Chelan County
- Pipeline Rehabilitation
- Construction Vehicle Turnaround
- Temporary Access Routes
- Spillway Pool
- Trailhead
- LNFH Sand Settling Basin and Inside and Outside Screen Chambers
- Chelan-Douglas Land Trust
- Icicle Irrigation District
- Fish and Wildlife Service
- City of Leavenworth











0 500 1,000 Feet

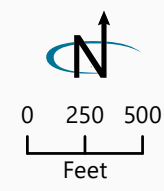
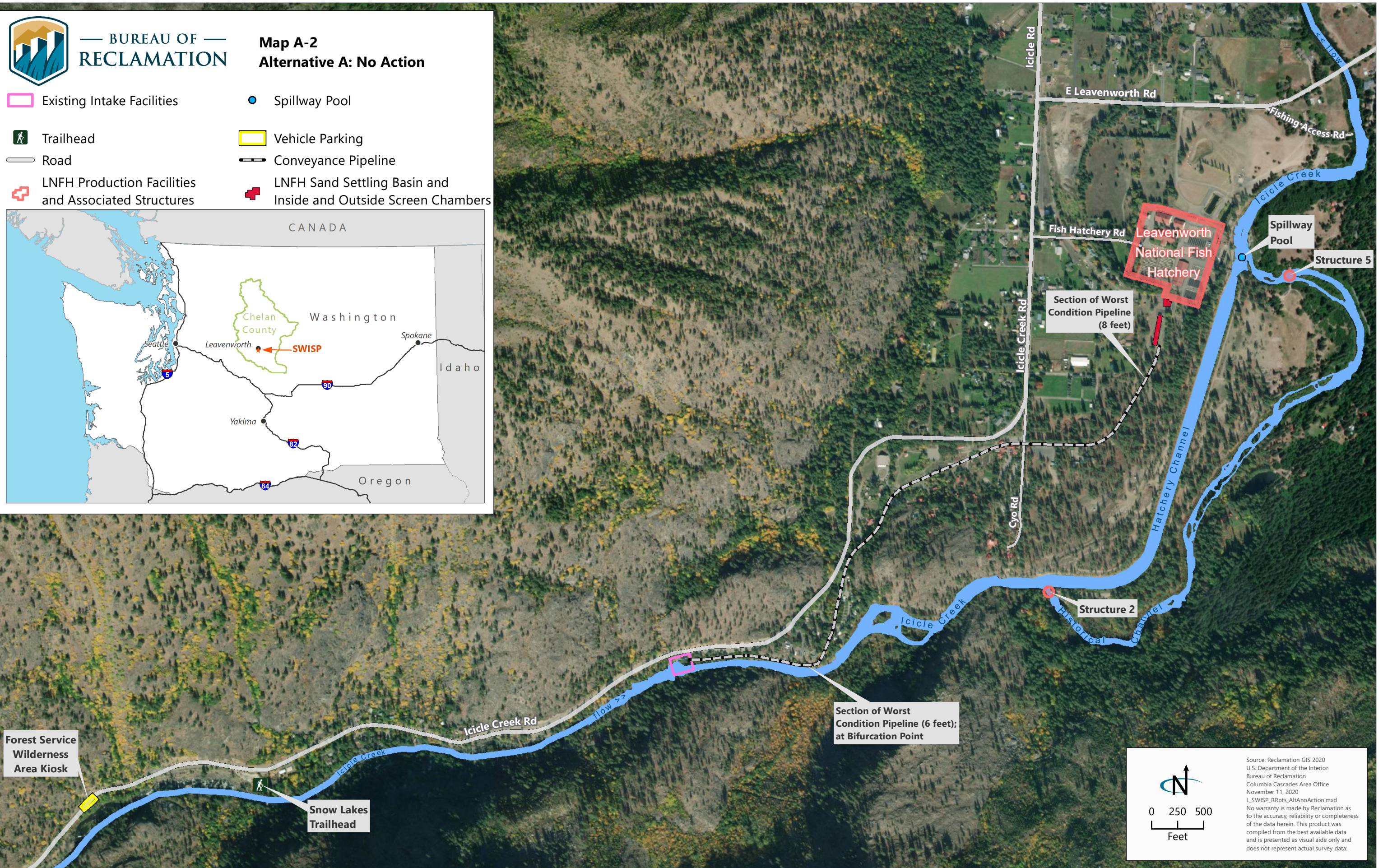
Source: Reclamation GIS 2020
 U.S. Department of the Interior
 Bureau of Reclamation
 Columbia Cascades Area Office
 November 11, 2020
 L_SWISP_RRpts_overview.mxd
 No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aid only and does not represent actual survey data.



BUREAU OF RECLAMATION

Map A-2
Alternative A: No Action

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



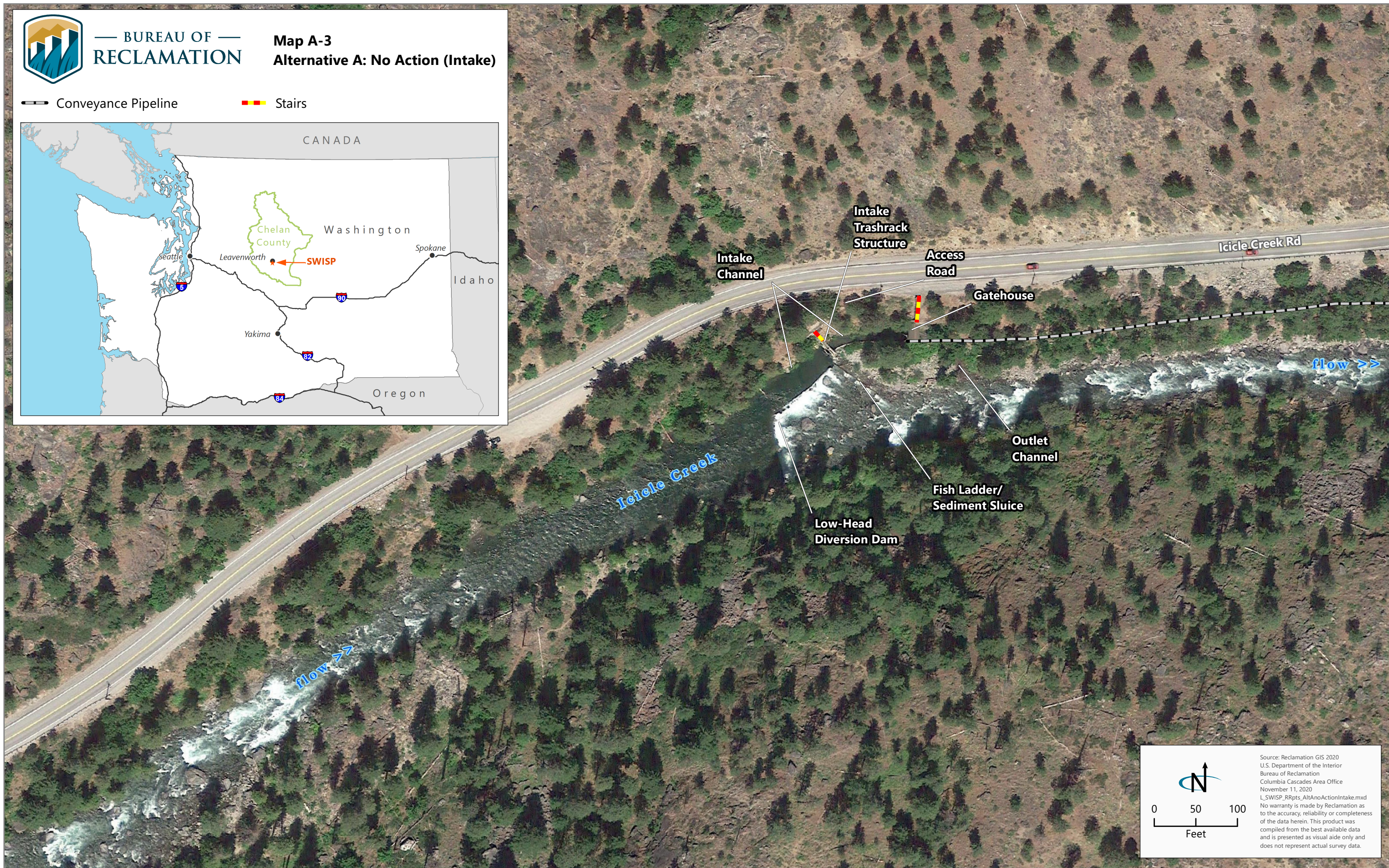
Source: Reclamation GIS 2020
 U.S. Department of the Interior
 Bureau of Reclamation
 Columbia Cascades Area Office
 November 11, 2020
 L_SWISP_RRpts_AltAnoAction.mxd
 No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aid only and does not represent actual survey data.



BUREAU OF RECLAMATION

Map A-3
Alternative A: No Action (Intake)

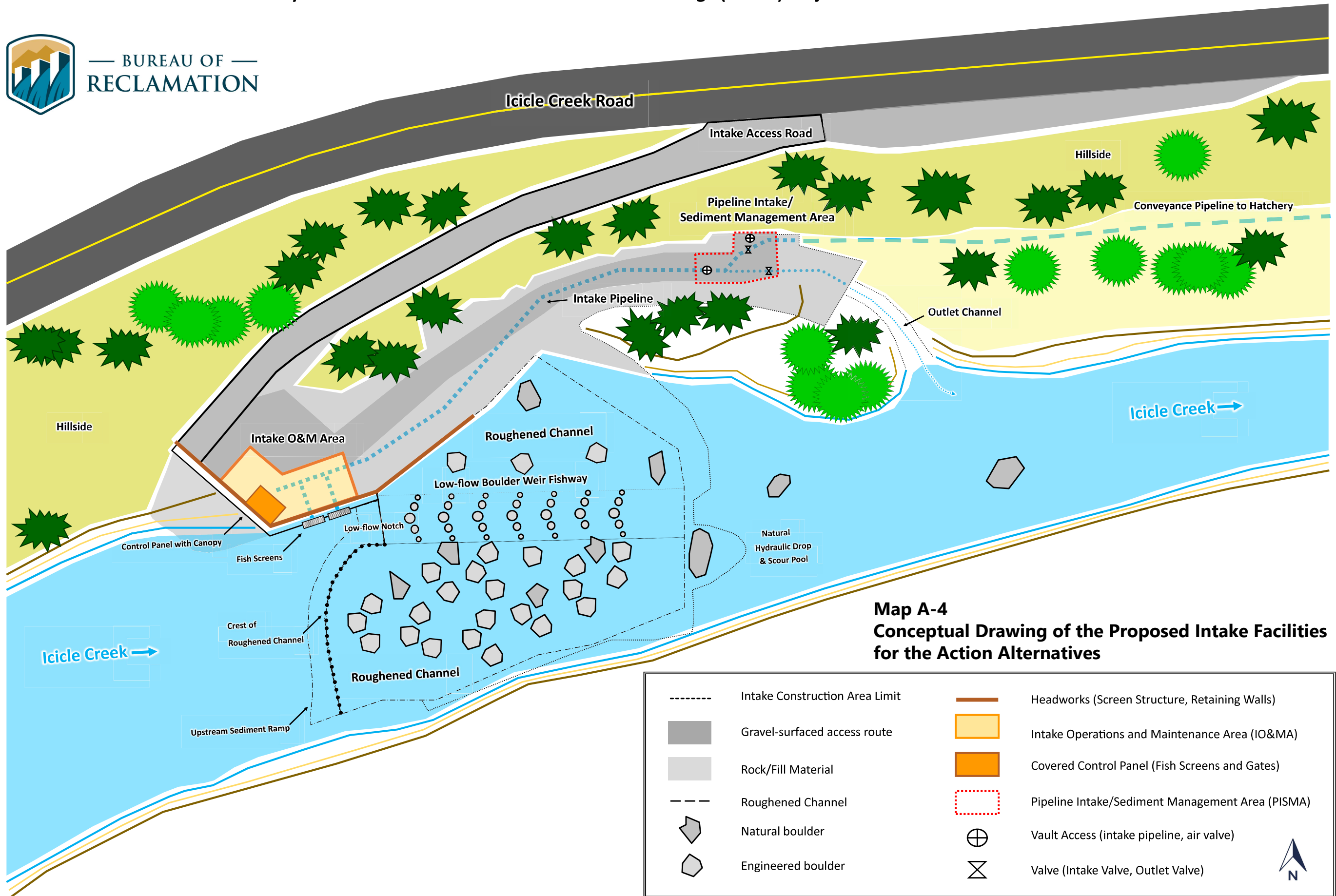
Conveyance Pipeline Stairs



0 50 100
Feet

Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
November 11, 2020
L_SWISP_RRpts_AltAnoActionIntake.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 aid only and does not represent actual survey data.

Leavenworth National Fish Hatchery Surface Water Intake Fish Screens and Fish Passage (SWISP) Project





BUREAU OF RECLAMATION

**Map A-5
Alternative B (Proposed Action)
and Alternative D**

Phase I

Intake Facilities

Phase II

Construction Area

Contractor Use Area (CUA)

Temporary Pump and Pipeline

Temporary Access Route

Phase I and II

Staging and Storage Site for Construction Equipment and Materials, and Construction Staff Administration

Road

Spillway Pool

Trailhead

Temporary Access Route

Conveyance Pipeline lined with Cure-in-Place Pipe (approximately 4,000 feet)

Pipeline Replacement

Access Routes

Construction Vehicle Turnaround/ Vehicle Parking

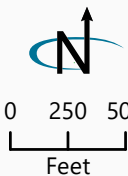
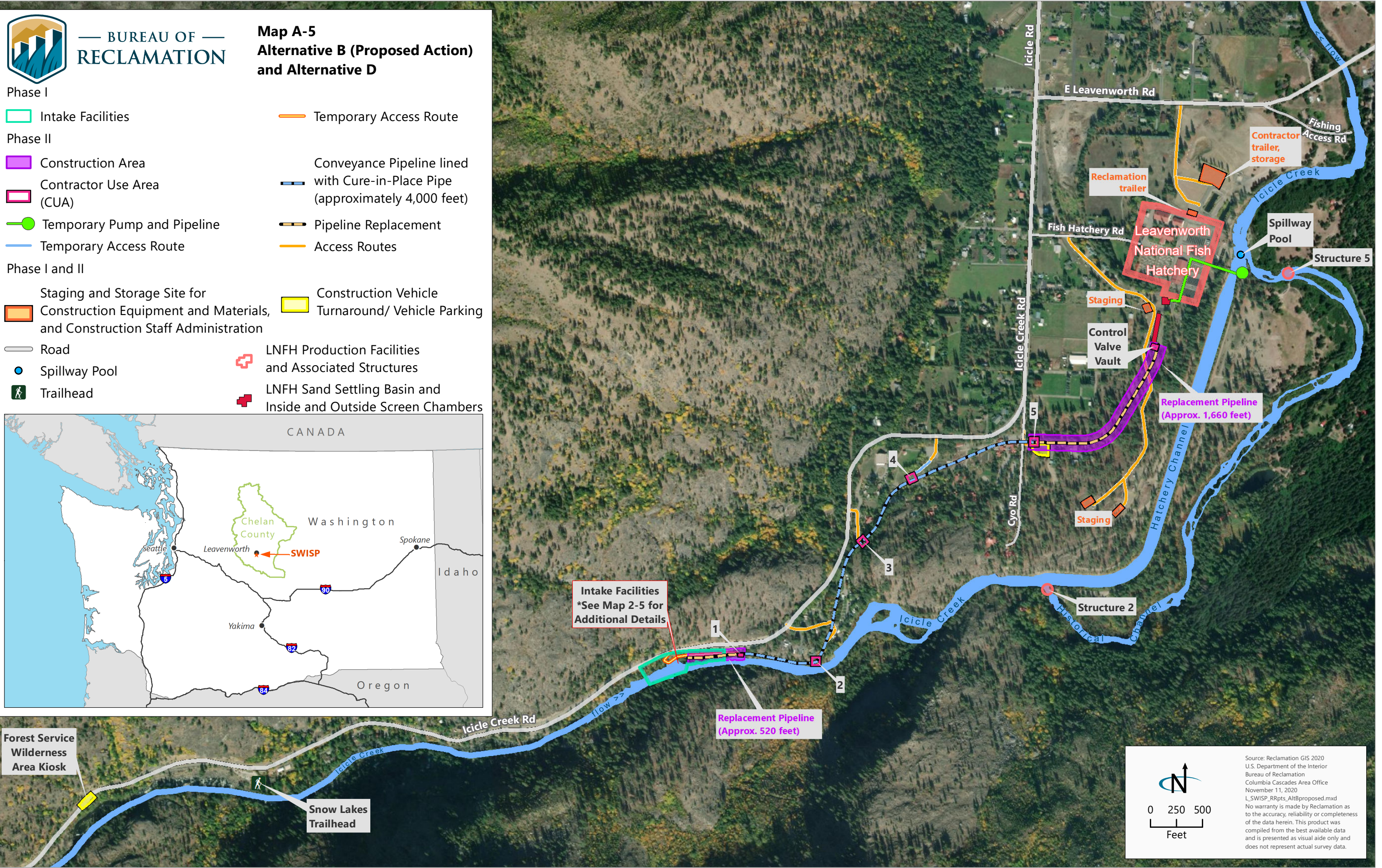
LNFH Production Facilities and Associated Structures

LNFH Sand Settling Basin and Inside and Outside Screen Chambers



Forest Service Wilderness Area Kiosk

Snow Lakes Trailhead



Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
November 11, 2020
L_SWISP_RRpts_AltBproposed.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 aid only and does not represent actual survey data.



BUREAU OF RECLAMATION

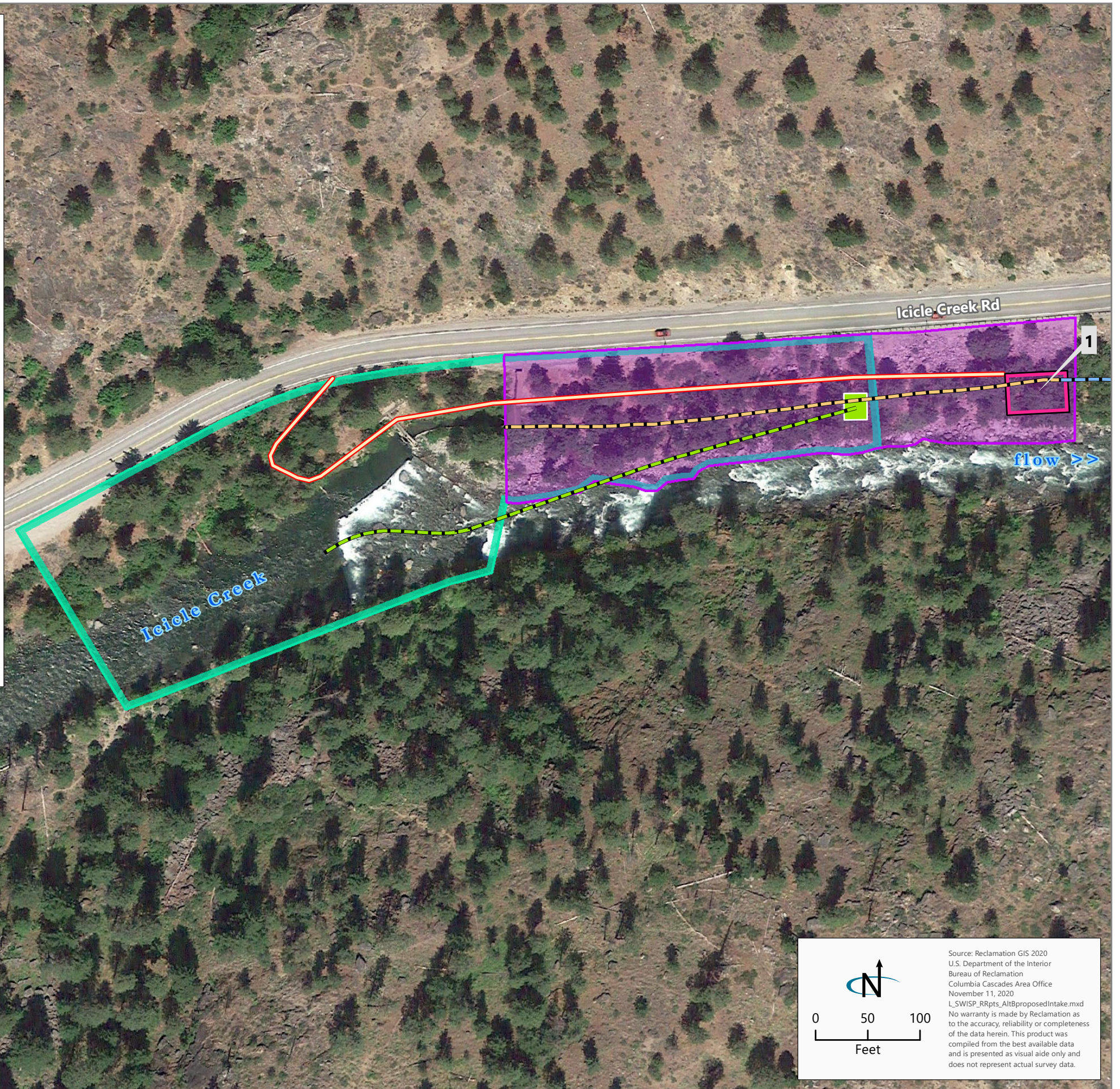
Map A-6 Alternative B (Proposed Action) and Alternative D: Intake

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
 November 11, 2020
 L_SWISP_RRpts_AltBproposedIntake.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 aid only and does not represent actual survey data.



BUREAU OF RECLAMATION

Map A-7 Alternative C

Phase I

Intake Facilities

Phase II

Construction Area

Contractor Use Area (CUA)

Temporary Pump and Pipeline

Temporary Access Route

Phase I and II

Staging and Storage Site for Construction Equipment and Materials, and Construction Staff Administration

Road

Spillway Pool

Trailhead

Temporary Access Route

Conveyance Pipeline lined with Cure-in-Place Pipe (approximately 4,520 feet)

Pipeline Replacement

Access Routes

Construction Vehicle Turnaround/ Vehicle Parking

LNFH Production Facilities and Associated Structures

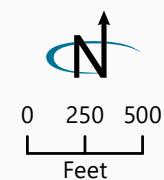
LNFH Sand Settling Basin and Inside and Outside Screen Chambers



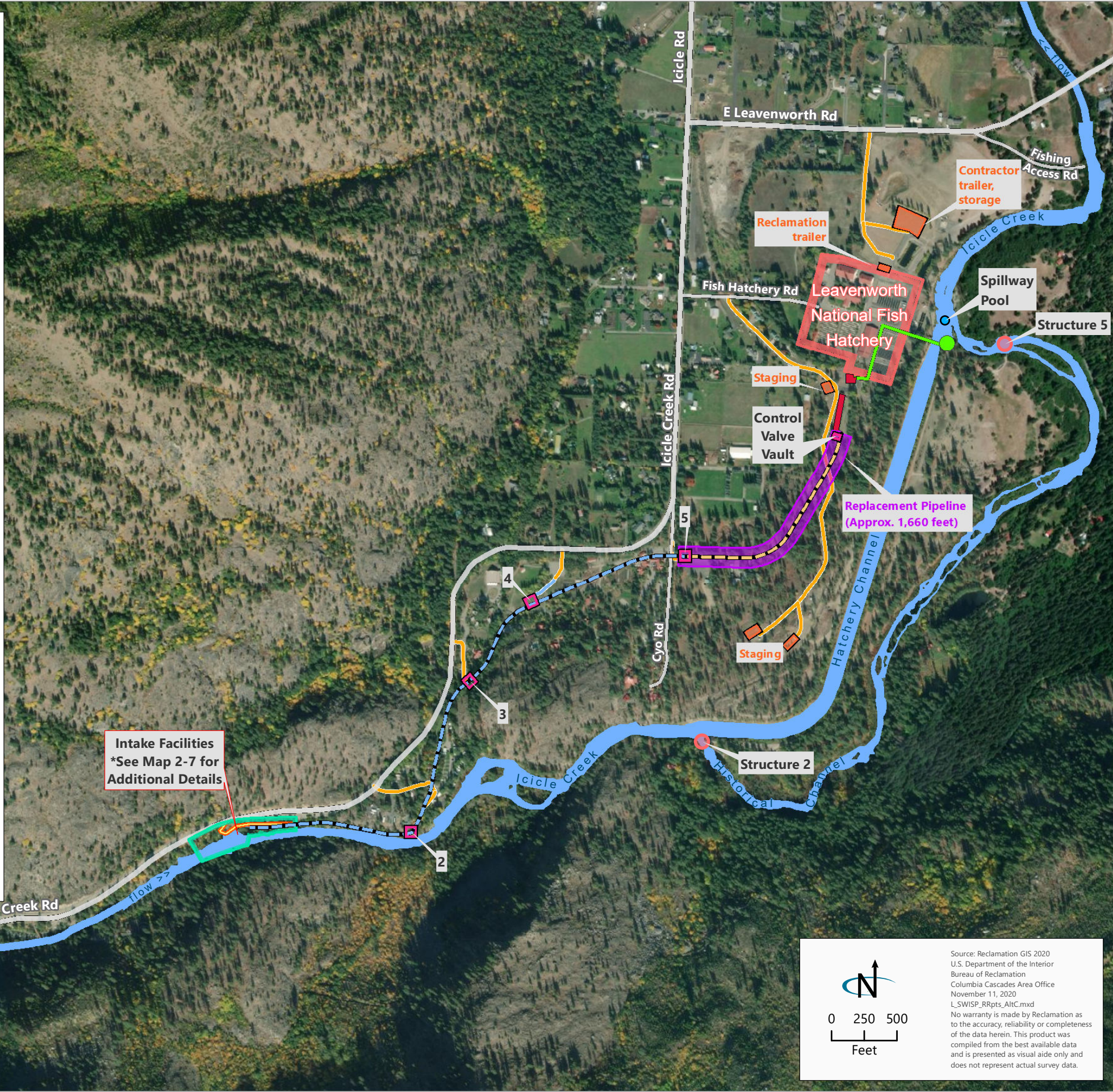
Forest Service Wilderness Area Kiosk

Snow Lakes Trailhead

Intake Facilities
*See Map 2-7 for Additional Details



Source: Reclamation GIS 2020
 U.S. Department of the Interior
 Bureau of Reclamation
 Columbia Cascades Area Office
 November 11, 2020
 L_SWISP_RRpts_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 aid only and does not represent actual survey data.





BUREAU OF RECLAMATION

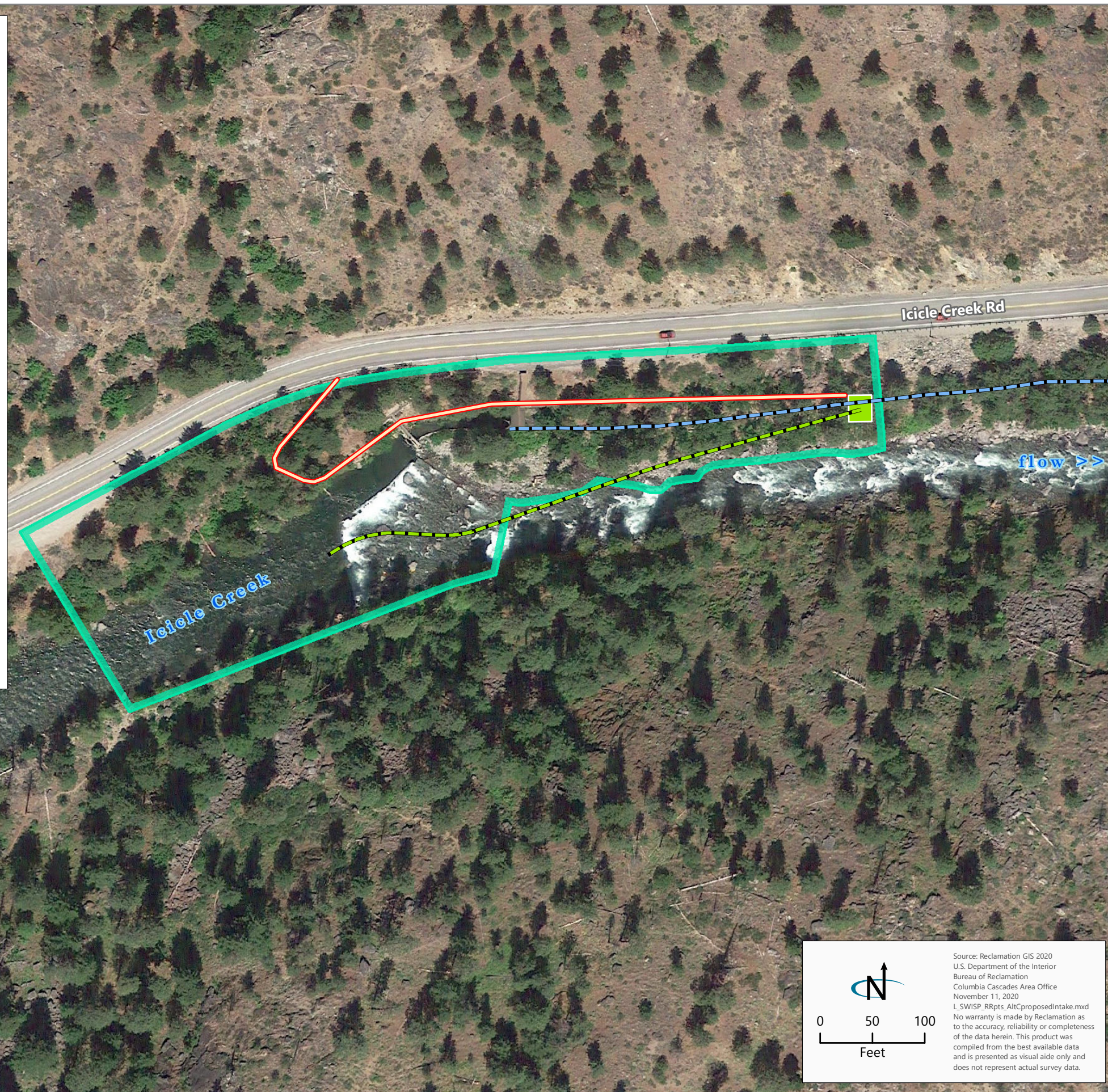
Map A-8 Alternative C (Intake)

Phase I

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

Phase II

- Conveyance Pipeline lined with Cure-in-Place Pipe



0 50 100
Feet

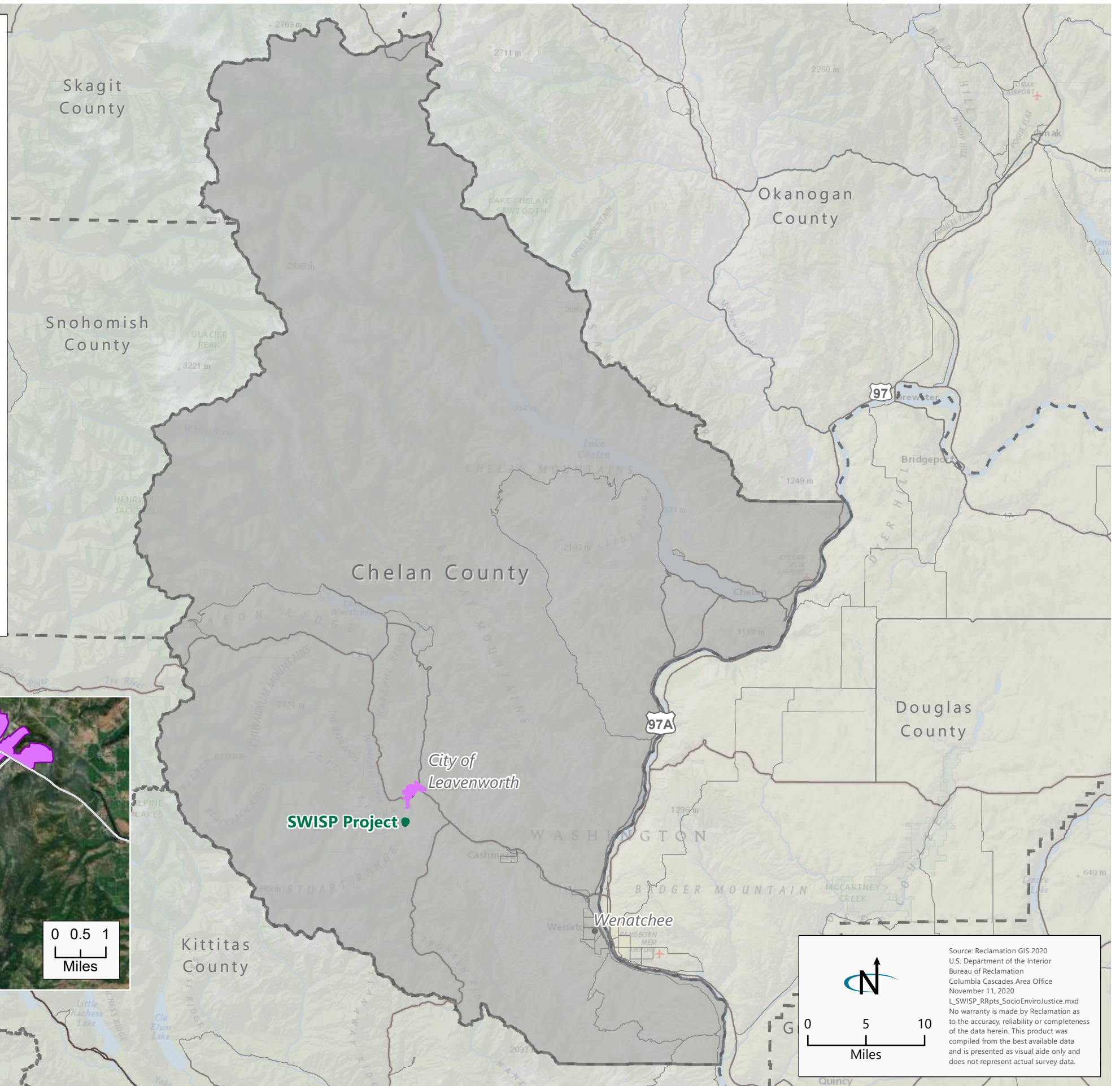
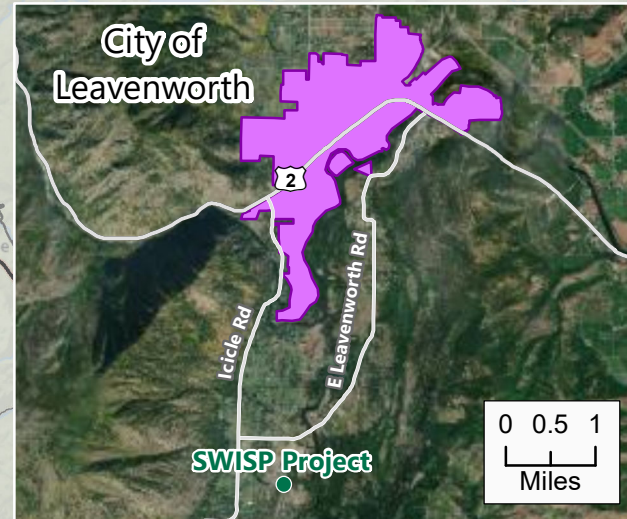
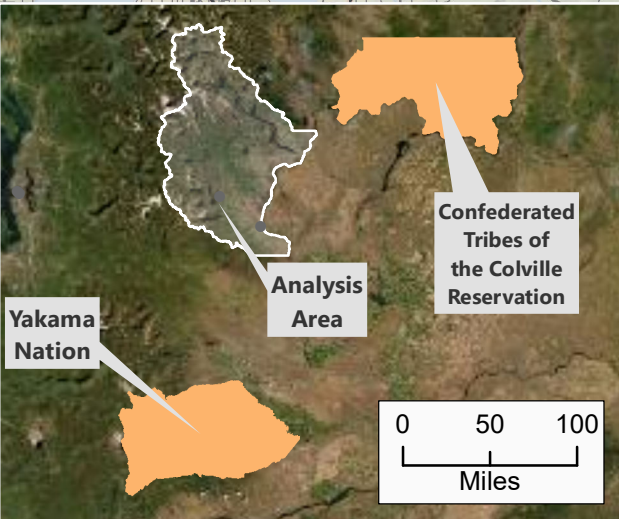
Source: Reclamation GIS 2020
U.S. Department of the Interior
Bureau of Reclamation
Columbia Cascades Area Office
November 11, 2020
L_SWISP_RRpts_AltCproposedIntake.mxd
No warranty is made by Reclamation as to the accuracy, reliability or completeness of the data herein. This product was compiled from the best available data and is presented as visual aid only and does not represent actual survey data.



BUREAU OF RECLAMATION

Map A-9 Socioeconomic and Environmental Justice Analysis Area

- Environmental Justice Analysis Area
- SWISP Project
- City of Leavenworth
- Native American Reservation
- County
- Highway



Source: Reclamation GIS 2020
 U.S. Department of the Interior
 Bureau of Reclamation
 Columbia Cascades Area Office
 November 11, 2020
 L_SWISP_RRpts_SocioEnviroJustice.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 aid only and does not represent actual survey data.

This page intentionally left blank.

Appendix B

Best Management Practices

This page intentionally left blank.

Appendix B. 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) and by the NMFS (addressing endangered spring Chinook Salmon and threatened Steelhead; NMFS 2015, NMFS 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)¹.
- 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**.

¹ 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 30, 2020. Reclamation anticipates that ESA Section 7 consultation with the USFWS for the SWISP Project will result in similar conservation measures as those contained in the expired programmatic biological opinion.

Table B-1. Best Management Practices

Resource Topic	Best Management Practice
General	<ul style="list-style-type: none"> • 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). • Conduct operations to prevent unnecessary destruction, scarring, or defacing of natural surroundings in the vicinity of the work.
Air Quality and Climate	<ul style="list-style-type: none"> • Dust control and abatement measures will be implemented during construction. • Vehicle traffic on unpaved surfaces would be limited to 10 miles per hour to minimize dust generation. • Vehicle traffic on government rights-of-way, dirt roads, and paved roads through LNFH property would be limited to 10 miles per hour. • Prevent, control, and abate dust pollution on government rights-of-way. • Provide labor, equipment, and materials, and use efficient methods wherever and whenever required to prevent dust nuisance or damage to persons, property, or activities. • Provide means for eliminating atmospheric discharges of dust during mixing, handling, and storing of cement, pozzolan, and concrete aggregate. • Use reasonably available methods and devices to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants. • Do not operate equipment and vehicles that show excessive exhaust gas emissions until corrective repairs or adjustments reduce such emissions to acceptable levels.
Geology and Soils	<ul style="list-style-type: none"> • The number of temporary access roads will be minimized, and roads will be designed to avoid adverse effects like creating excessive erosion (NMFS 2017a). • Temporary roads and trails across slopes greater than 30 percent will be avoided when feasible (NMFS 2017a). • Existing roadways or travel paths will be used whenever possible (NMFS 2017a).
Water Resources (Stream Conditions)	<ul style="list-style-type: none"> • Cofferdam placement will maintain natural stream flow, minus the 40 cfs diversion to the hatchery, within the greatest amount of natural streambed width as possible. • Additional flow outage shall require the prior written approval of the COR, and of appropriate Federal and State water quality control agencies.

Resource Topic	Best Management Practice
Water Resources (Water Quality)	<p data-bbox="617 253 709 277">General</p> <ul data-bbox="667 289 1892 529" style="list-style-type: none"> <li data-bbox="667 289 1892 386">• 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. <li data-bbox="667 394 1892 492">• 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). <li data-bbox="667 500 1892 529">• The use of acids for cleaning or preparing concrete surfaces for repair will not be permitted. <p data-bbox="617 553 793 578">In-water work</p> <ul data-bbox="667 589 1892 1317" style="list-style-type: none"> <li data-bbox="667 589 1892 751">• 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). <li data-bbox="667 760 1892 824">• Use of rapidly deployable prefabricated cofferdam systems would minimize impacts to subgrade and surrounding water. <li data-bbox="667 833 1892 898">• 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. <li data-bbox="667 906 1892 971">• Spill prevention and clean-up kits will be on site when heavy equipment is operating within 25 feet of the water (NMFS 2017a). <li data-bbox="667 979 1892 1044">• 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). <li data-bbox="667 1052 1892 1117">• Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities around the water (NMFS 2017a). <li data-bbox="667 1125 1892 1317">• Equipment will cross the stream in-water only under the following conditions: (NMFS 2017a). <ul data-bbox="716 1149 1892 1317" style="list-style-type: none"> <li data-bbox="716 1149 1892 1214">○ A. Equipment is free of external petroleum-based products, soil and debris has been removed from the drive mechanisms and undercarriage; and <li data-bbox="716 1222 1892 1252">○ B. The substrate is bedrock or coarse rock and gravel; or <li data-bbox="716 1260 1892 1317">○ C. Mats or logs are used in soft bottom situations to minimize compaction while driving across streams; and

Resource Topic	Best Management Practice
Water Resources (Water Quality, continued)	<ul style="list-style-type: none"> ○ D. Stream crossings will be performed at right angles (90 degrees) to the bank if possible; and ○ E. 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; and ○ F. The number of crossings will be minimized. • 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 Corps 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 Corps, 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.
	<p>Erosion and spill prevention and control</p>
	<ul style="list-style-type: none"> • 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 spill prevention and countermeasures plan (SPCC) 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 United States 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.

Resource Topic	Best Management Practice
Water Resources (Water Quality, continued)	<p data-bbox="617 253 1255 279">Erosion and spill prevention and control, continued</p> <ul style="list-style-type: none"> <li data-bbox="709 289 1570 315">○ Prevent, stop, and control spills or leaks during construction activities: <li data-bbox="709 324 1016 350">○ Stop source of spill or leak. <li data-bbox="709 360 1108 386">○ Stop migration of spill or leak. <li data-bbox="709 396 1419 422">○ Place berm of sorbent material around perimeter of spill. <li data-bbox="709 431 1045 457">○ Solidify free standing oil. <li data-bbox="663 467 1885 526">● A supply of emergency erosion control materials will be on hand and temporary erosion controls will be installed and maintained in place until site restoration is complete (NMFS 2017a). <li data-bbox="663 535 1885 669">● Landward erosion control methods shall be used to prevent silt-laden water from entering waters of the U.S. These may include, but are not limited to, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas (NMFS 2017a). <li data-bbox="663 678 1860 776">● Control pollutants by use of sediment and erosion controls, wastewater and stormwater management controls, construction site management practices, and other controls including State and local control requirements. <li data-bbox="663 786 1885 987">● Sediment and Erosion Controls: <ul style="list-style-type: none"> <li data-bbox="709 818 1822 915">○ Establish methods for controlling sediment and erosion which address vegetative practices, structural control, silt fences, straw dikes, sediment controls, and operator controls as appropriate. <li data-bbox="709 925 1885 987">○ Institute stormwater management measures as required, including velocity dissipators, and solid waste controls which address controls for building materials and offsite tracking of sediment. <li data-bbox="663 997 1885 1268">● Pollution Prevention Measures: <ul style="list-style-type: none"> <li data-bbox="709 1029 1860 1127">○ Use methods of dewatering, unwatering, excavating, or stockpiling earth and rock materials which include prevention measures to control silting and erosion, and which will intercept and settle any runoff of sediment-laden waters. <li data-bbox="709 1136 1885 1234">○ Prevent wastewater from general construction activities such as drainwater collection, aggregate processing, concrete batching, drilling, grouting, or other construction operations, from entering flowing or dry watercourses without the use of approved turbidity control methods. <li data-bbox="709 1243 1604 1268">○ Divert stormwater runoff from upslope areas away from disturbed areas.

Resource Topic	Best Management Practice
Water Resources (Water Quality, continued)	<p data-bbox="617 250 1255 276">Erosion and spill prevention and control, continued</p> <ul style="list-style-type: none"> <li data-bbox="667 289 1881 633"> <ul style="list-style-type: none"> <li data-bbox="667 289 1075 315">• Turbidity Prevention Measures: <ul style="list-style-type: none"> <li data-bbox="718 324 1881 454">○ 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. <li data-bbox="718 464 1881 529">○ Wastewaters discharged into surface waters shall meet conditions of Clean Water Act section 402, the National Pollutant Discharge Elimination System (NPDES) permit. <li data-bbox="718 539 1881 633">○ 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. <li data-bbox="667 643 1881 708">• Clean up spills or leaks in a manner that complies with applicable Federal, State, and local laws and regulations. <li data-bbox="667 717 1881 919">• Dispose of spilled or leaked materials: <ul style="list-style-type: none"> <li data-bbox="718 743 1881 808">○ Handle and dispose of spilled or leaked materials contaminated with 50 ppm or greater polychlorinated biphenyls. <li data-bbox="718 818 1881 919">○ 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. <p data-bbox="617 938 961 964">Discharge water and wastes</p> <ul style="list-style-type: none"> <li data-bbox="667 974 1881 1104">• 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). <li data-bbox="667 1114 1881 1211">• 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). <li data-bbox="667 1221 1881 1352">• 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).

Resource Topic	Best Management Practice
Water Resources (Water Quality, continued)	<p data-bbox="617 250 869 276">Storage and staging</p> <ul data-bbox="663 289 1892 1055" style="list-style-type: none"> <li data-bbox="663 289 1892 561">• 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 Corps’ jurisdictional boundary of wetlands and waterbodies. If possible, staging will be located at least 300 feet away from the Corps’ jurisdictional boundary of wetlands and waterbodies, and on impervious surfaces to prevent spills from reaching ground water. If moving equipment between the staging area and the worksite 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 (NMFS 2017a). <li data-bbox="663 570 1457 596">• Equipment will not be stored overnight in the instream channel. <li data-bbox="663 604 1864 704">• 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. <li data-bbox="663 712 1892 1055">• Petroleum Product Storage Tanks Management. <ul data-bbox="709 745 1892 1055" style="list-style-type: none"> <li data-bbox="709 745 1871 810">○ 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. <li data-bbox="709 818 1220 844">○ Do not use underground storage tanks. <li data-bbox="709 852 1877 985">○ 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. <li data-bbox="709 993 1892 1055">○ Areas for refueling operations: Lined with impermeable barrier at least 40 mils thick covered with 2 to 4 inches of soil. <p data-bbox="617 1079 1096 1105">Reclamation of temporary disturbance</p> <ul data-bbox="663 1118 1881 1317" style="list-style-type: none"> <li data-bbox="663 1118 1755 1183">• All temporary access will be removed (including gravel surfaces) and planted after Project completion (NMFS 2017a). <li data-bbox="663 1192 1881 1317">• Within 7 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 Corps (NMFS 2017a).

Resource Topic	Best Management Practice
Water Resources (Water Rights)	<ul style="list-style-type: none">• 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 20.
Biological Resources (Vegetation)	<ul style="list-style-type: none">• 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 by the use of 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	Best Management Practice
Biological Resources (Fisheries and Aquatic Ecosystems)	<p data-bbox="617 253 793 279">Riparian areas</p> <ul data-bbox="663 289 1892 915" style="list-style-type: none"> <li data-bbox="663 289 1625 315">• The removal of riparian vegetation for access will be minimized (NMFS 2017a). <li data-bbox="663 324 1829 383">• All native, non-invasive organic material (large and small wood) cleared from the action area for access will remain on site (NMFS 2017a). <li data-bbox="663 393 1877 451">• 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). <li data-bbox="663 461 1892 737">• 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 of an acre, a final monitoring report will be submitted to the Corps 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). <li data-bbox="663 747 1864 805">• 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. <li data-bbox="663 815 1871 915">• 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).

Resource Topic	Best Management Practice
Biological Resources (Fisheries and Aquatic Ecosystems, continued)	<p data-bbox="617 269 978 295">Fisheries and aquatic wildlife</p> <ul data-bbox="667 305 1892 1284" style="list-style-type: none"> <li data-bbox="667 305 1367 331">• Instream work is limited to July 1 through November 15. <li data-bbox="667 337 1892 578">• A minimum depth of 0.8 ft 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 are conservative, but attempts should be made to provide fish passage to the greatest extent practical across the natural stream channel width and hydrograph. <li data-bbox="667 584 1892 753">• Work site dewatering will follow the Dewatering and Fish Capture Protocol in Appendix D (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). <li data-bbox="667 760 1797 824">• 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). <li data-bbox="667 831 1850 896">• 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). <li data-bbox="667 902 1829 967">• 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). <li data-bbox="667 974 1797 1006">• Post-construction monitoring of the low-flow fishway would be done to ensure effectiveness. <li data-bbox="667 1013 1871 1143">• 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). <li data-bbox="667 1149 1881 1214">• 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). <li data-bbox="667 1221 1839 1284">• 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).

Resource Topic	Best Management Practice
Biological Resources (Fisheries and Aquatic Ecosystems, continued)	<ul style="list-style-type: none"> • 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).

Resource Topic	Best Management Practice
Biological Resources (Terrestrial Wildlife)	<ul style="list-style-type: none"> • 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. • 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).
Cultural Resources	<ul style="list-style-type: none"> • As required by the Washington State Historic Preservation Officer, the <i>Plan and Procedures for the Inadvertent Discovery of Cultural Resources and Human Remains</i> (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 ground-disturbing activities.
Land Use	<ul style="list-style-type: none"> • Restore contractor use areas to pre-construction condition.

Resource Topic	Best Management Practice
Transportation	<ul style="list-style-type: none"> • 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. • Meet requirements of the Manual on Uniform Traffic Control Devices for Streets and Highways, Part 6 (Temporary traffic control; https://mutcd.fhwa.dot.gov/) and WAC 296-155-305 (Signaling and flaggers). • Provide cones, delineators, concrete safety barriers, barricades, flasher lights, danger signals, signs, and other temporary traffic control devices as required to protect work and public safety. • Provide flaggers and guards as required to prevent accidents and damage or injury to passing traffic. • 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 USFS kiosk or backing onto the Intake Access Road. • Provide unobstructed, smooth, and dustless passageway for one lane of traffic through construction operations. • 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.
Noise	<ul style="list-style-type: none"> • Do not use jackhammers in excess of 30 pounds without Reclamation approval. Blasting is not permitted.
Recreation	<ul style="list-style-type: none"> • There are no construction activities (such as parking, storage, or vehicle turnaround) allowed in the Forest Service Snow Lakes Trailhead parking lot.

Resource Topic	Best Management Practice
Visual Resources	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 Confederated Tribes of the Colville Reservation 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.
Utilities	<ul style="list-style-type: none"> A locate for underground utilities would be coordinated with the Washington Utility Notification Center (http://www.callbeforeyoudig.org/washington/index.asp) prior to construction.
Hazardous Materials and Public Health and Safety	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> Dispose by removal from jobsite. Recycle hazardous waste whenever possible. Dispose of hazardous waste materials that are not recycled at appropriately permitted treatment or disposal facilities. Transport hazardous waste in accordance with 49 CFR 171-179. Provide protection for personnel and existing facilities from harm due to demolition activities. 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.

Resource Topic	Best Management Practice
Tribal Interests	<ul style="list-style-type: none"><li data-bbox="663 253 1860 457">• 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 Confederated Tribes of the Colville Reservation 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.

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 anticipated terms and conditions is included below. Regulating agencies may also impose additional conditions on a project-by-project basis.

B.1.1 U.S. Army Corps of Engineers Section 404 Nationwide Permits

USACE General Conditions for all NWP

- **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 FEMA-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 NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.
- **Tribal Rights.** No NWP 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 NWP 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 Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP 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 FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

- 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 Corps 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.1.2 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 on-going 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:

- Land Use and Landscape Rehabilitation Plan
- Traffic Control Plan
- Pollution Prevention Plan
- Spill Prevention, Control, and Countermeasure Plan
- Tree and Plant Protection Plan
- Waste Production and Disposal Plan
- Waste Handling and Disposal Plan
- Demolition Plan
- Concrete Removal and Disposal Plan
- Water Control Plan
- Cofferdam Construction Plan
- Seeding Plan
- Work Area Isolation Plan
- Temporary Erosion and Sediment Control Plan
- Inadvertent Discovery Plan

B.4 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 Fisheries Program Office, Vancouver, Washington.
- NMFS (National Marine Fisheries Service). 2015. Endangered Species Act (ESA) Section 7(a)(2) 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.
- _____. 2017a. 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). West Coast Region, Portland, Oregon.
- _____. 2017b. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation, Leavenworth National Fish Hatchery Spring Chinook Salmon Program (Reinitiation 2016). National Marine Fisheries Service, West Coast Region, Portland, Oregon.
- NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 2008. Endangered Species Act 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. NMFS Tracking No. 2008/03598, USFWS No. 13410-2008-FWS#F-0209. Lacey, Washington.
- Reclamation (U.S. Bureau of Reclamation). 2010. Technical Memorandum No. 86-68220-07-05: Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, 2010 Edition. Denver, Colorado.
- USFWS (U.S. Fish and Wildlife Service). 2011. Biological Opinion for the operations and maintenance (O&M) of the LNFH and effects on the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat. USFWS Reference No. 13260-2011-F-0048 and 13260-2011-P-0002. Wenatchee, Washington.

This page intentionally left blank.