RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Snow Lake Water Control Structure

Chelan County, Washington

U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia Cascades Area Office
Yakima, Washington

October 2017

U.S. DEPARTMENT OF THE INTERIOR

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian tribes and our commitments to island communities.

MISSION OF THE BUREAU OF RECLAMATION

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.

Cover Photograph: Existing butterfly valve and valve support.

Acronyms and Abbreviations

CCT	Confederated Tribes of the Colville Reservation
Complex	Leavenworth Fisheries Complex
cfs	cubic feet per second
DAHP	Washington Department of Archelogy and Historic Preservation
dB	decibel
EA	Environmental Assessment
ESA	Endangered Species Act
IPID	Icicle and Peshastin Irrigation Districts (IPID)
ITAs	Indian Trust Assets
LNFH	Leavenworth National Fish Hatchery
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
Reclamation	Bureau of Reclamation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
Wilderness Act	Wilderness Act of 1964
Yakama Nation	Confederated Tribes and Bands of the Yakama Nation

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Table of Contents

1 Introduction 1
1.1 History 2
1.2 Ownership 4
1.3 Water Rights 7
1.4 Purpose and Need for Action 7
1.5 Proposed Federal Action 7
1.6 Public Involvement 8
1.7 Legal Authority 8
1.8 Regulatory Compliance 9
1.8.1 National Environmental Policy Act 9
1.8.2 Endangered Species Act (1973) 9
1.8.3 Clean Water Act (33 U.S.C. 1251 et seq.) 9
1.8.4 National Historic Preservation Act of 1966 10
1.8.5 Executive Order 13007: Indian Sacred Sites 10
1.8.6 Secretarial Order 3175: Department Responsibilities for Indian Trust Assets 10
1.8.7 Executive Order 12898: Environmental Justice 11
2 Description of Alternatives 11
2.1 No Action Alternative 11
2.2 Proposed Action –– Water Discharge Control Valve Removal and Replacement 11
2.2.1 Project Construction Details 12
2.2.2 Project Staging 14
2.2.3 Project Design Features and Best Management Practices 18
2.3 Alternatives Considered but Eliminated 21
2.3.1 Use of Foot Traffic 21
2.3.2 Use of Pack Animals 21
2.4 Comparison of Alternatives 23
3 Affected Environment and Environmental Consequences 29
3.1 Cultural and Historical Resources 31

3.1.1 Affected Environment 31
3.1.2 Environmental Consequences 33
3.2 Recreation Values and Uses 34
3.2.1 Affected Environment 34
3.2.2 Environmental Consequences 35
3.3 Water Rights 36
3.3.1 Affected Environment 36
3.3.2 Environmental Consequences 36
3.4 Fish 37
3.4.1 Affected Environment 37
3.4.2 Environmental Consequences 37
3.5 Wildlife 38
3.5.1 Affected Environment 38
3.5.2 Environmental Consequences 40
3.6 Threatened and Endangered Species 41
3.6.1 Affected Environment 41
3.6.2 Environmental Consequences 42
3.7 Environmental Justice 48
3.7.1 Affected Environment 48
3.7.2 Environmental Consequences 49
3.8 Noise 50
3.8.1 Affected Environment 50
3.8.2 Environmental Consequences 53
3.9 Indian Sacred Sites 54
3.9.1 Affected Environment 54
3.9.2 Environmental Consequences 54
3.10 Indian Trust Assets 54
4 Consultation and Coordination 56
4.1 National Historic Preservation Act 56
4.2 Endangered Species Act (1973) Section 7 Consultation 56

4.3 Tribal Coordination and Consultation 57
5 References 59

Table of Figures

Figure 1-1. Overview of Project Area 4
Figure 1-2. Outline of USFWS boundary, proposed campsites and helicopter landing sites 6
Figure 2-1. Existing butterfly valve and valve support (circled in yellow). 13
Figure 2-2. LNFH staging area and helipad. 15
Figure 2-3. Adit Tunnel entrance located to the right of the valve control house (shown at right in left photograph) and Adit Tunnel interior (in right photograph). 16
Figure 2-4. Locations of primary and secondary campsites and helipads located near Snow Lake Water Discharge control valve. 17

Table of Tables

Table 2-1. Summary comparison of alternatives and potential impacts to the affected environment 23
Table 3-1. Resources that were eliminated in the Impact Analysis 30
Table 3-2. List of threatened, endangered, and candidate species protected by the Endangered Species Act found in Chelan County, Washington. 41
Table 3-3. Analysis of environmental consequences of the proposed action on Federal threatened and endangered plant species. 42
Table 3-4. Analysis of environmental consequences of the proposed action on Federal threatened and endangered terrestrial wildlife species 43
Table 3-5. Analysis of environmental consequences of the proposed action on Federal threatened and endangered fish species. 46
Table 3-6. U.S. Census Bureau's 2011-2015 American Community Survey 5 year estimates of population and racial statistics in Chelan County and the State of Washington (U.S. Census Bureau 2017). 49
Table 3-7. U.S. Census Bureau's 2011-2015 American Community Survey 5 year estimates of income and poverty statistics in Chelan County and the State of Washington (U.S. Census Bureau 2017). 49
Table 3-8. Representative outdoor and indoor noise levels. 51

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1 INTRODUCTION

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and state laws and regulations. This EA summarizes a Bureau of Reclamation (Reclamation) and U.S. Fish and Wildlife Service (USFWS) proposal to remove and replace the existing Upper Snow Lake tunnel water discharge control valve with a new valve. The two agencies are co-leads and have identified the following reasons for the valve replacement:

1. The valve has exceeded its service life (Frisz 2014) .
2. Since the valve has exceeded its service life, the valve could malfunction resulting in interrupted water delivery.
3. Replacement of the valve is necessary to meet the terms and conditions of the 2015 National Marine Fisheries Service (NMFS) Biological Opinion Titled: Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation for Leavenworth National Fish Hatchery (LNFH) Spring Chinook Salmon Program (Consultation Number: WCR-2015-00969).

The Upper Snow Lake valve was designed with an estimated service life of 10 years. It has currently been in place for 15 years and needs to be replaced. Due to the significant amount of wear and tear of the existing valve caused by cavitation, simply repairing the valve is not a viable option.

Due to the age and wear of the valve, malfunction may occur which would impede water delivery to Icicle and Peshastin Irrigation Districts (IPID) and LNFH. Valve malfunction may lead to reinitiation of consultation with NMFS as stated in the 2015 NMFS Biological Opinion: "If events such as prolonged equipment malfunction or two or more consecutive years of drought occur, this may alter the lake reservoir release operations. If this occurs, and the USFWS determines it is necessary to alter releases, reinitiation of consultation may be necessary" (Cappellini 2014, pers. comm.).

Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS to ensure their actions are not likely to jeopardize ESA-listed species or adversely modify designated critical habitat.

Term and condition 2b in the 2015 NMFS Biological Opinion states: "From August 1 through September 30, provide up to 50 cubic feet per second (cfs) of supplemental flow from the Snow/Nada Lake Basin Supplementation Water Supply Reservoirs, to ensure access to LNFH's surface water withdrawal and improve instream flow conditions to the extent possible during the irrigation season in cooperation with IPID as described in this opinion." As the above term and condition is non-discretionary, Reclamation and the USFWS must comply with it (50 CFR 402.14).

Without the water release of approximately 50 cfs from the Snow/Nada Lake Supplementation Reservoirs in August and September, the downstream reaches of Icicle Creek could go dry in some years (Skalicky et al. 2013). Installation of the new valve is expected to provide water delivery to LNFH and IPID in August and September. The valve is part of a water supply control feature located on land owned by the USFWS (as discussed in Section 1.2) and surrounded by the Alpine Lakes Wilderness Area (ALWA), in Chelan County, Washington (Figure 1-1 and Figure 1-2). Reclamation and the USFWS have prepared this EA to analyze impacts from the removal and replacement of the valve, including the means to transport materials, equipment, supplies and contract personnel to the remote location.

Precipitation and run-off is stored in Upper and Lower Snow and Nada Lakes. Each lake has a small dam and water control discharge structure. From Upper Snow Lake, water is discharged through the valve from July to October. From the Upper Snow Lake discharge point, the water flows down a steep boulder field into Nada Lake, and then water is released from Nada Lake down Snow Creek, until it joins Icicle Creek (Figure 1-1 and Figure 1-2). If water levels are high in Upper Snow Lake, water will flow over the top of the small dam and into Lower Snow Lake (Figure 1-1 and Figure 1-2).

1.1 History

When Grand Coulee Dam was constructed by Reclamation, the hydrology of the Columbia River was altered and fish passage above the dam was eliminated. Mitigation for the impact of Grand Coulee Dam on fisheries included the construction of Leavenworth Fisheries Complex (Complex). The Complex consists of three National Fish Hatcheries: Leavenworth, Entiat, and Winthrop National Fish Hatcheries. LNFH construction started in 1938 for the purpose of propagating and helping restore native salmon runs in the Columbia River system. Icicle Creek runs adjacent to LNFH and the water from this creek is diverted for salmon holding and rearing ponds. To assure adequate water supply for the Icicle Creek historical channel and LNFH, as well as water for pre-existing irrigation uses, a supplementary water supply, (approximately 16,000 acre-feet) was needed (Reclamation 1941).

In order to fill this need, Reclamation engineered and constructed a small water supply project at Snow and Nada Lakes that would allow USFWS and IPID to capture and store additional runoff. The water supply project included the following:

- Building a trail to Snow and Nada Lakes;
- Constructing small dams across the outlets of Upper Snow, Lower Snow, and Nada Lakes for additional water storage;
- Excavating a tunnel;
- Constructing control works and sumps for debris; and
- Blasting the end of the adit tunnel to tap and convey water from the bottom of Upper Snow Lake.

The construction of the Upper Snow Lake water supply discharge valve is discussed further in Section 2.2. These dams and associated infrastructure allow IPID and the USFWS to capture and store additional runoff during the winter and spring.

The valve and valve control house were replaced in 2001 by USFWS using helicopters to transport materials, equipment, supplies and contractors. The existing valve has exceeded its expected 10 year service life and cannot meet the combined discharge capacity (80 cfs) needed by the IPID and LNFH in the late summer.

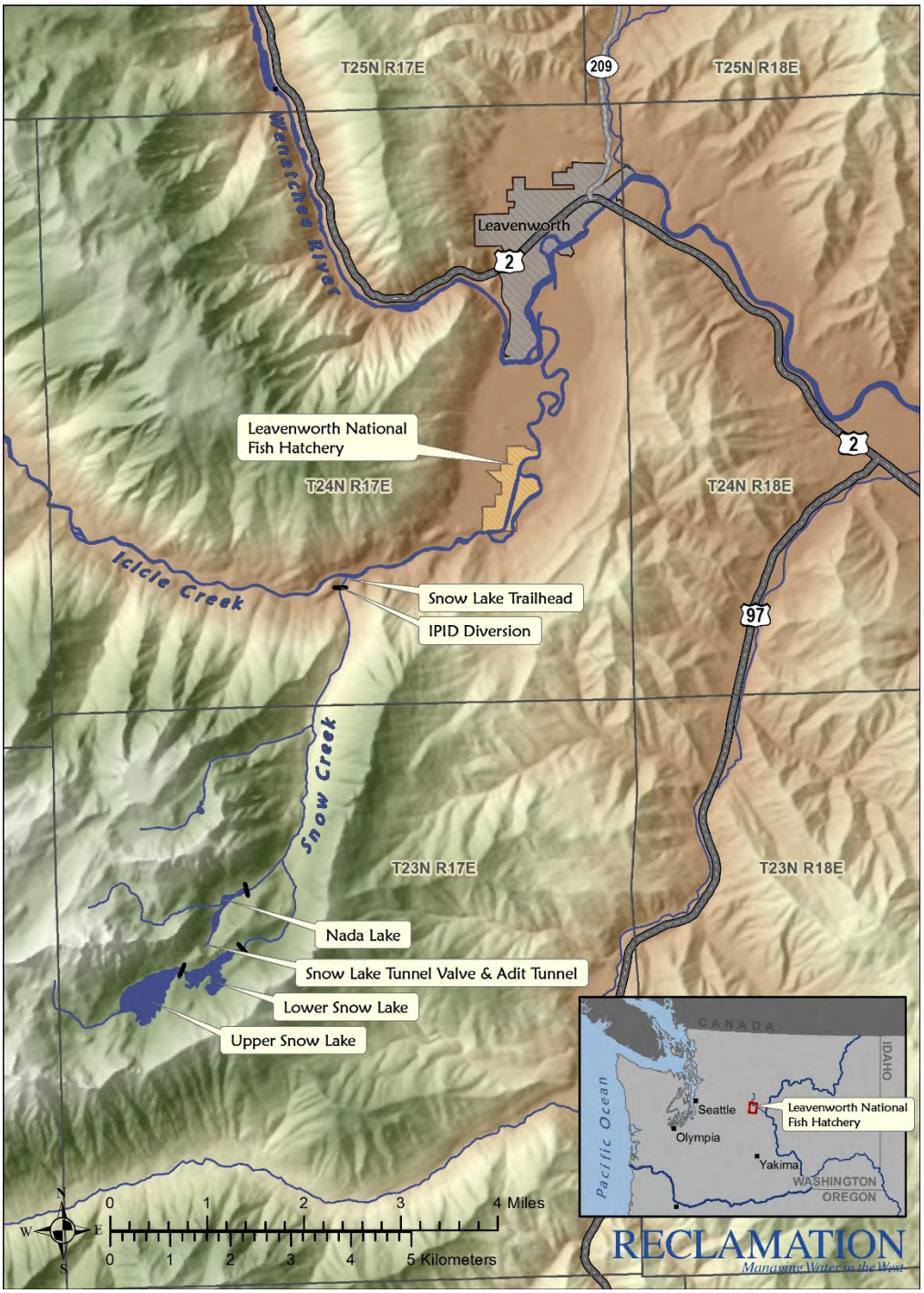

Figure 1-1. Overview of Project Area

1.2 Ownership

Lands associated with the project area have a combination of ownership. The earliest land easement was in 1930 when IPID acquired an easement from the State of Washington to

overflow the bed and shores of Snow Lake. The easement was a part of the water rights filing process discussed in Sections 1.3 and 3.3.

In 1939, Reclamation acquired portions of Section 17 and 19, Township 23 North, Range 17 East, Willamette Meridian adjacent to Snow and Nada Lakes. In 1930, IPID acquired an easement from the State of Washington to overflow the bed and shores of Snow Lake. That easement was transferred to Reclamation in 1941, and then to USFWS in 1949. Ownership of these properties was never transferred to the U.S. Forest Service (USFS). However, the USFS owns lands adjacent to the shoreline of Upper and Lower Snow Lakes located in Section 18 and 20 of Township 23 North, Range 17, East Willamette Meridian. The USFWS owns approximately 1,084 acres including Upper Snow, Lower Snow, and Nada Lakes. The proposed action would occur entirely within the USFWS boundary as shown in Figure 1-2.

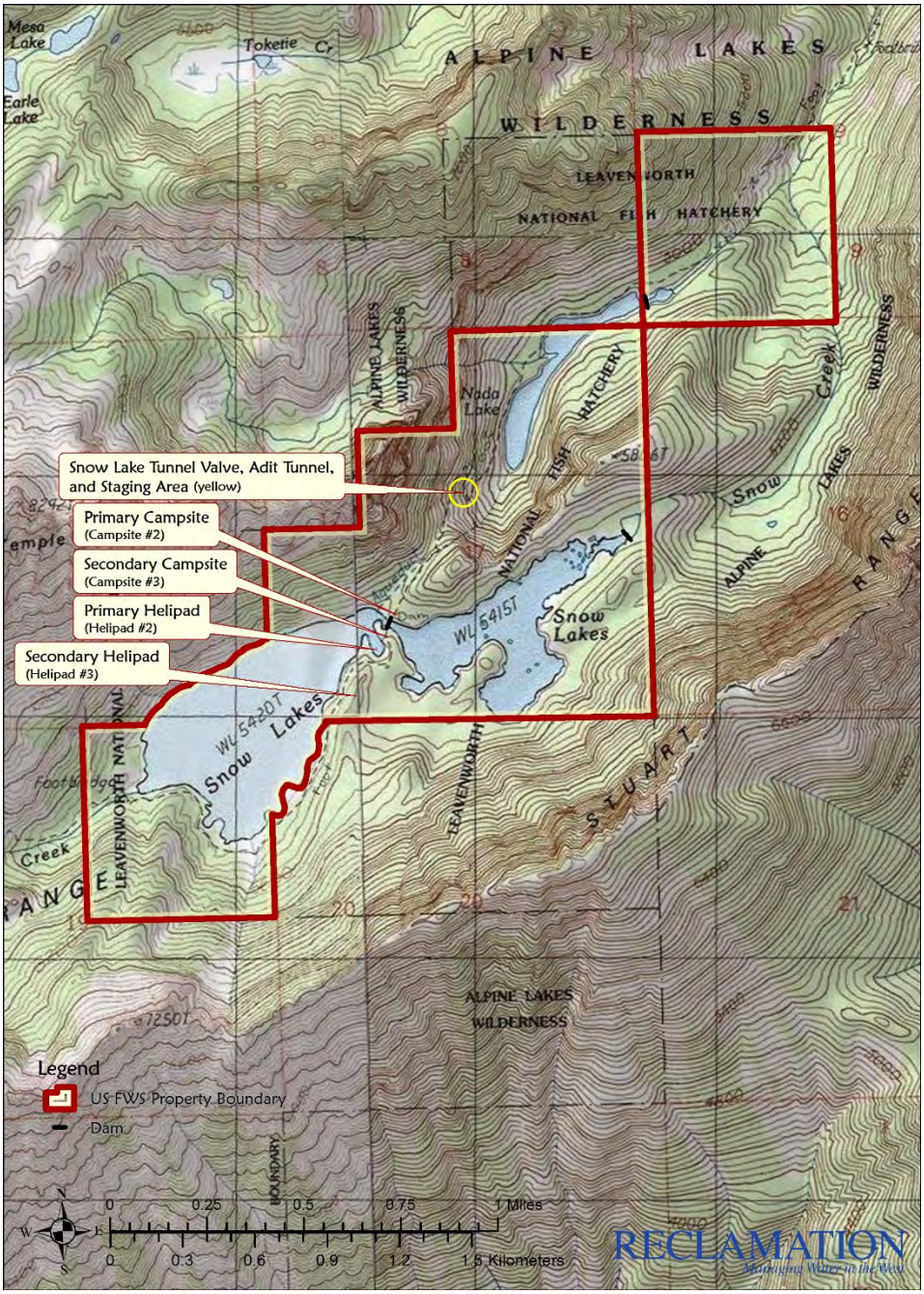

Figure 1-2. Outline of USFWS boundary, proposed campsites and helicopter landing sites.

The Alpine Lakes Wilderness Area, managed by the U.S. Forest Service, was authorized by Congress in 1976 and, as previously mentioned, the USFWS lands containing Snow and Nada Lakes are surrounded by this wilderness area. As shown in Figure 1-2 (red outline), the USFWS lands are completely surrounded by ALWA, but are not a part of ALWA. LNFH retains the right to operate and maintain the water control structures, as they have done since 1940 (WDOE 2017).

1.3 Water Rights

In 1941, a Water Supply Contract was filed between Icicle Irrigation District, Peshastin Irrigation District, and the United States of America (Reclamation) (Reclamation 1941) for water supply from Snow and Nada Lakes. The two districts are operated jointly and are collectively known as the Icicle Peshastin Irrigation District. The 1941 contract is discussed further in Section 3.3.

1.4 Purpose and Need for Action

The proposed action is to remove the existing Upper Snow Lake tunnel water discharge control valve and replace it with a new valve. The Proposed Action is needed to satisfy the following:

1. The valve has exceeded its service life.
2. Since the valve has exceeded its service life, the valve could malfunction resulting in interrupted water delivery.
3. Replacement of the valve is necessary to meet term and condition 2b of the 2015 NMFS Biological Opinion. In the late summer and fall when cool, high quality water is necessary for fish, the existing valve cannot meet the 80 cfs discharge capacity needed by IPID and LNFH. The proposed action would ensure a reliable water source when both parties request water at the same time.

1.5 Proposed Federal Action

Under the proposed action, Reclamation and the USFWS would design, fund, and replace the Upper Snow Lake tunnel water discharge control valve. The new valve would be a knife valve that provides the following design benefits that were not incorporated into the existing valve: a newer more robust design; an extended service life of 50 years; and a larger size to accommodate an increased discharge rate. As previously stated, the new valve has exceeded its service life and could malfunction resulting in interrupted water delivery. This water delivery is necessary to meet the term and condition 2b of the 2015 NMFS Biological Opinion. The new valve would be designed to increase instream flows to Icicle Creek and meet the discharge rate needed in late summer for LNFH operations and IPID irrigation deliveries. The proposed knife valve replacement would allow for the necessary release of up to 80 cfs.

The Federal Action involves essentially routine operations and maintenance activities. However, the site access presents a unique challenge because the location is remote and is adjacent to a wilderness area where certain means of transportation are restricted. Due to these challenges, a limited range of alternatives were developed, and can be found in Section 2.

1.6 Public Involvement

Scoping is an early and open process used to obtain information that helps identify issues and concerns related to a proposed action, the affected public and geographical area, alternatives, and constraints in the NEPA process.

Scoping for this project was initiated in the Icicle Work Group meetings as part of the State Environmental Policy Act document. Chelan County and Washington Department of Ecology's (WDOE) Office of Columbia River co-convened the Icicle Work Group in December 2012 to find collaborative solutions for water management within the Icicle Creek Watershed. The Icicle Work Group is made up of a diverse set of stakeholders representing local, state and federal agencies, tribes, irrigation and agricultural interests and environmental organizations.

Chelan County and WDOE are initiating preparation of a Programmatic Environmental Impact Statement for the Icicle Strategy. This is being prepared in accordance with the State Environmental Policy Act and will include evaluating the proposal for probable significant adverse impacts, alternative ways to meet adopted guiding principles, mitigation measures, and permit approvals.

The Snow Lake valve replacement was one of the projects included in the Programmatic Environmental Impact Statement for the Icicle Strategy. As such, scoping for that project allowed for comments to be collected regarding this proposed action and helped inform this document.

The Icicle Work Group held a Public Open House on Wednesday, April 20, 2016, and there was a public comment period that ended May 11, 2016. The comments can be viewed on the comment summary report found here: http://www.co.chelan.wa.us/natural-resources/pages/icicle-strategy-sepa-comments.

The draft EA will be made available on the Reclamation and USFWS websites for public review, and a public comment period will take place for 15 days. Reclamation will mail and/or email letters to Federal, state, local agencies, elected officials, Indian tribes, and interest groups notifying them that the EA will be available for public comment in October 2017. In addition, Reclamation will provide a joint news release to media that announces the 15 day public comment period on the draft EA.

1.7 Legal Authority

Funding for the Leavenworth Fisheries Complex (consisting of the Leavenworth, Entiat, and Winthrop National Fish Hatcheries) is provided under authority of P.L. 76-826 (Oct. 9, 1940) and Section 2(c) of the August 12, 1958 amendments to the Fish and Wildlife Coordination Act (P.L. 85-624). The former provides authorizes hatcheries to be built as part of fish protection program for the Grand Coulee Dam project. This latter provides that Federal agencies authorized to construct or operate water control projects, are authorized to modify

or add to the structures and operation of such projects, if the construction has not been substantially completed on the date of enactment of the FWCA. 16 USC §2(c) Section 2(g) of FWCA defines substantially complete at 60 percent of the estimated construction costs having been obligated at time of enactment of FWCA. In 1980, the U.S. District Court for the Eastern District of Washington, held that the Columbia Basin Project was not 60 percent completed at the time of the enactment of P.L. 85-624.

1.8 Regulatory Compliance

Various laws, executive orders, and secretarial orders apply to the Proposed Action and are summarized below. The legal and regulatory environment within which the Federal activity would be conducted depends on which alternative is implemented.

1.8.1 National Environmental Policy Act

The National Environmental Policy Act requires that the action agency use a public disclosure process to determine whether there are any environmental impacts associated with proposed Federal actions. If there are significant impacts to the human environment, then Reclamation and the USFWS must prepare an environmental impact statement. If there are no significant environmental impacts, Reclamation and the USFWS can sign a Finding of No Significant Impacts to complete the NEPA compliance.

1.8.2 Endangered Species Act (1973)

The Endangered Species Act requires all Federal agencies to ensure that their actions do not jeopardize the continued existence of species on the threatened and endangered species list, or destroy or adversely modify their critical habitat. As part of the ESA's Section 7 process, an agency must request information from the USFWS and NMFS on whether any threatened and endangered species occur within or near the action area. The action agency then must evaluate impacts to those species. If the action might affect any listed species, the action agency must consult with the USFWS or NMFS.

1.8.3 Clean Water Act (33 U.S.C. 1251 et seq.)

Section 402 of the Clean Water Act requires that all construction sites on an acre or greater of land, as well as municipal, industrial and commercial facilities discharging wastewater or storm water directly from a point source (a pipe, ditch or channel) into a surface water of the United States (a lake, river, and/or ocean) must obtain permission under the National Pollutant Discharge Elimination System (NPDES) permit. All NPDES permits are written to ensure the Nations receiving waters will achieve specified Water Quality Standards (WQS). The proposed project is under one acre, and there would be no wastewater or storm water discharged through the pipe.

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in

waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities). This proposed project would not require the discharge of dredged or fill material in waters of the United States, including wetlands.

1.8.4 National Historic Preservation Act of 1966

Section 106 of the National Historic Preservation Act (NHPA), as amended, requires that Federal agencies consider the effects that their projects have on properties eligible for, or are already on, the National Register of Historic Places. The 36 CFR 800 regulations provide procedures that Federal agencies must follow to comply with the NHPA. For any undertaking, Federal agencies must determine if there are properties of National Register quality in the project area, the effects of the project on any such properties, and the appropriate mitigation for adverse effects. In making these determinations, Federal agencies are required to consult with State Historic Preservation Officers, Native American tribes with a traditional or culturally significant religious interest in the study area, interested public, and, in certain cases, the Advisory Council on Historic Preservation.

1.8.5 Executive Order 13007: Indian Sacred Sites

Executive Order 13007, dated May 24, 1996, instructs Federal agencies to promote accommodation of access to and protect the physical integrity of American Indian sacred sites. A sacred site is a specific, discrete, and narrowly delineated location on Federal land. An Indian tribe or an Indian individual determined to be an appropriately authoritative representative of an Indian religion must identify a site as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion. However, this only applies if the tribe or authoritative representative has informed the agency of the existence of such a site.

1.8.6 Secretarial Order 3175: Department Responsibilities for Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States (with the Secretary of the Interior acting as trustee) for Indian tribes or Indian individuals. Examples of ITAs are lands, minerals, hunting and fishing rights, and water rights. In many cases, ITAs are on-reservation; however, they may also be found off-reservation.

The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to Indian tribes or Indian individuals by treaties, statutes, and executive orders. These rights are sometimes further interpreted through court decisions and regulations. This trust responsibility requires that officials from Federal agencies, including Reclamation and

the USFWS, take all actions reasonably necessary to protect ITAs when administering programs under their control.

1.8.7 Executive Order 12898: Environmental Justice

Executive Order 12898, dated February 11, 1994, instructs Federal agencies, to the greatest extent practicable and permitted by law, to make achieving environmental justice part of its mission by addressing, as appropriate, disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. Environmental justice means the fair treatment of people of all races, income, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no person or group of people should shoulder a disproportionate share of negative environmental impacts resulting from the execution of environmental programs.

2 DESCRIPTION OF ALTERNATIVES

The decision to be made involves two actions: a proposed action (with two alternatives) and no action. The proposed action is for the removal and replacement of the water discharge control valve using helicopter round trip flights. Alternative 2 of the proposed action uses up to 30 helicopter round trip flights and Alternative 3 uses up to 15 helicopter round trip flights. Other alternative methods to access and perform the work were considered but eliminated, and are discussed in Section 2.3.

2.1 No Action Alternative

Under the No Action Alternative, USFWS would continue to operate the Upper Snow Lake valve as has been done in the past. Reclamation and the USFWS would not design, fund, or replace the valve at Upper Snow Lake. The current valve would continue to operate past its expected service life and, as such, the valve could malfunction. The potential for valve malfunction may impede water delivery to IPID and LNFH. If the valve were to malfunction, the guard gate would be closed so no water would be released through the Upper Snow Lake valve. Further, the term and condition 2b of the 2015 NMFS Biological Opinion would not be met. In particular, discharge would remain limited to approximately 50 cfs, which may restrict the amount of water to be withdrawn by the LNFH due to IPID senior water rights.

2.2 Proposed Action –– Water Discharge Control Valve Removal and Replacement

The proposed action would remove and replace the existing outdated butterfly water discharge control valve at Upper Snow Lake with a knife valve. Helicopters would be used to stage equipment prior to construction and would be used during construction to transport contract personnel, equipment, and supplies to the site during the valve replacement project.

Under the proposed action, the current valve would be replaced with a new valve with a 50 year service life. This would reduce the possibility of malfunction and help to ensure reliable water delivery to IPID and LNFH. Further, valve replacement is the central step in achieving compliance with term and condition 2b of the 2015 NMFS Biological Opinion by allowing up to 80 cfs of discharge from the new valve. This would allow senior and junior water users simultaneous access to water from Snow and Nada Lakes.

Alternative 2: Water Discharge Control Valve Removal and Replacement with up to 30 Helicopter Flights

In this alternative, helicopter trips between LNFH and the helicopter landing site at the project location would be restricted to 30 round trip flights over the 7 to 21 day span of the project. Allowing 30 round trip flights during the project would provide contractors the most flexibility in scheduling and performing the work. Crews could be flown in and out daily which would likely eliminate the need for construction crews to camp on USFWS land that is surrounded by ALWA.

However, it is possible that this alternative would require the contractor to have a base camp and some crew camping on USFWS land that is surrounded by ALWA. Thirty round trip flights may provide for better efficiency and quicker completion of the project as the contractor would be able to return to the base to address unforeseen supply, equipment and personnel issues, and resolve them quicker than having to wait until the next scheduled flight.

Alternative 3: Water Discharge Control Valve Removal and Replacement with up to 15 Helicopter Flights

In this alternative, helicopter trips between LNFH and the helicopter landing site at the project location would be restricted to 15 round trip flights over the 7 to 21 day span of the project. Under this alternative, a contractor would have to adhere to a strict flight schedule to ensure that the staging, work and debris clean up could be completed with no more than 15 round trip flights. This alternative would likely require that the contractor have a base camp and crew camping on USFWS land that is surrounded by ALWA. Unplanned round trip flights for incidentals would not be possible. Also, if an unforeseen situation arises, project delays could occur because of the need to wait for the next scheduled flight.

2.2.1 Project Construction Details

The knife valve replacement would occur at the Upper Snow Lake outlet (Figure 1-1 and Figure 1-2). The knife valve weighs approximately 1,300 pounds. Due to the weight of the valve and accessibility to the project site, access would be helicopter based. Campsite Number 2 and Helipad Number 2 (Figure 1-2 and Figure 2-4) have been identified as the primary sites that would be used for the project. All construction activities would occur away from and outside of Upper Snow Lake.

As previously mentioned, the period of work is anticipated at 7 to 21 days. This would include staging, construction, and demobilization. Staging of construction materials and equipment may occur prior to the valve shut off date in early October (the end of irrigation season) at the three staging locations discussed in Section 2.2.2. Once staging has been completed, the existing butterfly valve would be removed using power tools, chains, hand wrenches, and come-alongs and then flown out from the site. The existing valve support made of concrete and wood may also be removed and/or replaced as needed (Figure 2-1). The new valve would then be flown in on a helicopter tether; lowered to the Upper Snow Lake outlet; and installed using power tools, chains, hand wrenches and come-alongs. Once installation is completed, demobilization would occur and crew, equipment, and scrap metal and debris would be flown out.

Figure 2-1. Existing butterfly valve and valve support (circled in yellow).

Construction Schedule

Construction is proposed to begin after irrigation withdrawals are suspended for the season, typically in early October. The 7 to 21 day construction period could continue until mid-November, or until access became limited due to winter weather conditions.

The following construction tasks would be completed following the estimated 7 to 21 day time frame:

1. Mid- to late September, stage equipment in staging areas at LNFH, Upper Snow Lake Outlet, and Adit Tunnel.
2. Prior to construction, set-up medical emergency shelter at Upper Snow Lake outlet.
3. Remove and replace existing butterfly water discharge control valve.
4. Add air release valve.
5. After the pipe and knife valve are installed, the valve would be tested.
6. When completed, the contractor would remove construction materials, equipment, and debris from the site.

2.2.2 Project Staging

The valve replacement would occur in a single phase once the existing water discharge control valve is turned off. The staging, landing, and loading areas would be located at LNFH and on lands owned by the USFWS around the Upper Snow Lake Outlet and Adit Tunnel (Figure 1-2 and Figure 2-2).

The LNFH is approximately a 7 minute helicopter flight from the Upper Snow Lake valve project site. Due to the remote location of the construction site, a medical/emergency shelter would be located near the Upper Snow Lake Outlet where construction would occur. Materials being staged at LNFH would be transported by truck on state highways and county roads to the LNFH. An existing helicopter pad located at LNFH would be used for helicopter take off and landings. A helicopter would transport supplies, equipment, and contractors from LNFH to the Upper Snow Lake Outlet and Adit Tunnel staging areas. The Adit Tunnel (Figure 2-3) has locks and the contractor could use it to securely store materials and equipment prior to the start of construction.

Snow Lake Campsite and Helipad Number 2 are the primary sites that would be used by the contractor (Figure 1-2 and Figure 2-4). Campsite and Helipad Number 3 are secondary sites in the event of an emergency, or if the primary sites are not available for unforeseeable reasons. The contractor would use an existing campsite and pit toilets located on USFWS land in the area of the work site (Figure 1-2 and Figure 2-4). The contractor would be granted an administrative permit by the USFS to camp on their lands. Access to the work site from the proposed campsite is wholly contained within USFWS land. The distance from the proposed contractor campsite to the construction site ranges from 0.4 to 0.6 miles.

Figure 2-2. LNFH staging area and helipad.

Figure 2-3. Adit Tunnel entrance located to the right of the valve control house (shown at right in left photograph) and Adit Tunnel interior (in right photograph).

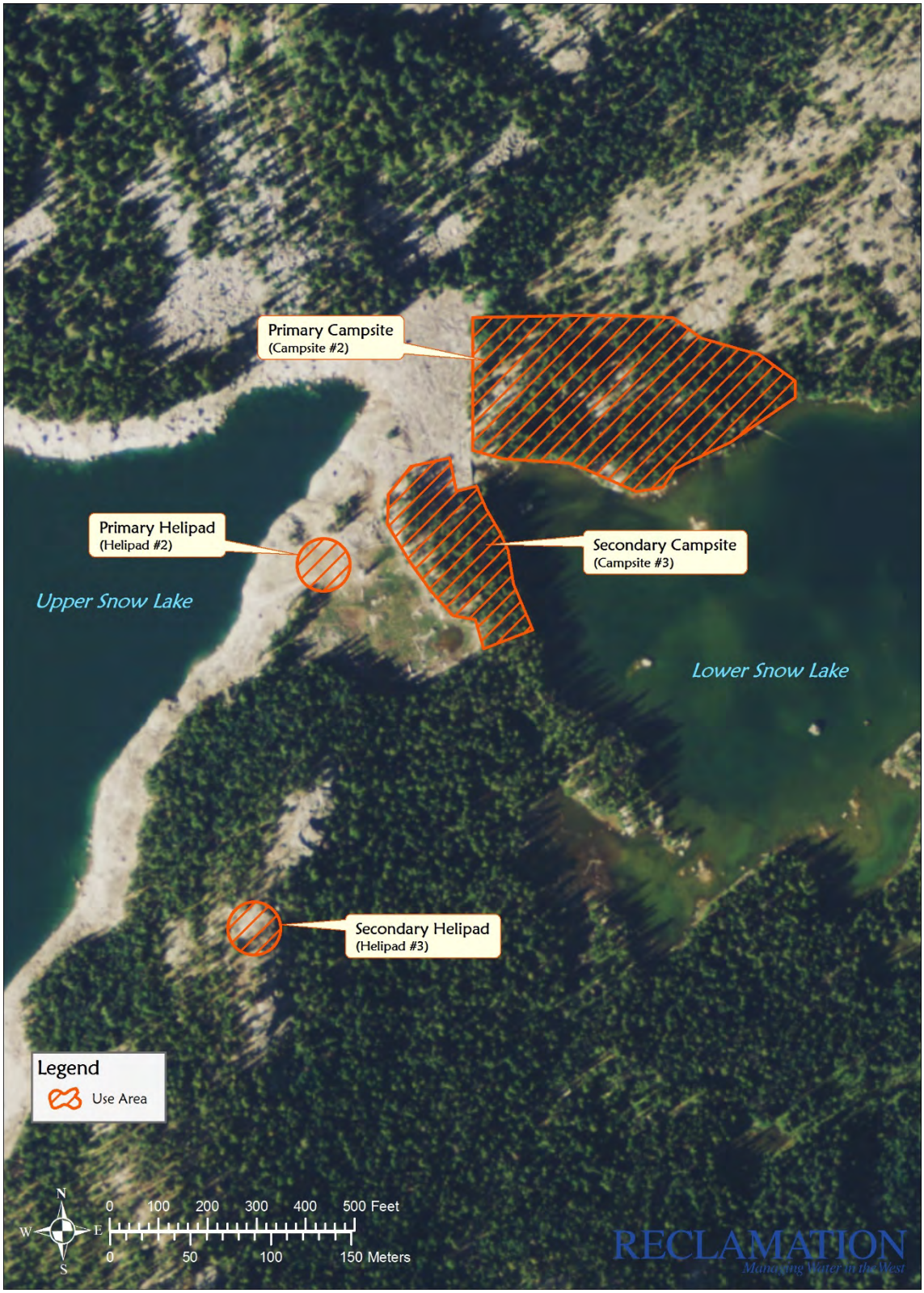

Figure 2-4. Locations of primary and secondary campsites and helipads located near Snow Lake Water Discharge control valve.

2.2.3 Project Design Features and Best Management Practices

Best Management Practices would be implemented by the contractor to reduce the potential for impacts to the human and natural environment. Further detail on control methods would be delineated in the construction specifications. The contractor must review and comply with all applicable safety and health regulations to ensure a comprehensive safety plan. For instance, contractors must follow Reclamation's Safety and Health Standards 2014 Edition (Reclamation 2014).

Dust Control

Dust control caused by helicopter takeoffs and landings could be an issue at LNFH and potentially when landing on the dry bed of Upper Snow Lake. The contractor would be required to employ methods and use equipment and materials that would prevent fugitive dust or damage to persons, property, or activities throughout the project.

Air Quality

Currently the state of Washington does not have any non-attainment areas (EPA 2017). The following air quality control measures would be taken during the proposed project:

- Due to the short-term construction and limited equipment of the project, best management practices would be followed.
- Reasonably available methods and devices would be used to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.
- Equipment and vehicles that have excessive exhaust gas emissions would not be operated until corrective repairs or adjustments reduce such emissions to acceptable levels.

Noise Control

The following noise control measures would be taken during the proposed project:

- Noise levels of 100 decibels, as measured at noise-sensitive areas such as residences and campsites when using a helicopter, would not be exceeded during the hours of 7:00 a.m. to 7:00 p.m. (daytime) (INC 2017). Noise levels of 65 decibels would not be exceeded during the hours of 7:00 p.m. to 7:00 a.m. (nighttime) since no helicopter would be used.
- Construction activities would only be allowed during the hours of 7:00 a.m. to 7:00 p.m.
- Specialty mufflers may be required for continuously running generators, pumps, and/or other stationary equipment to meet the decibel requirements above.

Invasive Species Control

Contractors would be required to ensure that all equipment entering the project and staging areas be free of noxious weeds, invasive species, and their propagules, in accordance with State of Washington law. This includes aquatic and terrestrial (i.e., land-dwelling) species.

Water Pollution Controls

Pollutants would be controlled through the use of sediment and erosion controls, wastewater and storm water management controls, construction site management practices, and other controls, including state and local control requirements. All controls would be implemented in a manner that does not disturb, excavate, or penetrate native soil.

The following construction site and petroleum storage tanks management measures would be taken during the proposed project:

Construction Site Management

- Construction activities would be performed by methods that would prevent entrance or accidental spillage of solid matter, contaminants, debris, or other pollutants or wastes into the LNFH and Snow Creek.
- Food Storage should follow wilderness best management practices to avoid conflicts with wildlife (NPS 2017).
- The contractor is responsible for following the Wilderness Human Waste Disposal Protocol (NPS 2014). Improper disposal of human waste can cause water pollution, harm wildlife and fish, and affect the wilderness experience of others. The contractor must use the closest pit toilet to the work site. In the event that a toilet is not available, the contractor must use the following best management practices for human waste:
    - To be able to dispose of waste properly, bring the necessary and appropriate tools and equipment, such as a spade, small trowel, waste disposal bag, or portable toilet.
    - Never leave waste or toilet paper exposed on the ground.

Petroleum Product Storage Tanks Management

- A petroleum product storage containment plan would be implemented that includes provisions for double-wall tanks, plastic lining, closed-top containers, containment walls, or other measures for containment of mobile equipment fuels and liquids at the hatchery and at Snow Lake Tunnel.
- If mobile equipment would be parked at any location on the project site, drip pans would be placed under motors or engines to catch any drips or leaks from engine casings.

- Spill containment kits would be readily available in areas where liquids, petroleum, oils, and/or lubricants would be stored, either on land sites or on the watercraft being used in the project.
- Spark arresters would be used to prevent emission of flammable debris from combustion sources.

Use of Helicopter

The following control measures would be taken in regards to the use of a helicopter during the proposed project:

- Operators and aircraft would be licensed and would comply with the applicable requirements of the Federal Aviation Administration and the U.S. Department of the Interior's Office of Aviation Services' "Handling Loads Suspended from Rotorcraft" (ASME/ANSI B30.12) requirements.
- Before each day's operation, the contractor would be required to conduct a briefing for pilots and ground personnel and discuss the plan of operation in detail.
- The contractor would be required to follow Reclamation's Helicopter Operations Safety and Health Standards Chapter 19.25 in Reclamation's Safety and Health Standards 2014 Edition (Reclamation 2014).
- The contractor would be required to avoid flying over residences and structures.

Remote Work Location Safety

The following remote work location safety precautions would be taken during the proposed project:

- Emergency medical services would be readily available for employees and employees would know how and where to access the services or supplies as described in Reclamation's Safety and Health Standards 2014 Edition (Reclamation 2014).
- The work areas would be posted and fenced to keep the public away from project related activities (see Table 3-1 Public Health and Safety).
- Employees would be adequately trained to render first aid and cardiopulmonary resuscitation (CPR). Adequate first aid supplies would be provided to address medical emergencies.
- Reliable means of communication would be provided to contact emergency medical facilities. Specific guidance would be provided on actions to take when a medical emergency occurs. Emergency numbers would be posted in a visible and highly trafficked area.

2.3 Alternatives Considered but Eliminated

2.3.1 Use of Foot Traffic

The use of foot traffic to transport materials to the project site was considered. However, this option was eliminated as a feasible option because the valve weighs approximately 1,300 pounds and cannot be disassembled into smaller pieces to transport to the project site. In addition, the trail to the project site is through the wilderness and would need a significant amount of reconstruction to haul heavy, wide equipment up the steep, rugged terrain.

2.3.2 Use of Pack Animals

The use of pack animals to transport materials to the project site was considered. However, the USFS has stated that pack animals are not permitted and the trail is impassible due to recent landslides (Schuur 2017)

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2.4 Comparison of Alternatives

Table 2-1. Summary comparison of alternatives and potential impacts to the affected environment

	Alternative 2: 30 round trip helicopter flights	Alternative 3: 15 round trip helicopter flights	No Action
Historical Resources	No Adverse Effect. Replacement is of a valve that was installed in 2001. No contributing features, structures, or buildings of the LNFH historic district would be impacted by the proposed action.	No Adverse Effect. Replacement is of a valve that was installed in 2001. No contributing features, structures, or buildings of the LNFH historic district would be impacted by the proposed action.	No Effect
Water Rights	No Effect	No Effect	No Effect
Fisheries	Most of the work would occur in upland areas. Some limited staging would occur within the lake shorelines, but it would be within the dry areas on the lake margins when the lakes are drawn down at the end of the summer (for example, see Helipad 2 on Figure 2-4). Construction is not anticipated to result in water quality impacts and; therefore, it would not be expected to affect fish or aquatic invertebrates.	Most of the work would occur in upland areas. Some limited staging would occur within the lake shorelines, but it would be within the dry areas on the lake margins when the lakes are drawn down at the end of the summer (for example, see Helipad 2 on Figure 2-4). Construction is not anticipated to result in water quality impacts and; therefore, it would not be expected to affect fish or aquatic invertebrates.	Under the No Action Alternative, the valve would continue to operate at 50 cfs and the term and condition 2b of the 2015 NMFS Biological Opinion may not be met due to IPID senior water rights. If the valve were to malfunction, the guard gate would be closed so no water would be released through the Upper Snow Lake valve. Valve malfunction may impede water delivery to IPID and LNFH. Under either of the above scenarios, no effects to recreational fisheries are anticipated in Snow Lake.

	Alternative 2: 30 round trip helicopter flights	Alternative 3: 15 round trip helicopter flights	No Action
Wildlife	Wildlife would likely be exposed to some short-term increases in noise during construction. Wildlife species are expected to disperse to adjacent habitat areas to avoid impacts. Neither vulnerable species nor those with seasonal breeding or juvenile dispersal considerations are likely to be adversely affected due to the timing of the proposed construction activity. Under this alternative, a contractor base camp and crew camping may occur. Frequent recreation takes place in this area on lands owned by USFWS and in the adjacent ALWA. Therefore, impacts to wildlife from camping are expected to be minimal.	Wildlife would likely be exposed to some short-term increases in noise during construction. Wildlife species are expected to disperse to adjacent habitat areas to avoid impacts. Neither vulnerable species nor those with seasonal breeding or juvenile dispersal considerations are likely to be adversely affected due to the timing of the proposed construction activity. Under this alternative, project associated disturbance to wildlife could be reduced compared to Alternative 2 due to less helicopter flights. A contractor base camp and crew camping may occur. Frequent recreation takes place in this area on lands owned by USFWS and in the adjacent ALWA. Therefore, impacts to wildlife from camping are expected to be minimal.	Under the No Action Alternative, the valve would continue to operate at 50 cfs and the term and condition 2b of the 2015 NMFS Biological Opinion may not be met due to IPID senior water rights. If the valve were to malfunction, the guard gate would be closed and no water would be released through the Upper Snow Lake valve. Valve malfunction may impede water delivery to IPID and LNFH. Under either of the above scenarios, no effects to wildlife are anticipated.

	Alternative 2: 30 round trip helicopter flights	Alternative 3: 15 round trip helicopter flights	No Action
Threatened and Endangered Species	Under this alternative, no significant impacts would occur to any of the threatened and endangered species listed in Table 3-2 (see Table 3-3 to Table 3-5, Analysis of Environmental Consequences for more detail). This is due to breeding dispersal, the absence of critical habitat in the project area, and existing recreational use of the project area and adjacent ALWA which make it unlikely that individuals of the species would be present.	Under this alternative, no significant impacts would occur to any of the threatened and endangered species listed in Table 3-2 (see Table 3-3 to Table 3-5, Analysis of Environmental Consequences for more detail). This is due to breeding dispersal, the absence of critical habitat in the project area, and existing recreational use of the project area and adjacent ALWA which make it unlikely that individuals of the species would be present.	Under the No Action Alternative, the valve would continue to operate at 50 cfs and the term and condition 2b of the 2015 NMFS Biological Opinion may not be met due to IPID senior water rights. If the valve were to malfunction, the guard gate would be closed so no water would be released through the Upper Snow Lake valve. Valve malfunction may impede water delivery to IPID and LNFH. Under current operation, no effects are anticipated to threatened and endangered species. However, if the valve were to malfunction, it could potentially compromise Endangered Species Act listed species and critical habitat due to increased temperatures and loss of cool supplemental water in Icicle Creek.
Noise	Under this alternative, short-term noise impacts would occur due to construction activities and up to 30 round trip helicopter flights. Effects would be mitigated using Best Management Practices as described in Section 2.2.3, to include use of specialty mufflers and construction activities limited to daylight hours of 7:00 am to 7:00 pm. Further, potential camping during the	Under this alternative, short-term noise impacts would occur due to construction activities and up to 15 round trip helicopter flights. Effects would be mitigated using Best Management Practices as described in Section 2.2.3, to include use of specialty mufflers and construction activities limited to daylight hours of 7:00 am to 7:00 pm. Further, the allowable round trip flights would be	No Effect

	Alternative 2: 30 round trip helicopter flights	Alternative 3: 15 round trip helicopter flights	No Action
	construction window could add to night time noise levels of less than 65 decibels.	reduced by half. However, permanent camping during the construction window could add to night time noise levels of less than 65 decibels.	
Recreation Values and Uses	Under this alternative, the proposed action would temporarily diminish the quality of the primitive setting by competing with the sights and sounds of the natural world due to the use of up to 30 round trip helicopter flights. Temporary impacts would also occur from replacement activities that would disturb the solitary experiences of passersby during the construction period. In addition, a potential contractor base camp and crew camping may displace some visitors. However, the impacts to recreational visitors within the Snow Lake Area are expected to be negligible as the heavy vegetation and rugged environment of the area would muffle noise over relatively short distances and screen visitors from the majority of the activity. The impacts would be short-term in nature	Under this alternative, the proposed action would temporarily diminish the quality of the primitive setting by competing with the sights and sounds of the natural world due to the use of up to 15 round trip helicopter flights. Temporary impacts would also occur from replacement activities that would disturb the solitary experiences of passersby during the construction period. In addition, a contractor base camp and crew camping may displace some visitors. However, the impacts to recreational visitors within the Snow Lake Area are expected to be negligible as the heavy vegetation and rugged environment of the area would muffle noise over relatively short distances and screen visitors from the majority of the activity. The impacts would be short-term in nature.	No Effect
Cultural Resources	No potential to cause effects to archaeological or traditional cultural resources. All activities are in areas of prior disturbance.	No potential to cause effects to archaeological or traditional cultural resources. All activities are in areas of prior disturbance.	No Effect

	Alternative 2: **30 round trip helicopter flights**	**Alternative 3:** **15 round trip helicopter flights**	**No Action**
Sacred Sites	No Effect. No sacred sites identified in project area.	No Effect. No sacred sites identified in project area.	No Effect
Indian Trust Assets	No Effect	No Effect	No Effect
Environmental Justice	No Effect	No Effect	No Effect

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3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes existing physical, biological, natural, social, and cultural resources that could be affected by the action and identifies potential impacts, beneficial or adverse, to those resources that could result from the two actions: Proposed Action (two alternatives) and No Action.

The Affected Environment section describes the existing environment upon which the alternatives could have an effect, and the Environmental Consequences section describes the potential direct and indirect effects of those alternatives, if implemented, on the resources evaluated. This EA also discusses cumulative effects, which are effects that may result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects will only be addressed for those resources where direct or indirect effects would be realized.

The No Action Alternative describes the conditions of a specific resource if Reclamation and the USFWS take no action and provides the basis to compare the action alternative.

Preliminary analysis indicated that the valve replacement project has no potential impact to certain resources in Table 2-1. Resources that may experience non-significant impacts can be found beginning on Table 3-1. Resources or uses that may be affected by the No Action Alternative or the Proposed Action are analyzed in the remainder of this chapter.

Table 3-1. Resources that were eliminated in the Impact Analysis

Resource	Rationale For Elimination
Air Quality	There would be a slight increase in exhaust emissions from helicopter staging and worker transport. Proper maintenance of equipment would prevent any increase in regulated air-quality parameters over established limits. Best Management Practices implemented as part of the project would avoid measurable air quality impacts. Examples of appropriate Best Management Practices include dust suppression during construction, maintaining construction equipment exhaust emission controls according to manufacturer's instructions, and reducing emissions through carpooling of workers.
Climate Change	The Proposed Action would be short in duration and its impact on climate change would not be measurable. However, the Proposed Action may lead to possible mitigation for the impacts of climate change on stream temperatures. If Snow and Icicle Creeks have experienced elevated stream temperatures during summer and fall low flow conditions as a result of climate change, they could benefit from a greater discharge rate of cool water in the lower summer and fall flows.
Energy	Energy supplies would not be impacted by the alternatives. Therefore, energy use is not addressed further in this EA.
Hazardous Materials and Waste	No hazardous contamination conditions are known to exist within the project and staging areas. Hazardous materials such as petroleum are discussed in Section 2.2.3 above and would be mitigated through Best Management Practices. Therefore, hazardous materials and wastes are not addressed in this EA.
Wetlands	There are no wetlands in the project area and therefore wetlands will not be addressed in this EA.
Infrastructure	Infrastructure changes would be minimal (i.e. valve and pipe replacement); therefore, infrastructure is not addressed further in this EA.
Land Use	Land use would not change under either alternative or with implementation of the related actions; therefore, land use is not addressed further in this EA.
Vegetation	No impacts to vegetation are anticipated in this EA. All work would occur in areas that are already disturbed and minimal or no vegetation is in the work area. Therefore, vegetation will not be addressed further in this EA.
Water Quality	No impacts to Water Quality are anticipated in this EA. All work would be conducted out of the water and, therefore, water quality will not be addressed further in this EA.

Resource	Rationale For Elimination
Public Health and Safety	Public health and safety concerns related to this project are addressed by the contractor identifying the work sites and landing zones with fencing, signage and personnel thereby eliminating the risk to the public.
Realty	There are no realty-related issues for this project and therefore it is not addressed in this EA because the land where landings and work would take place are owned by the USFWS.
Visual Resources	There would be a temporary change to visual resources at the staging areas and project site during construction. This short-term impact would occur over a small area; therefore, visual impacts are not further addressed in this EA.
Wild and Scenic Rivers	There are no Wild and Scenic Rivers in the project area; therefore, Wild and Scenic Rivers are not addressed further in this EA.
Wilderness	Helicopters would fly over the ALWA, but construction and helicopter landings would occur on land owned by the USFWS. Construction would not occur on any USFS managed wilderness areas. There would be short-term noise increases; however, they would occur over a small area and be short in duration.

3.1 Cultural and Historical Resources

The National Historic Preservation Act and other laws and policies require Federal agencies to evaluate their impact on historic properties within the human environment. "Historic property" means any prehistoric or historic district, site, building, structure, traditional cultural property (TCP), or object included in or eligible for inclusion in the National Register of Historic Places (National Register) and includes any material, artifacts, or records related to and located within such historic properties. "Cultural resources" covers a wider range of resources than "historic properties," and includes subjects such as cultural items protected under the Native American Graves Protection and Repatriation Act, isolated artifacts, and archaeological collections.

Section 106 of the NHPA defines the process for identifying and evaluating project developments and their potential effects on cultural resources. This process calls for the identification of significant (eligible) historic properties within the area potentially affected by the proposed action and consultation with the State Historic Preservation Officer, potentially affected Indian Tribes, managing agencies, the Advisory Council on Historic Preservation, and other interested parties (36 CFR part 800).

3.1.1 Affected Environment

The Area of Potential Effect for the Upper Snow Lake water discharge control valve replacement includes six different locations. The majority of the following six locations are

remote and would require camping or staging areas outside of the work area in the U.S Geological Survey Blewett or Leavenworth Quadrangles:

1. Snow Lake Tunnel Outlet staging area is 0.13 of an acre (Blewett Quadrangle)
2. LNFH staging area (normally used for firefighting crews) is 23.74 acres (Leavenworth Quadrangle)
3. Campsite 2 is 3.97 acres (Blewett Quadrangle)
4. Campsite 3 is 1.4 acres (Blewett Quadrangle)
5. Helipad 2 staging area is 0.21 acres (Blewett Quadrangle)
6. Helipad 3 staging area is 0.21 acres (Blewett Quadrangle)

The combined total Area of Potential Effect of all six locations is 29.68 acres. Except for the modification of the valve in the Upper Snow Lake Tunnel Outlet, all of the other locations would not have any affects to historic properties.

Archaeological evidence of occupation of indigenous groups in the area of the Snow Lakes has been dated to at least 12,000 years before present. The project area is within the traditional territory of the Wenatchi Tribe, one of the Confederated Tribes of the Colville Reservation (CCT). Descendants of the Wenatchi can also be found as members of the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation). The project area is within the ceded lands of the Yakama Nation.

Prior to the coming of Euro-Americans in the 1800s, the Wenatchee Valley was occupied by the Wenatchi people. As with many other parts of Washington State, the earliest known Euro-American travelers into the Wenatchee Valley were fur trappers. The Treaty of 1855 led to the relocation of the Wenatchi people over the next decade to the Yakama and Colville Reservations. Subsequently, the local population became comprised of Chinese immigrant gold miners and Euro-American settlers working in the timber and agriculture industries. The first use of irrigation in the Wenatchee Valley was by a Catholic Priest named Father Urban Grassi who had come to the area to bring Catholicism to the Wenatchi tribe in 1872 (Wilma 2006).

The growth in the upper Wenatchee Valley in areas such as Leavenworth was tied to the development of the Great Northern Railway in the late 1800s. However, the area economy suffered when the Great Northern Railway moved its division point and the railroad itself away from Leavenworth in 1922. During the Great Depression, Leavenworth was buoyed by the construction of the LNFH from 1939 to 1941. The LNFH was then used to populate streams with fingerlings in the Wenatchee, Entiat, Methow, and Okanogan Rivers (Neilson 1940).

One of the features of the LNFH Complex is the Snow Lake water discharge valve described in the introduction to this EA, which was used to bring additional cool water to the LNFH. The tunnel and its embedded 30 inch pipeline carries water from Snow Lake and was

completed in October 25, 1939 (Nielson 1940). However, once the Snow Lake Tunnel was put into operation, it was discovered that the tube valve had to be relocated to the outlet portal of the tunnel. With the outlet located 124 feet inside the tunnel, wind velocities were as high as 60 miles per hour when the valve was open, which made it too dangerous for operating personal. As a result, in 1940, 124 feet of pipe was added to the existing pipe, along with concrete supports, a concrete plug, and another 20 inch butterfly valve at the outlet. Also, a control house was built on a concrete structure in front of the outlet portal for the new valve (Reclamation 1940). From 1941 to 1945, Reclamation worked on the operations and maintenance at the LNFH. Then, in 1945 Reclamation turned over operations and maintenance to the USFWS, and in 1949 the USFWS took over complete ownership and operation of the LNFH (Speulda 1998).

In 1998, the Snow Lake Tunnel was listed on the National Register of Historic Places (National Register) as part of the LNFH Historic District. At its time of completion, the LNFH was the largest hatchery in the world. The LNFH was determined eligible under National Register Criteria A and C (Speulda 1998). In 2014, Historical Research Associates, Inc. complied the LNFH Preservation Plan for the USFWS and in this document the Snow Lake Tunnel was determined to be a contributing resource to the historic district and not individually eligible on its own (Sneddon, Beckner, and Miller 2014). As discussed in Chapter 1 and discussed further below, the original tube valve was replaced in 2001 with the current butterfly discharge valve.

3.1.2 Environmental Consequences

3.1.2.1 Proposed Action

Under Alternatives 2 and 3, helicopter delivery of the new valve and supplies would not affect any archaeological and ethnographic resources at the Snow Lake Tunnel Outlet or at the LNFH. As listed below, all work is within areas where no additional ground disturbance or vegetation clearing is required:

1. All work at the Snow Lake Tunnel Outlet staging and work area is within an existing staging/work area.
2. The LNFH staging area is already in heavy use since it has been used for firefighting crews.
3. The campsites to be used by the contractor's crews are existing campsites.
4. The proposed helipads are areas that have been previously cleared and used as landing areas.

Helicopter delivery of the new valve and supplies would not affect any historic resources at the Snow Lake Tunnel Outlet or at the LNFH. The proposed replacement of the 2001 butterfly valve with a knife discharge valve, connecting pipe, and new controls would result in a determination of No Adverse Effect for the Snow Lake Tunnel. The USFWS replaced

the original valve and valve control house in 2001. Those two outlet features of the Snow Lake Tunnel water control structure are no longer original or character defining features of the Snow Lake Tunnel. The original valves inside the tunnel at Station No. 1+38.48 and the steel pipeline, inlet, and the tunnel itself are still character defining features. Consultation is ongoing on the Section 106 report with the State Historic Preservation Officers (which is called the Washington Department of Archelogy and Historic Preservation (DAHP)), CCT, the USFWS, and the Yakama Nation.

In both Alternatives 2 and 3, camping by the contractor's crew may occur. Camping would occur in existing campsites so there would be no added impact.

Mitigation: Mitigation is not anticipated with this project as it is Reclamation and the USFWS's determination that the project would result in No Adverse Effect to the National Register listed Snow Lake Tunnel.

NHPA Section 106 Consultation

The NHPA Section 106 report is complete. Consultation has been conducted among DAHP, CCT, the USFWS, and the Yakama Nation. As a result, Reclamation and the USFWS have determined there would be No Adverse Effects as a result of the Proposed Action. DAHP concurred with Reclamation and the USFWS's findings on August 28, 2017.

3.1.2.2 No Action

Since there would be no modification, no impacts on historic resources would occur.

3.1.2.3 Cumulative Effects

No cumulative effects are anticipated on this resource as a result of the proposed project.

3.2 Recreation Values and Uses

3.2.1 Affected Environment

The Wilderness Act of 1964 (Wilderness Act) established the National Wilderness Preservation System and wilderness uses and rules. Within the ALWA there is the Enchantment's Permit Area, which was established under the Wilderness Act and the Alpine Lakes Management Act of 1976. Much of the lands surrounding the project are governed by these acts.

The Enchantment's Permit Area includes Eightmile, Colchuck, Nada, and Upper and Lower Snow Lakes and is a popular destination for hiking and backpacking. Numerous trails transverse the wilderness to support these recreational pursuits and provide a transportation network between the guard station, fire look-outs and trailheads. Overnight visitors are required to have a permit between May 15 and October 31 (USFS 2017).

According to the USFS, day use hiking has continued to grow in popularity over the past few years (Wilderness Connect 2017) and demand for overnight permits far exceeds the number available (Wilderness Connect 2017). In 2016, the USFS received 19,646 lottery applications for overnight stays. In 2015, an estimated 10,200 people camped in the Enchantment Permit Area.

Fishing in the area is managed by the Washington Department of Fish and Wildlife. In addition to possessing a freshwater fishing license, anglers age 15 and over must comply with specific size limits, gear restrictions, and bag limits (WDFW 2017).

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

Under Alternative 2, the use of 30 round trip helicopter flights used to transport people and equipment would temporarily diminish the quality of the primitive setting by competing with the sights and sounds of the natural world. Temporary impacts would also occur from replacement activities that would disturb the solitary experiences of passersby. In addition, the contractor's potential base camp and crew camping may displace some visitors. However, the impacts to recreational visitors within the Snow Lake Area are expected to be negligible as the heavy vegetation and rugged environment of the area would muffle noise over relatively short distances and screen visitors from the majority of the activity.

The impacts would be short-term in nature (small bursts of activities over a period of 7 to 21 days) and would only affect those individuals within the immediate proximity to the proposed activities. The contractor would be granted an administrative permit to camp on USFWS lands which may displace some visitors from the selected sites, but would not introduce relative crowding to those recreating in the ALWA. Recreation impacts are expected to be minor and temporary and only impact those in direct proximity of construction activities, or in proximity of the helicopter flight path.

Under Alternative 3, the use of 15 round trip helicopter flights to transport people and equipment would be similar to Alternative 2, but have less flights and may have more impacts from contractor camping.

3.2.2.2 No Action

Under no action there would be no impacts to recreation in the area.

3.2.2.3 Cumulative Effects

Under Alternative 2 and 3, the valve replacement project would improve the recreational fishing by augmenting cold water from Snow Lake to Snow and Icicle Creeks in the late summer and fall and provide cold water needed for fish propagation at LNFH. Therefore, long-term and cumulative impacts resulting from the Proposed Action would be beneficial to anglers who fish in downstream waters.

3.3 Water Rights

3.3.1 Affected Environment

In the 1941 Water Supply Contract between Reclamation and IPID, an agreement was established that Reclamation would build and maintain the water discharge control structures and control works to provide storage at Upper and Lower Snow and Nada Lakes. In return, IPID would reduce its call on stored water from 1,000 to 750 acre-feet per year and would not call on storage from the lakes until water stored in IPID's other reservoirs has begun to be used to supplement the IPID direct diversion right. The intent of this agreement was that IPID would use their other stored waters as their first source of supplementing their direct appropriation rights. It was understood that IPID would follow their best judgement regarding a rate of withdrawal on other storage that was calculated to maintain the use of waters through the end of each irrigation season. However, IPID is not required to exhaust any other storage before demanding storage water from the lakes.

As part of the agreement, Reclamation filed for and received a state water right certificate for Upper and Lower Snow and Nada Lakes in the amount of 16,000 acre-feet per year to supplement the water supply for the hatchery rearing and holding ponds (Reclamation 1941). Currently, LNFH releases about 50 cfs from Snow and Nada Lakes for supplemental flow in August and September to meet hatchery production needs (NMFS 2015).

IPID has priority for up to 750 acre-feet of water stored in Upper and Lower Snow Lakes. This water is released from Upper Snow Lake into Snow Creek via Nada Lake. It is then diverted from Snow Creek about a quarter mile upstream from the confluence of Snow Creek and Icicle Creek (Figure 1-1, Reclamation 1941). However, the storage water that is delivered to IPID under the provisions of the 1941 contract is to be delivered at a rate not to exceed 30 cfs.

Up until 2015, IPID had not used water from Snow and Nada Lakes. In 2015, IPID informed the LNFH that they intended to use 10 cfs of supplemental flow for 38 days during the 2015 irrigation season (NMFS 2015). The current valve is not able to discharge both LNFH's 50 cfs and IPID's 30 cfs concurrently; therefore, a valve that can discharge a minimum of 80 cfs in needed.

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Under Alternatives 2 and 3, there would be no change in water rights. The valve would be replaced under both alternatives ensuring a reliable water supply at the discharge rate needed for both the LNFH and IPID.

3.3.2.2 No Action

Under the No Action Alternative, USFWS would continue to operate the Upper Snow Lake valve as has been done in the past. Reclamation and the USFWS would not replace the valve at Upper Snow Lake and no efforts would be made to ensure a reliable water source for LNFH and IPID in the future. The discharge would remain limited to approximately 50 cfs which would restrict IPID and LNFH from simultaneously being able to withdraw water. IPID would have first access to the water supply, which would potentially leave LNFH with a shortage of cool water to supplement its rearing and holding ponds. Also, the valve has passed its service life and would presumably malfunction at some point.

3.3.2.3 Cumulative Effects

The Proposed Action would be beneficial to LNFH, irrigators, and fish due to the installation of a more reliable discharge valve that is not likely to malfunction in the near-term, and would provide cold water downstream for fish. Valve replacement is the central step in achieving compliance with term and condition 2b of the 2015 NMFS Biological Opinion by allowing up to 80 cfs to discharge from the new valve. This would allow senior and junior water users simultaneous access to water from Snow and Nada Lakes.

3.4 Fish

This section describes the fish species and life stages present within the project area and their distributions, species status, and habitat conditions. Information on threatened and endangered species is provided in Section 3.6. Information on tribal fishing harvest is provided in Section 3.10.

3.4.1 Affected Environment

There is a sport fishery for resident trout in the Alpine Lakes Wilderness Area. Prior to human settlement, most of the high lakes were barren of fish (USFS 1981). In the past, lakes were stocked, but stocking has been discontinued due to lack of funding or sufficient natural reproduction (Maitland 2016). All lakes were stocked with westslope cutthroat trout (*Oncorhynchus clarki lewisi*) at one time, some with rainbow trout (*O. mykiss*), and some with non-native eastern brook trout and lake trout (*Salvelinus fontinalis* and *Salvelinus namaycush*). No stocking currently occurs in Nada, Upper, or Lower Snow Lakes.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Under Alternative 2 and 3, most of the work would occur in upland areas. Some limited staging would occur within the lake shorelines, but it would be within the dry areas on the lake margins when the lakes are drawn down at the end of the summer (for example, Helipad 2, Figure 2-4). Construction is not anticipated to result in water quality impacts and,

therefore, it would not be expected to affect fish or aquatic invertebrates. These activities are generally consistent with routine operation and maintenance activities that have occurred, such as the previous valve replacement in 2001.

3.4.2.2 No Action

Under the No Action Alternative, the valve would continue to operate at 50 cfs and the term and condition 2b of the 2015 NMF Biological Opinion may not be met due to IPID senior water rights. If the valve were to malfunction, the guard gate would be closed so no water would be released through the Upper Snow Lake valve. Valve malfunction may impede water delivery to IPID and LNFH. Under either of the above scenarios, no effects to recreational fisheries are anticipated in Snow Lake.

3.4.2.3 Cumulative Effects

Implementing the Proposed Action or No Action Alternative would not result in cumulative impacts to fisheries.

3.5 Wildlife

3.5.1 Affected Environment

3.5.1.1 Amphibians and Reptiles

Wetland and riparian areas in the Alpine Lakes Wilderness Area provide suitable habitat for a range of amphibians including the following: "Pacific treefrog (*Pseudacris regilla*), western toad (*Anaxyrus boreas*), tailed frog (*Ascaphus truei*), Cascades frog (*Rana cascadae*), Columbia spotted frog (*Rana luteiventris*), and long-toed salamander (*Ambystoma macrodactylum*). The USFS performed large-scale amphibian presence/absence surveys in the Icicle Creek Basin in July and August 2016, which included Nada and Upper and Lower Snow Lakes. Columbia spotted frog and long-toed salamander were among amphibian species observed in Upper and Lower Snow Lakes in July 2016" (WDOE 2017).

"Reptiles, such as the western garter snake (*Thamnophis elegans*), are likely to occur in the upland habitats surrounding the lakes. Northern alligator lizard (*Elgaria coerulea*) and western fence lizard (*Sceloporus occidentalis*) are among species likely supported by upland habitats with rock and wood debris. Common garter snakes *(Thamnophis sirtalis)* and northern alligator lizards were observed during the July 2016 surveys" (WDOE 2017).

3.5.1.2 Mammals

Forested habitats in the Alpine Lakes Wilderness Area support a range of mammal species including "mountain beaver (*Aplodontia rufa*), bobcat (*Lynx rufus*), hoary marmot (*Marmota caligata*), fisher (*Martes pennanti*), Douglas squirrel (*Tamiasciurus douglasii*), voles (*Microtus spp.*), pika (*Ochotona princeps*), and striped skunk (*Mephitis mephitis*). Larger,

wide-ranging mammals, such as elk (*Cervus elaphus*), black-tailed deer *(Odocoileus hemionus),* black bear (*Ursus americanus*), cougar (*Felis concolor*), and coyote *(Canis latrans)* are also supported by associated alpine forested habitat. Mountain goats (*Oreamnos americanus*) are found in the high-altitude areas and deer tracks and scat were frequently observed during the July 2016 surveys" (according to the USFWS, as cited in WDOE 2017).

"Wetlands and riparian areas associated with lake-fed streams provide habitat for bats (*Myotis spp.*), shrews *(Sorex spp.),* common opossum *(Didelphis marsupialis),* and raccoon *(Procyon lotor).* These species depend on aquatic habitat for foraging and breeding" (according to the USFWS, as cited in WDOE 2017).

3.5.1.3 Birds

"Forest habitat in the Alpine Lakes Wilderness Area and Snow Lake Project area serves as foraging and nesting habitat for a wide variety of bird species with more than 150 species of birds recorded. Songbird species that occupy habitats found within the Alpine Lakes Wilderness Area include song sparrow *(Melospiza melodia),* bushtit *(Psaltriparus minimus),* Bewick's wren *(Thryomanes bewickii),* Stellar's jay *(Cyanocitta stelleri),* spotted towhee *(Pipilo erythrophthalmus*), Swainson's thrush (*Catharus ustulatus*), winter wren (*Troglodytes troglodytes*), varied thrush (*Ixoreus naevius*), black-capped chickadee (*Parus atricapillus*), chestnut-backed chickadee (*Parus rufescens*), dark-eyed junco (*Junco hyemalis*), golden-crowned kinglet (*Regulus satrapa*), and red-breasted nuthatch (*Sitta canadensis*).

Migratory bird species, such as black swift (*Cypseloides niger*), Cassin's finch (*Carpodacus cassinii*), fox sparrow (*Passerella iliaca*), loggerhead shrike (*Lanius ludovicianus*), olive-sided flycatcher (*Contopus borealis*), rufous hummingbird (*Selasphorus rufus*), and willow flycatcher (*Empidonax traillii*) likely forage in forested habitats during spring and fall migrations" (WDOE 2017).

"Predatory birds, such as bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk *(Buteo jamaicensis),* and osprey *(Pandion haliaetus)* commonly hunt in forested habitat near bodies of water. Snags and downed trees along lake shorelines and riparian areas serve as perch sites for these and other raptor species. Snags in forested habitats also provide potential nest sites for cavity-nesting birds, such as great horned owl (*Bubo virginianus*) and several woodpecker species, including Lewis's woodpecker (*Melanerpes lewis*), downy woodpecker (*Picoides pubescens*), northern flicker (*Colaptes auratus*), and pileated woodpecker (*Dryocopus pileatus*).

A variety of bird species are dependent on lake and wetland habitats containing riverine, emergent, scrub/shrub, and forested wetland types. Lakes are likely to serve as habitat for belted kingfisher *(Ceryle alcyon*), and wintering and migratory waterfowl, including gadwall *(Anas strepera),* American widgeon *(Mareca americana),* mallard *(Anas platyrhynchos),* common loon (*Gavia immer*), and western grebe (*Aechmophorus occidentalis*). Emergent and scrub/shrub wetland areas provide habitat for red-winged blackbird *(Agelaius phoeniceus),* song sparrow *(Melospiza melodia),* and marsh wren *(Cistothorus palustris),*

among others. Great blue heron *(Ardea herodias)* often forage in lake and wetland habitats where they prey on amphibians and other species (according to the USFWS, as cited in WDOE 2017)."

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Under Alternative 2 and 3, all associated valve replacement construction work would occur at the Upper Snow Lake Tunnel outlet works at approximately 5,300 feet in elevation. Some limited staging activity would occur within the lake shoreline riparian area and on dry lakebed at the east end of Upper Snow Lake following drawdown at the end of the summer. Staging areas that have been previously disturbed have been identified to be used for this project.

Construction activity would last for a period of 7 to 21 days at the Upper Snow Lake Tunnel outlet works. The Snow Lakes are used by a variety of species, including large and small mammals, reptiles, amphibians, cavity nesting birds, raptors, waterfowl, and a variety of songbirds (WDOE 2017). Wildlife would likely be exposed to some short-term increases in noise during construction, including multiple helicopter trips, which could be associated with decibel readings as outlined in Section 3.8. In general, in response to periodic increases in noise and activity, most wildlife species are expected to disperse to adjacent habitat areas to avoid impacts (WDOE 2017). Species with seasonal breeding or juvenile dispersal considerations are not likely to be adversely affected due to the timing of the proposed construction activity (Youkey 2017). Also, proposed timing of construction activity is unlikely to disrupt overwintering of native wildlife species using riparian or forested habitat (Youkey 2017).

There is a known Peregrine falcon nest near the Snow Creek Wall. However, project construction activities and associated helicopter use would occur in the fall, which is outside of the breeding season and after juvenile dispersal. Therefore, project activity would be unlikely to disturb or adversely affect individual birds (Youkey 2017).

Increases in flows in Icicle Creek associated with operating the new valve would be within the natural variation already occurring within the system. Additional flow in Snow Creek as a result of increased discharge from the new valve would be redirected through IPID's irrigation canal which is 0.25 miles upstream from the Snow/Icicle Creek confluence. This project is not anticipated to result in any long-term impacts on wildlife.

Under Alternatives 2 and 3, there may be a contractor base camp and crew camping at established USFWS campsites that are managed by the USFS. However, frequent recreation occurs in this area on lands owned by USFWS and in the adjacent ALWA. Therefore, impacts to wildlife from camping are expected to be minimal. These campsites have already been disturbed and pit toilets are located near the campsites as outlined in Section 2.2.2.

Under Alternative 3, project associated disturbance to wildlife could be reduced compared to Alternative 2 because the reduced number of round trip helicopter flights.

3.5.2.2 No Action

Under the No Action Alternative, the Upper Snow Lake valve would not be replaced. The valve would continue operating under existing constraints. Acknowledging the age and condition of the existing valve, the No Action Alternative could result in malfunction of the valve, triggering emergency shut off valve procedures. Any change in surface elevation of Upper Snow Lake as a result of valve malfunction could yield negative effects for wildlife that are dependent upon the lake or associated riparian habitat.

3.5.2.3 Cumulative Effects

Implementing the Proposed Action or No Action Alternative would not result in cumulative impacts to wildlife. Reasonably foreseeable future actions associated with a proposed maintenance and upgrade framework at the LNFH are laid out in the Draft Leavenworth Fisheries Complex Project Implementation Plan: 2017-2027 (USFWS and Reclamation 2017). The 2015 NMFS Biological Opinion requires completion of certain activities in that framework by 2023. Each component of the framework will require environmental compliance prior to project initiation.

3.6 Threatened and Endangered Species

3.6.1 Affected Environment

The following list of threatened, endangered, and candidate species protected by the Endangered Species Act was developed using the USFWS's online Information for Planning and Consultation tool for Chelan County, Washington at https://ecos.fws.gov/ipac/.

Table 3-2. List of threatened, endangered, and candidate species protected by the Endangered Species Act found in Chelan County, Washington.

Federal Threatened and Endangered Plant species	
Showy Stickseed (*Hackelia venusta*)	Endangered
Wenatchee Mountains Checkermallow (*Sidalcea oregana var. calva*)	Endangered
Whitebark Pine (*Pinus albicaulis*)	Candidate
Federal Threatened and Endangered Terrestrial Wildlife Species	
North American Wolverine (*Gulo luscus*)	Proposed Threatened
Canada Lynx (*Lynx canadensis*)	Threatened

Gray Wolf (*Canis lupus*)	Endangered
Grizzly Bear (*Ursus arctos horribilis*)	Threatened
Marbled Murrelet (*Brachyramphus marmoratus*)	Threatened
Northern Spotted Owl (*Strix occidentalis caurina*)	Threatened
Yellow Billed Cuckoo (*Coccyzus americanus*)	Threatened
Federal Threatened and Endangered Fish Species	
Bull Trout (*Salvelinus confluentus*)	Threatened
Upper Columbia River Steelhead (*Oncorhynchus (=salmo) mykiss*)	Threatened
Federal Threatened and Endangered Fish Species (continued)	
Upper Columbia River Spring-run Chinook Salmon (*O. tshawytscha*)	Endangered

3.6.2 Environmental Consequences

In this section, the environmental consequences of the proposed action on Federal threatened and endangered plant, terrestrial wildlife, and fish species are analyzed.

3.6.2.1 Proposed Action

Under Alternatives 2 and 3, no significant impacts would occur to any of the threatened and endangered species listed (see Table 3-3 to Table 3-5, Analysis of Environmental Consequences). This is due to breeding dispersal, the absence of critical habitat in the project area, and existing recreational use of the project area and adjacent ALWA which make it unlikely that individuals of the species would be present.

Table 3-3. Analysis of environmental consequences of the proposed action on Federal threatened and endangered plant species.

Federal Threatened and Endangered Plant Species	
Species	**Environmental Consequences**
Showy Stickseed (*Hackelia venusta*)	Showy Stickseed has a very limited range and does not occur in the proposed project area (Youkey 2017). Despite its limited range, no critical habitat has been designated for Showy Stickseed (WDOE 2017). Since showy stickseed is not present in the action area, the proposed project and associated activities would have no effect on this species.

Federal Threatened and Endangered Plant Species	
Species	**Environmental Consequences**
Wenatchee Mountains Checkermallow (*Sidalcea oregana var. calva*)	The Snow Lakes project site is located outside the designated critical habitat for Wenatchee Mountains Checkermallow (WDOE 2017). The range of this species is limited and does not occur in the project area (Youkey 2017). The proposed project and associated activities would have no effect on this species or its critical habitat since neither occur within the action area.
Whitebark Pine (*Pinus albicaulis*)	Whitebark Pine was indicated by the USFWS's Information for Planning and Consultation tool as having been historically identified in Chelan County, Washington. However, Whitebark Pine would be found at higher elevations than 5,300 feet, which is the elevation of the Snow Lakes project area (Youkey 2017) Since Whitebark Pine is only a candidate, it has not had any critical habitat designated (WDOE 2017). The proposed project and associated activities would have no effect on this species since it is only found at higher elevations than the action area for this project.

Table 3-4. Analysis of environmental consequences of the proposed action on Federal threatened and endangered terrestrial wildlife species.

Federal Threatened and Endangered Terrestrial Wildlife Species	
Species	**Environmental Consequences**
North American Wolverine (*Gulo luscus*)	The project area and the Alpine Lakes Wilderness Area at large are suitable habitat for the North American Wolverine, a candidate species under the ESA. According to Youkey, "There were wolverine tracks observed by a biologist along the Snow Lakes trail in the winter approximately 5 years ago. Also, wolverine have been detected many times further west in the Icicle Creek drainage in the last 10 years" (2017). Since the North American Wolverine is a candidate species for listing, no critical habitat has been designated for this species. Existing recreational use of this area is so high that occurrence of this species in the project area is unlikely, especially since there is suitable habitat on the periphery of the area that experiences less frequent recreational disruption (Youkey 2017). Due to the high-level of recreational use, individuals of the species are not likely to be present in the action area when the project is implemented. Therefore, the proposed project and associated activities are not likely to jeopardize the continued existence of this species.
Canada Lynx (*Lynx canadensis*)	Although the project area represents suitable habitat for Canada Lynx and wide ranging carnivores, the heavy recreational use within the Alpine

Federal Threatened and Endangered Terrestrial Wildlife Species	
Species	**Environmental Consequences**
	Lakes Wilderness and project area makes it unlikely that any are going to be in the area (Youkey 2017). According to Youkey, "There are no records of Canada Lynx nearby, with the last observation being approximately 30 miles north on Entiat Ridge, and it was not verified. The most recent verified Canada Lynx observations were north of Lake Chelan in the critical habitat unit in the summer of 2016" (2017). The proposed project area lies outside designated Canada Lynx critical habitat (https://ecos.fws.gov/ecp/species/3652). The proposed project and associated activities would have no effect on this species since it has not been documented using the area and is unlikely to use the area due to heavy recreation use. The project would have no effect on critical habitat because there is no designated critical habitat within the action area.
Gray Wolf (*Canis lupus*)	The project area and the Alpine Lakes Wilderness at large constitute suitable habitat for the Gray Wolf. According to Youkey, "There's a known wolf pack, that has denned approximately 10 miles south of Snow Lakes for approximately the past 5 years, though no observations have been made in the immediate area" (2017). Existing recreational use of this area is so high that occurrence of this species in the project area is unlikely, especially provided the availability of suitable habitat on the periphery of the area which experiences less frequent recreational disruption (Youkey 2017). No critical habitat has been designated for this species in the West (https://ecos.fws.gov/ecp/species/4488). The proposed project and associated activities are not likely to adversely affect this species due to the high level of recreation use, which would likely lead to an avoidance of the project area.
Grizzly Bear (*Ursus arctos horribilis*)	There was a verified grizzly track on Wedge Mountain, 5 miles northeast of Snow Lakes in 1991. However, more recently, they are found much farther away in the North Cascades near the Canadian border (Youkey 2017). No critical habitat has been designated for this species (https://ecos.fws.gov/ecp/species/7642). Existing recreational use of this area is so high that occurrence of this species in the project area is unlikely, especially provided the availability of suitable habitat on the periphery of the area, which experiences less frequent recreational disruption (Youkey 2017).

Federal Threatened and Endangered Terrestrial Wildlife Species	
Species	**Environmental Consequences**
	The proposed project and its associated activities are not likely to adversely affect this species due to their highly unlikely presence in the action area as a result of the high level of recreational use.
Marbled Murrelet (*Brachyramphus marmoratus*)	The project area is outside the critical habitat designated for Marbled Murrelets and outside the 55-mile marine foraging zone (https://ecos.fws.gov/ecp/species/4467). Therefore, the proposed project and associated activities would have no effect on this species (Youkey 2017).
Northern Spotted Owl (*Strix occidentalis caurina*)	While the proposed project area does overlap with habitat designated as critical for Northern Spotted Owls, according to Youkey, "5000 feet in elevation is generally considered to be their upper limit, and Snow Lakes are above this" (2017). Youkey also stated that his "very general habitat map shows some fragmented suitable habitat near Nada Lake, but none near Snow Lakes" (2017). Also, the Northern Spotted Owl habitat becomes a little more contiguous along the trail between Nada Lake and the trailhead. Therefore, in this area, if a low-flying helicopter would be used, disturbance from noise could occur. While there are no recent surveys of the area, historic surveys never detected Northern Spotted Owls in the vicinity (Youkey 2017). Lastly, Youkey noted that, "The closest record he has of a nest site is 2.7 miles to the east, over the high ridge, and down again along Allen Creek" (2017). Past surveys within the action area did not show the presence of nesting Northern Spotted Owls. In addition, the elevation of the proposed action is above the elevation preferred by Northern Spotted Owls, and finally, the action would be implemented in the fall when breeding and nesting is complete. Therefore, implementation of the proposed project would have no effect on the Northern Spotted Owls.
Yellow Billed Cuckoo (*Coccyzus americanus*)	There are no records of Cuckoo in Chelan County unless prior to 1941. The most recent records were near Omak (~90 miles away) in 1990, Tonasket (~110 miles away) in 1991, and downtown Seattle in 1997 (Youkey 2017). The action area does not contain suitable nesting habitat and individuals have not been observed in the area; therefore, the proposed project and associated activities would likely have no effect on this species.

Table 3-5. Analysis of environmental consequences of the proposed action on Federal threatened and endangered fish species.

Federal Threatened and Endangered Fish Species	
Species	**Environmental Consequences**
Bull Trout (*Salvelinus confluentus*)	Bull trout do occur in Icicle Creek, but their access to Snow Creek is blocked by a high-gradient boulder field near its mouth (Youkey 2017). Critical habitat for bull trout is designated in Icicle Creek, but no critical habitat is designated in Snow Creek (https://ecos.fws.gov/ecp/species/8212). The proposed action would occur when no water is being discharged from the lake, so there would be no opportunity for fine sediment to be transported downstream to Icicle Creek where bull trout may be present and critical habitat is designated. The 2015 LNFH Biological Opinion stipulates that: "From August 1 through September 30, provide up to 50 cfs of supplemental flow from the Snow/Nada Lake Basin Supplementation Water Supply Reservoirs, to ensure access to LNFH's surface water withdrawal and improve instream flow conditions to the extent possible during the irrigation season in cooperation with IPID as described in this Opinion" (NMFS 2015). The new valve's discharge capacity ensures that both IPID and the hatchery could simultaneously withdraw the maximum supply that their respective water rights allow. Changes in flows in Icicle Creek associated with operations of the new valve would be within the natural variation already occurring within the system. Additional flow in Snow Creek as a result of increased discharge from the new valve would be redirected through IPID's irrigation canal which is 0.25 miles upstream from the Snow/Icicle confluence. This project is not anticipated to result in any long-term impacts to Federal threatened and endangered species.
Upper Columbia River Spring-run Chinook Salmon (*O. tshawytscha*)	Upper Columbia River Spring-run Chinook Salmon likely occur in Icicle Creek, but the extent of their distribution within Icicle Creek is unknown. Chinook do not occur within Snow Creek due to the presence of a high-gradient boulder field near the mouth of Snow Creek (Youkey 2017). Critical habitat for this species is not found within the action area (https://ecos.fws.gov/ecp0/profile/speciesProfile.action?spcode=E06D). The proposed action would occur when no water is being discharged from the lake, so there would be no opportunity for fine sediment to be transported downstream to Icicle Creek where Chinook salmon may be present and critical habitat is designated. The 2015 LNFH Biological Opinion stipulates that: "From August 1 through September 30, provide up to 50 cfs of supplemental flow from the Snow/Nada Lake Basin Supplementation Water Supply Reservoirs, to ensure access to LNFH's surface water withdrawal and improve

Federal Threatened and Endangered Fish Species	
Species	**Environmental Consequences**
	instream flow conditions to the extent possible during the irrigation season in cooperation with IPID as described in this Opinion" (NMFS 2015). The new valve's discharge capacity ensures that both IPID and the hatchery could simultaneously withdraw the maximum supply that their respective water rights allow. Changes in flows in Icicle Creek associated with operations of the new valve would be within the natural variation already occurring within the system. Additional flow in Snow Creek as a result of increased discharge from the new valve would be redirected through IPID's irrigation canal which is 0.25 miles upstream from the Snow/Icicle confluence. This project is not anticipated to result in any long-term impacts to Federal threatened and endangered species.
Upper Columbia River Steelhead *(Oncorynchus (=salmo) mykiss)*	Upper Columbia River Steelhead occur in Icicle Creek, which is designated critical habitat (https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E08D). Steelhead do not occur within Snow Creek due to the presence of a high-gradient boulder field near the mouth of Snow Creek (Youkey 2017). The proposed action would occur when no water is being discharged from the lake, so there would be no opportunity for fine sediment to be transported downstream to Icicle Creek where Steelhead may be present and critical habitat is designated. The 2015 NMFS Biological Opinion stipulates that, "From August 1 through September 30, provide up to 50 cfs of supplemental flow from the Snow/Nada Lake Basin Supplementation Water Supply Reservoirs, to ensure access to LNFH's surface water withdrawal and improve instream flow conditions to the extent possible during the irrigation season in cooperation with IPID, as described in this Opinion" (NMFS 2015). The new valve's discharge capacity ensures that both IPID and the hatchery could simultaneously withdraw the maximum supply that their respective water rights allow. Changes in flows in Icicle Creek associated with operations of the new valve would be within the natural variation already occurring within the system. Additional flow in Snow Creek as a result of increased discharge from the new valve would be redirected through IPID's irrigation canal which is 0.25 miles upstream from the Snow/Icicle confluence. This project is not anticipated to result in any long-term impacts to Federal threatened and endangered species.

3.6.2.2 No Action

Under the No Action Alternative, the valve would continue to operate at 50 cfs and the term and condition 2b of the 2015 NMFS Biological Opinion may not be met due to IPID senior

water rights. If the valve were to malfunction, the guard gate would be closed so no water would be released through the Upper Snow Lake valve. Valve malfunction may impede water delivery to IPID and LNFH. Under current operation, no effects are anticipated to threatened and endangered species. However, in the event of valve malfunction, this could potentially compromise Endangered Species Act listed species and critical habitat due to increased temperatures and loss of cool supplemental water in Icicle Creek. Icicle Creek is designated critical habitat for bull trout. Bull trout benefit from cool supplemental flows from Upper Snow Lake. Upper Columbia River Steelhead and Upper Columbia River Spring-run Chinook Salmon similarly benefit from the supplemental flows in Icicle Creek from Upper Snow Lake.

3.6.2.3 Cumulative Effects

Implementing the No Action Alternative, Alternative 2 or Alternative 3 would not result in cumulative impacts to Federal threatened and endangered species. Reasonably foreseeable future actions associated with a proposed maintenance and upgrade framework at the LNFH are laid out in the Draft Leavenworth Fisheries Complex Project Implementation Plan: 2017-2027 (USFWS and Reclamation 2017). The 2015 NMFS Biological Opinion requires completion of certain activities in that framework by 2023. Each component of the framework will require environmental compliance prior to project initiation.

3.7 Environmental Justice

3.7.1 Affected Environment

Executive Order 12898, dated February 11, 1994, requires Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minorities and low-income populations and communities, as well as the equity of the distribution of the benefits and risks. Environmental justice addresses the fair treatment of people of all races and incomes with respect to actions affecting the environment. Fair treatment implies that no group should bear a disproportionate share of negative impacts.

The proposed project would occur in Chelan County, Washington. Currently, the Upper Snow Lake Tunnel valve area offers minority and low-income populations fishing, hunting, camping, swimming, and other recreational opportunities. While the areas are available throughout the year, visitation to the area is greatest during the summer months.

Table 3-6 summarizes the racial characteristics of Chelan County within the project area and compared to the state of Washington overall. Information contained in the 2010 to 2016 Census of Population was used to identify these populations. The 2010 to 2016 Census data for the white racial category comprise the greatest percentage for Chelan County and the state of Washington (U.S. Census Bureau 2017).

Table 3-6. U.S. Census Bureau's 2011-2015 American Community Survey 5 year estimates of population and racial statistics in Chelan County and the State of Washington (U.S. Census Bureau 2017).

U.S. Census Bureau Statistics	Chelan County	State of Washington
Total Population Estimate[1] (individuals)	74,267	6,985,464
White alone (percent) (a)	90.1	77.8
Black or African American alone (percent) (a)	0.5	3.6
American Indian and Alaska Native alone (percent) (a)	1.2	1.3
Asian alone (percent) (a)	0.8	7.7
Native Hawaiian and other Pacific Islander alone (percent) (a)	0.1	0.6
Two or more races (percent)	2.2	5.2

(a) Includes persons reporting only one race

Low-income populations are identified by several socioeconomic characteristics. Specific characteristics used in this description of the existing environment, as categorized by the 2011 to 2015 Census, are income (per capita income and median household income) and percentage of the population below poverty. Table 3-7 provides income and poverty information for the State of Washington and Chelan County.

Table 3-7. U.S. Census Bureau's 2011-2015 American Community Survey 5 year estimates of income and poverty statistics in Chelan County and the State of Washington (U.S. Census Bureau 2017).

Geographic Area	Per Capita Income	Median Household Income	People Below Poverty
Washington State	$31,762	$61,062	13.3%
Chelan County	$25,564	$51,837	14.3%

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Under Alternatives 2 and 3, implementation of the proposed valve replacement would have no adverse natural resources or socioeconomic impacts on minority and low income populations in Chelan County. No impacts would occur that would affect minority or low-income populations because the proposed project would occur on USFWS land. Therefore,

Reclamation and the USFWS have determined that there would be no disproportionate impacts on environmental justice.

3.7.2.2 No Action

If the project is not implemented, there would be no impacts on environmental justice.

3.7.2.3 Cumulative Effects

No cumulative effects are anticipated on this resource as a result of the proposed project.

3.8 Noise

This section defines noise and describes the existing noise setting and the potential noise during the Proposed Action. Construction hours would likely range from 8 to 12 hours per day and may take place 7 days per week over a 7 to 21 day period.

3.8.1 Affected Environment

Noise is defined as unwanted sound that is objectionable because it is disturbing or annoying due to its pitch or loudness (USGS 2006). Pitch is the height or depth of a tone or sound. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is intensity of sound waves combined with the reception characteristics of the ear.

A decibel (dB) is a unit of measurement that is used to indicate the relative amplitude of a sound. Sound levels in dB are calculated on a logarithmic scale. Subjectively, each 10 dB increase in sound level is generally perceived as approximately a doubling of loudness.

There are several methods of characterizing sound. The most common is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 3-8 (Illingworth and Rodkin, Inc. 2006; USDOT FHA 2006). Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy equivalent sound/noise descriptor is called Leq. The most common averaging period is hourly, but Leq can describe any series of noise events of arbitrary duration, since the sensitivity to noise increases during the evening and at night, largely because excessive noise interferes with the ability to sleep.

Twenty-four hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Community Noise Equivalent Level is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. to 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. to 7:00 a.m.) noise levels. The Day/Night Average Sound Level, Ldn, is essentially the same as the Community Noise Equivalent Level, with the exception that the evening period is dropped and all occurrences during this 3-hour period are grouped into the daytime period. A brief discussion of each of

these effects and standards commonly used to assess the impacts of blasting is shown in Table 3-8.

Table 3-8. Representative outdoor and indoor noise levels.

At a Given Distance from Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression Effect
---	— 140 —	---	---
Civil Defense Siren (100')	— 130 —	---	---
Jet Takeoff (200')	— 120 —		Pain Threshold
---	— 110 —	Rock Music Concert	---
Diesel Pile Driver (100')	— 100 —	---	Very Loud Hearing Damage After 15 Minutes Exposure
---	— 95 —	---	Repeated Exposure Risks Permanent Hearing Loss
Heavy truck (50')	— 90 —	Boiler Room	Very Annoying Hearing damage (8 hours)
Freight Cars (50')	---	Printing Press Plant	---
Pneumatic Drill (50')	— 80 —	---	Annoying, Intrusive Interferes With Conversation
Freeway (100')	---	In Kitchen With Garbage Disposal Running	---
Vacuum Cleaner (10')	— 70 —	---	Moderately Loud Intrusive, Interferes with Telephone Conversation Noise Begins To Harm Hearing
---	---	Data Processing Center	---
Air conditioning unit (20')	— 60 —	---	Intrusive

At a Given Distance from Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression Effect
---	---	Department Store	---
Light Traffic (100')	— 50 —	---	---
Large Transformer (200')	---	Private Business Office	---
---	— 40 —	---	Quiet
---	---	Quiet Bedroom	---
Soft Whisper (5')	— 30 —	---	Very Quiet
---	---	Recording Studio	---
---	— 20 —	---	---
---	— 10 —	---	Threshold of Hearing
---	— 0 —	---	---

Chelan County regulates noise standards through Title 7 of the Chelan County Code. Exemptions are listed in Washington Administrative Code 173-60-050 and include construction noise generated between 7:00 a.m. and 10:00 p.m.

The area for noise disturbance in the proposed project includes the Alpine Lakes (primarily Snow and Nada) and LNFH. The Snow Lake area is remote and exposed to little man-made noise. Noise sources in this area are predominantly associated with natural conditions and recreational activity. The primary sensitive noise receptors in this area include recreationalists who are hiking to and camping around the lakes.

The land near the hatchery has become increasingly urbanized with higher density agricultural, residential, and commercial land uses (Chelan County 2016). The predominant noise sources include intermittent sounds related to rural residential and agricultural noise with increasing noise related to urbanization moving closer to Leavenworth. Within the more urbanized areas, typical sound includes traffic noise and noise from commercial activity. Periodically, LNFH is a staging area and base camp for wildland fires and helicopter traffic is a normal occurrence. Sensitive receptors to noise changes within the more urbanized areas include residents, workers, and recreationalists. Their sensitivity to changes in the noise environment would depend on the relative change in noise conditions and how close to and for how long they are exposed to the change.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

Construction activities associated with this project would result in localized short-term, and elevated unnatural noise from transporting workers and equipment to the Upper Snow Lake valve staging area via helicopter, and from general construction activity including operation of a generator to power hand tools. No heavy equipment would be used related to this project. Transportation would involve helicopter trips to and from the lakes over a brief period (7 to 21 days) and in a non-peak time for recreationalists. Representative outdoor and indoor noise levels (in units of dB) can be found in Table 3-8.

Background noise levels at the project site is generally quiet and mainly includes sounds associated with the natural environment. Although there are no permanently occupied residences, recreationalists can hike and camp around the project site. Depending on the location of recreationalists relative to construction activity, they could be exposed to increased noise similar to the levels shown in Table 3-8. Although most camping sites are located farther than 50 feet from the proposed construction activities, anticipated noise levels could be a nuisance to recreationalists in the general vicinity. However, the increases in noise would not represent a permanent increase. Rather, nuisance noise would occur intermittently over a period of 7 to 21 days. Therefore, elevated noise levels during the construction period may occur, but is not anticipated to be significant.

Under Alternative 2, short-term noise impacts would occur due to construction activities and up to 30 round trip helicopter flights. Under Alternative 3, short-term noise impacts would occur due to construction activities and up to 15 round trip helicopter flights. For both alternatives, effects would be mitigated using Best Management Practices as described in Section 2.2.3, to include use of specialty mufflers and construction activities limited to daylight hours of 7:00 am to 7:00 pm. In Alternative 3, the allowable round trip flights would be reduced by half; however, contractor camping during the construction window could add to night time noise levels of less than 65 dB.

3.8.2.2 No Action

Under the No Action Alternative, the Upper Snow Lake Tunnel valve would not be replaced; therefore, there would be no increase to baseline noise levels.

3.8.2.3 Cumulative Effects

No cumulative effects are anticipated on this resource as a result of the proposed project because it is short in duration.

3.9 Indian Sacred Sites

3.9.1 Affected Environment

As indicated above, Federal agencies promote accommodation of access to and protect the physical integrity of American Indian sacred sites. A sacred site is a specific, discrete, and narrowly delineated location on Federal land. A site is sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion. The Affected Environment is equivalent to the Cultural Resources Area of Potential Effect for the Snow Lake water discharge control valve replacement, and includes six different locations:

1. Snow Lake Tunnel Outlet staging and work area
2. LNFH staging area
3. Campsite 2
4. Campsite 3
5. Helipad 2 and staging area
6. Helipad 3 and staging area

3.9.2 Environmental Consequences

No sacred sites have been identified by an Indian tribe or its designee.

3.9.2.1 Proposed Action

Under Alternatives 2 and 3, the Proposed Action would have no effect on Indian Sacred Sites.

3.9.2.2 No Action

The No Action Alternative would not have any effect on sacred sites.

3.9.2.3 Cumulative Effects

No cumulative effects are anticipated on this resource as a result of the proposed project.

3.10 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for federally-recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes with trust land and the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the

United States. The characterization and application of the United States trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

The federal government, through treaty, statute or regulation, may take on specific, enforceable fiduciary obligations that give rise to a trust responsibility to federally-recognized tribes and individual Indians possessing trust assets. Courts have recognized an enforceable federal fiduciary duty with respect to federal supervision of Indian money or natural resources, held in trust by the federal government, where specific treaties, statutes or regulations create such a fiduciary duty.

Consistent with President William J. Clinton's 1994 memorandum, *Government-to-Government Relations with Native American Tribal Governments,* Reclamation and the USFWS assesses the effect of its programs on tribal trust resources and federally-recognized tribal governments. Reclamation and the USFWS are tasked to actively engage federally-recognized tribal governments and consult with such tribes on a government-to-government level when its actions affect ITAs (White House 1994). The U.S. Department of the Interior Departmental Manual Part 512.2 (1995) ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices. The U.S. Department of the Interior is required to "protect and preserve Indian trust assets from loss, damage, unlawful alienation, waste, and depletion" (USDOI 2000).

It is the general policy of the U.S. Department of the Interior to perform its activities and programs in such a way as to protect ITAs and avoid adverse effects whenever possible. Reclamation and the USFWS complies with procedures contained in Departmental Manual Part 512.2 guidelines, which protect ITAs. Reclamation and the USFWS carries out their activities in a manner that protects trust assets and avoids adverse impacts when possible. If Reclamation and the USFWS cannot avoid adverse impacts, they would provide appropriate mitigation or compensation. Reclamation and the USFWS are responsible for assessing whether the proposed action has the potential to affect ITAs.

The Yakama Nation and the Confederated Tribes of the Colville Indian Reservation have treaty and/or cultural and historical rights/interests in the area. These may include, but are not limited to, hunting, fishing, gathering, and other traditional activities. However, the project does not lie within either tribe's reservation boundaries.

Reclamation used its Tessel mapping database to determine the presence of ITAs in the project area. This database includes all known instances of trust land, reservation land, and village and community sites. The database is updated frequently by the Bureau of Indian Affairs. No ITAs were identified within a 25 mile radius of the project area. However, some tribes may include other aspects of the environment in their definition of trust assets. These may include water rights, fishing, hunting, and gathering activities. Section 0 of this EA discusses effects of the project on those resources.

Treaty harvest by the Yakama Nation and the Colville Confederated Tribes, and non-Treaty harvest are important parts of the Icicle fishery (Aspect 2014). During the late summer and early fall, when natural flows in Icicle Creek are lowest, it is a challenge to supply water for out-of-stream uses while meeting instream flow targets needed to maintain adequate passage and habitat conditions for ESA-listed fish species. Improvements related to the valve replacement would provide more reliable instream flows during the late summer and early fall. In turn, this would provide benefit to a broad stakeholder group, including IPID, Federal, and tribal interests in enhancing instream flows on Icicle Creek.

3.10.1.1 Proposed Action

Under Alternatives 2 and 3, there would be no effect to Indian Trust Assets.

3.10.1.2 No Action

Under the No Action Alternative, there would be no effect to Indian Trust Assets.

3.10.1.3 Cumulative Effects

No cumulative effects are anticipated on this resource as a result of the proposed project.

4 CONSULTATION AND COORDINATION

4.1 National Historic Preservation Act

Congress enacted the National Historic Preservation Act in 1966. Section 106 of the Act requires Federal agencies to consider project-related impacts to historic properties, which includes prehistoric and historic-period archeological sites, traditional cultural properties, and elements of the built environment. Federal regulations (30 CFR 800) define the process for implementing the NHPA, which includes consultation with the State Historic Preservation Officers. The NHPA requires that Federal agencies complete inventories and site evaluations to identify historic resources that may be eligible for listing on the National Register, and then ensure those resources "are not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly." Regulations titled "Protection of Historic Properties" (36 CFR 800) define the processes for implementing requirements of the NHPA. These requirements include consultation with the appropriate State Historic Preservation Officers, the Advisory Council on Historic Preservation, Indian tribes, and other agencies about Federal findings regarding project effects. As indicated above, Reclamation and the USFWS have made a finding of No Adverse Effect under NHPA. Reclamation and the USFWS are reviewing this finding with the appropriate parties.

4.2 Endangered Species Act (1973) Section 7 Consultation

The Endangered Species Act of 1973 required all Federal agencies to ensure that their actions do not jeopardize the continued existence of listed species, or destroy or adversely modify

their critical habitat. As part of the ESA's Section 7 process, an agency must request information from the USFWS and NMFS on whether any threatened and endangered species occur within or near the action area. The agency then must evaluate impacts to those species. If the action may affect any listed species, the agency must consult with the USFWS or NMFS.

4.3 Tribal Coordination and Consultation

Reclamation and the USFWS will conduct ongoing consultation with the CCT, and the Yakama Nation regarding changing project conditions and any potential for those changes to affect historic properties and sacred sites. If any part of the project or the associated effects changes, Reclamation and the USFWS will consult with the CCT and the Yakama Nation regarding any potential effects to historic properties or cultural objects.

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