January 3, 2019

RE: Final Programmatic Environmental Impact Statement for the Icicle Creek Water Resource Management Strategy, Chelan County, Washington

Dear Interested Parties, Jurisdictions, Tribes and Agencies:

Enclosed for your review is the **Final** Programmatic Environmental Impact Statement (PEIS) for the Icicle Creek Water Resource Management Strategy (Icicle Strategy), prepared jointly by Chelan County and Washington State Department of Ecology. The objective of the Icicle Strategy is to improve instream flows, improve the sustainability of Leavenworth National Fish Hatchery, protect tribal and non-tribal fish harvest, improve domestic supply, improve agricultural reliability, enhance Icicle Creek habitat, and comply with State and Federal Law, including the Wilderness Acts within the Icicle Creek Subbasin, Chelan County, Washington.

This PEIS was prepared in compliance with Washington's State Environmental Policy Act (SEPA), Chapter 43.21C RCW and the SEPA Rules Chapter 197-11 WAC. In 2016, Chelan County and Washington State Department of Ecology issued a determination of significance on February 9, 2016 and formally initiated the SEPA scoping process. An open house was held in April 2016, with a 90-day SEPA scoping comment period that concluded May 11, 2016. Following scoping, several alternatives were developed in response to comments received. This PEIS evaluates five action alternatives to improve water management in Icicle Creek, as well as a No-action Alternative. The following table outlines the various alternatives analyzed in the PEIS.

A draft of this document was issued on May 31, 2018, which was followed by a 60-day comment period that closed on July 30, 2018. The intent of the Draft PEIS was to provide an opportunity for the public, tribes, agencies, stakeholders, and other parties to review likely impacts of implementing the Icicle Strategy at the programmatic level and provide comments on the document. The co-leads appreciate the time and attention that commenters committed to reviewing the Draft PEIS.

A total of 9,981 comments were submitted via email, letter, comment form, or court reporter on the Draft PEIS. Of these, 8,825 were considered. Comments not considered included comments

submitted before or after the comment period, duplicate comments (identical comment from the same commenter was only counted once), and emails from the co-leads with "test" included in the subject line. In total, there were 203 late/early comments, 943 duplicate comments, and 10 "test" comments not considered. Draft PEIS comments and responses are available in Appendix A of the Final PEIS. Some small revisions were made to the document based on comments received. Following the comprehensive scoping and public comment for the PEIS, Ecology and Chelan County have selected Alterative 1 as the Preferred Alternative.

The Final PEIS is available for viewing on the Internet at:

https://fortress.wa.gov/ecy/publications/SummaryPages/1812016.html

And

http://www.co.chelan.wa.us/natural-resources/pages/icicle-work-group?parent=Planning

This Final PEIS is being issued under WAC 197-11-460 and completes the programmatic SEPA review. This document will be used to inform Chelan County, Ecology, and the Icicle Work Group as work continues on the Icicle Strategy to ensure the guiding principles and goals of the program are met.

Sincerely,

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Enclosure: Icicle Strategy Final PEIS

Icicle Strategy PEIS Alternatives Table

Projects	Proposed Alternatives					
	No Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Conservation						
IPID Irrigation Efficiencies	○	●	●	●	●	
COIC Irrigation Efficiencies (Piping)	●	●	●	●	●	●
Domestic Conservation Efficiencies	○	●	●	●	●	●
LNFH Conservation and Water Quality Improvements	●	●	●	●	●	●
Pump Exchange						
IPID Dryden Pump Exchange	○	○	●	●		
Full IPID Pump Station						●
COIC Irrigation Efficiencies (Pump Exchange)	●	●	●	●	●	●
Modification/Restoration of Existing Storage						
Alpine Lakes Reservoir Optimization, Modernization and Automation	○	●			●	●
Eightmile Lake Storage Restoration	○	●	●	○	●	●
New Storage						
Eightmile Lake Storage Enhancement					●	
Upper Klonaqua Lake Storage Enhancement					●	
Upper and Lower Snow Lakes Storage Enhancement					●	
Habitat/Fisheries Improvements						
Tribal Fishery Protection	○	●	●	●	●	●
Habitat Protection and Enhancement	○	●	●	●	●	●
Fish Passage	●	●	●	●	●	●
Fish Screening	●	●	●	●	●	●
Legislative/Administrative Tools						
Water Markets		●	●	●	●	●
Instream Flow Rule Amendment	○	●	●	●	●	●
OCPI legislative fix from instream flow impacts				●		

○ Represents projects that might proceed if funding becomes available. However, under the No-action Alternative, project beneficiaries may be different and project timelines are unknown.

● Represents projects that are likely to occur as described, but could be replaced by another project that fulfills the same guiding principles if a design, funding, or permitting fatal flaw is identified.

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List of Acronyms and Abbreviations

Abbreviation	Definition
7	
7DADmax	7-Day Average Daily Maximum
A	
ac-ft	acre feet
afy	acre feet per year
ALWA	Alpine Lakes Wilderness Area
asl	above sea level
B	
BA	Biological Assessment
BIA	Bureau of Indian Affairs
BiOp	Biological Opinion
BMPs	Best Management Practices
BNSF	Burlington Northern Santa Fe Railway
C	
CAA	Clean Air Act
CAO	Critical Area Ordinance
CatEx	Categorical Exclusion
CELP	Center for Environmental Law and Policy
CFR	Code of Federal Regulations

Abbreviation	Definition
C	
cfs	cubic feet per second
CIG	Climate Impacts Group
COIC	Cascade Orchards Irrigation Company
CPUE	catch per unit effort
CSZ	Cascadia subduction zone
CTCR	Confederal Tribes of the Colville Reservation
CWA	Clean Water Act
CWCP	Comprehensive Water Conservation Plan
D	
DAHP	Washington State Department of Archeological and Historic Preservation
dBA	A-weighted decibels
dbh	diameter breast height
DDD	dichloro-diphenyl-dichloroethane
DDE	dichloro-diphenyl-ethane
DDT	dichloro-diphenyl-trichloroethane
DMR	Discharge Monitoring Reports
DO	dissolved oxygen
DOI	United States Department of Interior
DPS	distinct population segment
DS	Determination of Significance
DSO	Dam Safety Office

Abbreviation	Definition
E	
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EDNA	environmental designation for noise abatement
EFH	essential fish habitat
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ERU	Equivalent Residential Unit
ESA	Endangered Species Act
ESD	Washington Employment Security Department
ESU	Evolutionarily Significant Unit
F	
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
G	
GEO	Governor's Executive Order
GHG	greenhouse gas
GHOD	Geologically Hazardous Overlay District
GP	Guiding Principle
gpd	gallons per day
gpm	gallons per minute

Abbreviation	Definition
H	
HPA	Hydraulic Project Approval
I	
ICIFS	Icicle Creek Instream Flow Subcommittee
ICWC	Icicle Creek Watershed Council
IFIM	Instream Flow Incremental Methodology
IPID	Icicle-Peshastin Irrigation District
IID	Icicle Irrigation District
ITAs	Indian Trust Assets
IWG	Icicle Work Group
J	
JARPA	Joint Aquatic Resources Permit Application
L	
Ldn	average sound level
Leq	equivalent sound pressure levels
LNFH	Leavenworth National Fish Hatchery
LWD	large woody material
M	
MCRFRO	Mid-Columbia River Fisheries Resource Office
MOA	Memorandum of Agreement
MSA	Magnuson-Stevens Act
MSA	Metropolitan Statistical Area
MWG	Montgomery Water Group Inc.

Abbreviation	Definition
N	
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NEPA	National Environmental Policy Act
NF	National Forest
NMFS	Nation Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSD	Natural Systems Design
NWP	Nationwide Permit
NWS	National Weather Service
O	
O&M	operation and maintenance
OCPI	Overriding Consideration of the Public Interest
OCR	Office of the Columbia River
OFM	Washington Office of Financial Management
OHWM	ordinary high water mark

Abbreviation	Definition
P	
PA	Proof of Appropriation
PCBs	polychlorinated biphenyls
PCN	preconstruction notification
PEIS	Programmatic Environmental Impact Statement
PEM	palustrine emergent
PFO	palustrine forest
PHABSIM	Physical Habitat Simulation
PHS	Priority Habitat and Species
PID	Peshastin Irrigation District
PM	particulate matter
POTW	publicly owned treatment works
PUD	Public Utility District
PSS	palustrine scrub-shrub
Q	
Qa	annual quantity
Qi	instantaneous quantity
R	
RAS	recirculating aquaculture system
RCW	Revised Code of Washington
RM	River Mile
ROE	Report of Examination
RV	recreational vehicle

Abbreviation	Definition
S	
SAAQS	State Ambient Air Quality Standards
SEPA	State Environmental Policy Act
SIP	State Implementation Plan
SMA	Shoreline Management Act
SMP	Shoreline Master Plan
SUP	stand-up paddleboard
SWPPP	Stormwater Pollution Prevention Control Plan
T	
TCPs	Traditional Cultural Properties
TDH	total dynamic head
TMDL	Total Maximum Daily Load
TWRA	Trust Water Rights Agreement
TWRP	Trust Water Rights Program
U	
U&A	Usual and Accustomed
UCSRB	Upper Columbia Salmon Recovery Board
UGA	urban growth area
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USC	United States Code
USDA	United States Department of Agriculture

Abbreviation	Definition
U	
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
USGS	United States Geological Survey
UW	University of Washington
UWCLP	Upper Wenatchee Community Land Plan
W	
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WISAARD	Washington Information System for Architectural and Archaeological Data
WMSA	Wenatchee Metropolitan Statistical Area
WRIA	Water Resource Inventory Area
WSP	water system plan
WUA	weighted usable area
WWPU	Wenatchee Watershed Planning Unit
Y	
YN	Yakama Nation

EXECUTIVE SUMMARY

This Executive Summary reviews the analysis conducted in the programmatic environmental impact statement (PEIS) for proposals to improve water management in the Icicle Creek Subbasin. Per Washington Administrative Code (WAC) 197-11-400, the purpose of this PEIS is to provide discussion of the environmental impacts and to inform the Icicle Work Group (IWG), regulators, funders, and the public of reasonable alternatives and mitigation measures. A PEIS evaluates the effect of broad proposals and planning-level decisions, and thus the level of knowledge on project detail varies. The proposed alternatives and impacts discussed here are based on the current knowledge and understanding of project details. Per WAC 197-11-406, the co-leads initiated State Environmental Policy Act (SEPA) review as early in the process as possible so that the PEIS could be used effectively as part of the decision-making process.

Introduction

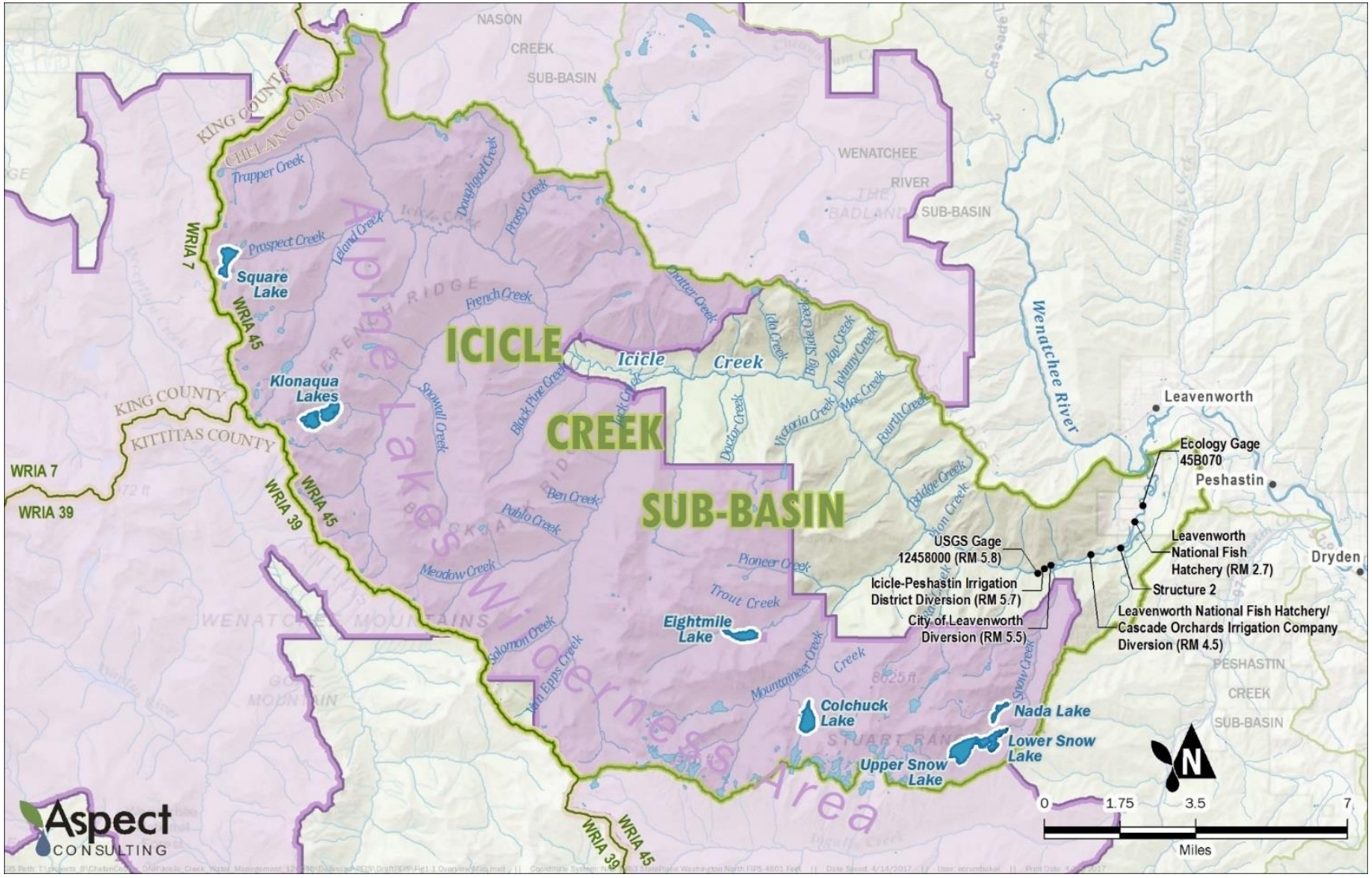
Icicle Creek is a major tributary to the Wenatchee River and is located entirely within Chelan County, Washington. Flows from Icicle Creek supply a variety of demands, including domestic water supply (e.g., City of Leavenworth and rural Chelan County residents), agricultural irrigation (e.g., Icicle-Peshastin Irrigation District (IPID) and Cascade Orchards Irrigation Company (COIC)), artificial aquatic habitat for hatchery fish raised at the Leavenworth National Fish Hatchery (LNFH), natural aquatic habitat for wild (non-hatchery) fish, and recreation. Figure ES-1 provides an overview of the Icicle Creek Subbasin. Taken together, water needs in the Subbasin are often greater than the available supply.

To find solutions for water management within the Subbasin, the Chelan County Natural Resource Department (Chelan County, County) and the Washington State Department of Ecology's (Ecology) Office of the Columbia River (OCR) co-convened the IWG (Work Group) in December 2012. The IWG comprises a diverse set of stakeholders representing local, state, and federal agencies, tribes, irrigation and agricultural interests, municipal/domestic water managers, and environmental organizations. Since 2012, the IWG has been studying and negotiating an integrated water resource management strategy for the Icicle Creek Subbasin. The proposal discussed in this document is the result of this effort.

Purpose and Need for Action

The current water management practices in the Icicle Creek Subbasin fail to consistently meet the demand for instream and out-of-stream water uses. This has been demonstrated by the minimum instream flows established in Chapter 173-545 WAC not being met, interruptible water users not receiving irrigation water, and litigation over water rights. There are additional issues in Icicle Creek surrounding fish habitat and passage, tribal fishing rights, and sustainable operation of the LFNH. The following sections summarize some of the key issues in water resource management and watershed function within Icicle Creek that lead to a need for a comprehensive water resource management plan within the Subbasin.

Figure ES-1. Icicle Creek Subbasin



These problems have created a need to improve ecological function in Icicle Creek and to provide reliable water resources for agriculture and domestic water users. With the additional pressures on water resources that will likely result from a changing climate, it is imperative to address these problems in a way that considers potential future impacts of climate change. The Icicle Strategy seeks to address these issues while considering the potential climate impacts and ensuring all actions comply with state and federal law, including the Wilderness Acts.

The Icicle Strategy and Guiding Principles

The Icicle Strategy is a comprehensive water resource management plan designed to balance and meet out-of-stream and instream water demand and resolve habitat and fisheries issues in the Icicle Creek Subbasin. The IWG developed the Icicle Strategy using stakeholder input and best available science. The crux of the Icicle Strategy is the Guiding Principles, which are a set of objectives that all members of the IWG agreed were in their mutual best interest to collaborate on and achieve. Over a 2-day work session facilitated by the U.S. Bureau of Reclamation (USBR) in December 2012, the IWG developed a list of shared goals to guide them in developing a strategy to meet the needs of the various stakeholders in the Subbasin. This list became known as the Guiding Principles, which have evolved since their initial development. These Guiding Principles, as they exist today, are described below:

Improve Instream Flow: This principle seeks to improve and enhance instream flows in the Icicle Creek historical channel. The goal is to modulate the flow in a way that enhances fish passage and fish utilization and promotes healthy habitats, serves channel formation function, meets aesthetic and water quality objectives, and is resilient to climate change.

The metric for this principle calls for 60 cubic feet per second (cfs) in drought years. To meet drought year goals, a minimum of 40 cfs will need to be protected instream. The short-term goal is for 100 cfs minimum flows in non-drought years, with a long-term goal set at 250 cfs. A maximum flow of 2,600 cfs can pass through LNFH's "Structure 2", which is located at River Mile (RM) 3.9 and is used to divert flows into the LNFH's Hatchery Channel. Based on work conducted by the IWG's Instream Flow Subcommittee, this flow maximum will remain in place.

Improve Sustainability of LNFH: This principle aims to enhance and maintain a healthy, sustainable LNFH that produces fish in adequate numbers to meet *U.S. v. Oregon*, which specifies fish production requirements. It also aims to produce diverse source availability to maximize fish health. To do this, calls for a 57 cfs supply to be protected long-term with a conservation goal of at least 20 cfs. It also includes appropriately screened diversions and minimizing unintended barriers to fish passage.

Protect Treaty/Non-treaty Harvest: Treaty harvest by the Yakama Nation, the Confederated Tribes of the Colville Reservation, and non-treaty fishing are important parts of the Icicle Creek Subbasin. This principle maintains that tribal and non-tribal, federally protected fishing and harvest rights must be met at all times regardless of season or drought conditions. It aims to improve the catch per unit effort (CPUE) and maintain multispecies harvest opportunities.

Improve Domestic Supply: As the population inside the Icicle Creek Subbasin grows, more water will be needed by the City of Leavenworth and surrounding areas in Chelan County. This principle calls for 1,750 acre-feet of reliable year-round supply, with 3 to 6 cfs on average and 6 to 12 cfs during peak flows to provide for projected growth through 2050. Additionally, this principle aims to improve domestic reliability for rural water users in the Icicle Creek Subbasin who depend on domestic wells to supply their drinking water.

Improve Agricultural Reliability: With agriculture vital to the health and prosperity of the region, this principle calls for projects to improve agricultural reliability that are operational, flexible, decrease risk of drought impacts, and are economically sustainable. It ensures current interruptible agricultural users have a firm supply in average water years.

Enhance Icicle Creek Habitat: This principle seeks to improve ecosystem health by protecting and enhancing aquatic and terrestrial habitat in the Icicle Creek Subbasin. This includes investments in physical habitat improvements that consider high-flow habitat and low-flow refuge, along with minimizing impediments to fish passage and improving limiting factors for spawning/rearing. It also offsets project-related terrestrial impacts with land acquisitions/easements.

Comply with State and Federal Law, and Wilderness Acts: Projects developed under the Icicle Strategy must comply with both Washington State and federal laws, including The Wilderness Act of 1964, the Alpine Lakes Wilderness Act of 1976, and the Alpine Lakes Wilderness Management Plan of 1981. The IWG actively identified and engaged regulators in the process of creating the approaches and projects for the Icicle Strategy.

Identification of Preferred Alterative

Following the comprehensive scoping and public comment for the PEIS discussed in Chapter 2, Ecology and Chelan County have selected Alterative 1 as the Preferred Alternative. The co-leads determined that the suite of projects and elements that comprise Alternative 1 have the best chance of meeting the Guiding Principles over time, have the highest likelihood of funding, and have the lowest environmental footprint of the other alternatives considered. Alternative 1 will achieve the following:

- Improve Instream Flows
- Improve Sustainability of LNFH
- Protect Tribal and Non-Tribal Harvest
- Improve Domestic Supply
- Improve Agricultural Reliability
- Enhance Icicle Creek Habitat
- Comply with State and Federal Law
- Comply with Wilderness Acts

There are anticipated environmental impacts from all alternatives considered under the PEIS, but overall Alternative 1 is the environmentally preferred alternative to meet the Purpose and Need of the Icicle Strategy. While the No-action Alternative and Alternative 3 have lower costs and impacts, they cannot fully meet the Purpose and Need. Additionally, Alternative 3, when accounting for elements of the No-action Alternative likely to proceed, have similar or greater impacts than the Preferred Alternative. The overall effect of Alternative 1 is expected to be more beneficial than the No-action Alternative for both instream and out-of-stream water supplies while enhancing fish habitat.

Alternatives

The Icicle Strategy seeks to improve water resources management in the Icicle Creek Subbasin and achieve the specific metrics outlined in the Guiding Principles. This PEIS evaluates five alternatives that meet the Guiding Principles, along with a No-action Alternative. Each alternative is composed of a package of several projects developed to help meet the IWG's Guiding Principles. In summary, the five alternatives and the No-action Alternative include:

- **No-action Alternative:** The No-action Alternative is presented to show the impacts of not implementing the Icicle Strategy. Under the No-action Alterative, some projects may be developed on separate and different pathways by proponents other than the IWG, although it is unlikely all would be implemented. Funding for projects would be delayed or less competitive without an integrated solution, resulting in slower implementation of projects that do succeed without IWG support. Project beneficiaries may be different and not focused on meeting guiding principles. Projects that may be implemented, on their own independent timelines, could improve streamflow by approximately 32 cfs and 18,094 acre-feet.
- **Alternative 1 (Preferred Alternative):** The IWG has identified the first alternative as the Base Package, consisting of 12 elements that work in concert to achieve all of the Guiding Principles. The package is a mix of projects, including automating and optimizing reservoir releases at seven Alpine Lakes; efforts to make hatchery, irrigation, and domestic use more efficient; enhancement of habitat, fish passage, and fish screening; and protection of tribal and non-tribal fisheries. The suite of projects proposed under Alternative 1 is estimated to cost $82.0 million, which includes a 25 percent contingency for all projects and an additional 25 percent contingency for projects within the ALWA. These projects are anticipated to provide 89 cfs and 31,958 acre-feet of total water benefit (instream and out-of-stream), of which 88 cfs and 28,458 acre-feet instream flow benefit. This estimate of instream flow benefit includes reach benefit for out-of-stream uses that would occur downstream.
- **Alternative 2:** This alternative builds on the foundation of Alternative 1, but replaces the Alpine Lakes Optimization project with the IPID Dryden Pump Exchange project. Alternative 2 is estimated to cost $91.4 million, which includes a 25 percent contingency for all projects and an additional 25 percent contingency for projects within the ALWA. This alternative would provide 84 cfs and 27,978 acre-feet of total water benefit (instream and out-of-stream), of which 83 cfs and 24,478 acre-feet of instream flow

benefit. This estimate of instream flow benefit includes reach benefit for out-of-stream uses that would occur downstream.

- **Alternative 3:** This alternative also builds on the foundation of Alternative 1, but focuses on project selection outside the ALWA through greater reliance on conservation and pump exchange projects. Because supply and demand cannot be matched well without storage, it also includes a legislative change for instream flow impacts that would occur when conserved water is not able to fully meet demand in-time and in-place. This is a requirement given recent Supreme Court clarity in the *Foster/Yelm* case. Alternative 3 is estimated to cost $89.0 million, which includes a 25 percent contingency. This alternative would provide 71 cfs and 24,378 acre-feet of total water benefit (instream and out-of-stream), of which 70 cfs and 23,578 of instream flow benefit. This estimate of instream flow benefit includes reach benefit for out-of-stream uses that would occur downstream.
- **Alternative 4:** This alternative provides a greater emphasis on development of water supplies, with enhancements to Eightmile Lake and storage improvements at the Upper Klonaqua and Snow Lakes. This alternative was selected to evaluate the value of greater flexibility in shaping water availability to meet future changes in both supply and demand. The estimated cost, which includes a 25 percent contingency for all projects and an additional 25 percent contingency for projects within the ALWA, is $87.8 million. However, it does not include cost estimates for the Upper Klonaqua Lakes Storage Enhancement project because costs are unknown at this stage of project development. This alternative would provide 132 cfs and 35,385 acre-feet of total water benefit, of which 131 cfs and 34,585 acre-feet of instream flow benefit. This estimate of instream flow benefit includes reach benefit for out-of-stream uses that would occur downstream.
- **Alternative 5:** This alternative builds on the foundation of Alternative 1, but provides a greater emphasis on out-of-basin water supplies. Under Alternative 5, the IPID Irrigation Efficiencies element would be replaced with the IPID Full Piping and Pump Exchange. Under the IPID Full Piping and Pump Exchange, the IPID diversion would be completely removed from Icicle Creek, and it would be replaced with three pump stations on the Wenatchee River. The estimated cost, which includes a 25 percent contingency, is $177.3 million. This alternative would provide 196 cfs and 58,958 acre-feet of total water benefit, and 195 cfs and 55,458 acre-feet of instream flow benefit to Icicle Creek. This estimate of instream flow benefit includes reach benefit for out-of-stream uses that would occur downstream.

The SEPA co-leads, in consultation with the IWG, selected Alternative 1 as the Preferred Alternative after public comment on this Draft PEIS closed and comments were considered.

No-action Alternative

The No-action Alternative represents what might happen if no integrated, comprehensive strategy for managing water resources in Icicle Creek is adopted and implemented by the IWG to meet the Guiding Principles established by the IWG. Under the No-action Alternative, some projects may still be developed, but projects would be developed on

separate timelines and for different purposes than those outlined in the Guiding Principles. Projects would likely be developed independently by members of the IWG or by proponents other than the IWG. Funding for projects would likely be delayed and projects may be less competitive for funding without an integrated strategy. Projects could be delayed or not implemented at all because of the lack of consensus-building at the local level. The No-action Alternative would fail to meet the instream flow Guiding Principle.

It is difficult to predict which of the projects might be constructed, delayed, or not implemented. However, based on the level of study and potential funding available for the various projects at the time of this PEIS, the following projects[1] are likely to be implemented in some form under the No-action Alternative.

- **Alpine Lakes Optimization, Modernization, and Automation** modernizes and automates the outlet works and gate infrastructure at seven lakes. Under the Icicle Strategy, this project would be implemented for instream flow benefit. However, if the Icicle Strategy does not advance, it is probable that at some point IPID would implement this project to improve their operations as part of routine reservoir maintenance that all infrastructure owners consider. However, if IPID pursues modernization and automation of the gates on its own, releases for the purposes of benefiting instream flow would not be guaranteed and would more likely be optimized for agricultural use.

- **IPID Irrigation Efficiencies** would likely continue to be explored and implemented if funding were available because IPID has continually worked to improve efficiency within the District. However, funding may be more limited if not included as part of an integrated water resource management strategy, which could limit the scope and magnitude of efficiency projects. Additionally, all water saved through irrigation efficiency upgrades would likely assist IPID in meeting agricultural reliability purposes only, rather than bolstering instream flows, unless funding is used for a specific project that requires a trust water right transfer or some other commitment to instream flows.

- **COIC Irrigation Efficiencies and Pump Exchange** funding opportunities will likely exist for this project if the Icicle Strategy is not implemented. The COIC project is already proceeding with design and environmental permitting based on the strength of consensus built by the IWG over the last 5 years. Funding for the project is primarily based on the potential benefit the project offers to Icicle Creek. The project would shift the point of diversion for COIC from Icicle Creek to a location near the confluence of Icicle Creek and the Wenatchee River. The project would also improve efficiency. The project would benefit Icicle Creek and assist in providing more reliable service to COIC.

[1] Refer to Section 2.5 for full descriptions of projects.

- **Domestic Conservation** would likely continue to be explored and implemented if funding were available because the City of Leavenworth has already invested in conservation in the past and is required to pursue water use efficiency measures as part of conservation planning required by Municipal Water Law. The County also has addressed continuing rural conservation options by teaming with local water purveyors on how to incentivize or promote this idea. However, funding may be more limited if not included as part of an integrated water resource management plan, which could limit the magnitude of conservation projects. Regardless, water saved under the No-action Alternative would benefit the domestic uses in a similar manner as, although potentially to a lesser degree than would occur for the other alternatives.

- **Eightmile Lake Storage Restoration** will occur because IPID has a long-term responsibility to maintain its infrastructure to provide reliable water service to its irrigation customers, while protecting public safety of those downstream of their dams. While the Eightmile Lake Dam is in need of repair, the District has prioritized other capital improvements over this project in recent years, including conservation and other dam maintenance, in part to allow for this project to be evaluated in more detail by the IWG. However, the need to make improvements has become more urgent because the outlet is collapsing and losing capacity. In addition, a fire in 2017 burned to the shoreline of the lake, likely changing the hydrology of inflow to the lake and raising concerns about the condition and safety of the dam. IPID declared an emergency on March 13, 2018, as a result of the 2017 fire and is actively coordinating with local, state, and federal agencies on this project. If not implemented or funded as part of an integrated strategy, IPID would not be obligated to release any of this water for instream flow or domestic benefit as envisioned under multiple Alternatives considered in this PEIS. Instead that water would be retained for agricultural reliability and drought resiliency.

- **Habitat Protection and Enhancement** may occur at a reduced level. Prior to the IWG, Chelan County has worked on habitat improvements in lower Icicle Creek. This would likely continue, although funding may be more limited if not included as part of an integrated water resource management plan project and the extent of the habitat protection and enhancement could be lower.

- **Instream Flow Rule Amendment** may be sought if other required projects are completed (e.g., LNFH improvements and habitat enhancement), as envisioned under the original rule language in WAC 173-545-090. However, this may occur over a longer timeline.

- **LNFH Conservation and Water Quality Improvements** focuses on projects to reduce surface water use and improve access to groundwater. Projects required in the Biological Opinion (BiOp) would continue without the Icicle Strategy. These include consideration of water reuse, groundwater augmentation, and a pump

back that would allow for changing operations at Structure 2 and the division of water between the historic and hatchery channels.

- **Fish Screen Compliance** upgrades will likely continue if the Icicle Strategy is not implemented. These upgrades are required by law, and grant funding has already been expended on the design of screening improvements for the City of Leavenworth and IPID diversions. Screening for COIC is included in the COIC Irrigation Efficiencies project, while screening for LNFH is required under the BiOp and will be the subject of National Environmental Policy Act (NEPA) environmental review. However, implementation may occur on a slower timeline based on funding and would not necessarily occur in a way that would benefit other projects included in the Icicle Strategy, such as Habitat Protection and Enhancement.
- **IPID Dryden Pump Exchange** may be implemented under the No-action Alternative. However, the project would likely be rescaled and focused, at least initially, on reducing diversions from Peshastin Creek and improving the reliability of water supply to the Peshastin Irrigation District (PID) Main Canal, which could result in no benefit or less benefit in Icicle Creek.

Alternative 1 (Preferred Alternative)

Alternative 1, also referred to as the Base Package, meets all the objectives defined in the IWG's Guiding Principles. Alternative 1 was selected as the Preferred Alternative). These projects have been agreed to and moved forward by the IWG for review in this PEIS. While IWG members had reserved a final recommendation on Alternative 1 until resolution of the PEIS and consultation with the co-leads, it has been determined that this alternative represented the best recommendation available after four years of study by IWG members and study in the PEIS.

Alternative 1 includes the following projects[2]:

- **Alpine Lakes Reservoirs Optimization, Modernization, and Automation** modernizes and automates the outlet works and gate infrastructure at seven lakes. The intent is to improve management and releases of stored water at seven lakes in the Icicle Creek Subbasin based on changing conditions to meet the Subbasin's needs. It increases streamflow for fish and improves reliability and operation of stored water for agricultural use and the LNFH.
- **IPID Irrigation Efficiencies** explores options to improve irrigation delivery and on-farm efficiencies. Projects may include canal piping or lining, on-farm efficiency upgrades, and a lawn buyback program, which would improve drought resiliency and reliability to district users. This project also benefits fish by increasing streamflow.

[2] Taken from Icicle Strategy SEPA Checklist: http://www.co.chelan.wa.us/files/natural-resources/documents/Planning/icicle_work_group/SEPA/Icicle%20Strategy%20SEPAChecklist%20Signed.pdf

- **COIC Irrigation Efficiencies and Pump Exchange** proposes to change COIC's point of diversion from its existing location at RM 4.5 on Icicle Creek to a location on the right bank of the Wenatchee River near its confluence with Icicle Creek or on the left bank of Icicle Creek near its confluence with the Wenatchee River and implement other water saving measures, such as piping the delivery system. The augmented streamflow has the potential to improve reliability of water supply for agriculture, benefit fish passage and habitat, and maintain treaty and non-treaty harvests.
- **Domestic Conservation Efficiencies** focuses on conservation projects in the City of Leavenworth and Chelan County and implements municipal and rural water efficiency projects such as leak detection and repair, meter installation, a lawn buyback program, and water use conservation to improve domestic supply.
- **Eightmile Lake Storage Restoration** rebuilds the Eightmile Lake dam to restore usable storage to the historical and permitted high water storage elevation. This would increase streamflow for fish and meet the domestic water needs of the City of Leavenworth and surrounding rural areas in Chelan County and improves the reliability and drought resiliency for agricultural users.
- **Tribal and Non-Tribal Fisheries** ensures that projects and actions taken do not have negative effects on tribal fishery activity in the Icicle Creek Subbasin. It monitors fishery effectiveness and implements actions for improvement, while protecting Tribal Treaty and federally protected harvest rights and non-tribal harvest at all times.
- **Habitat Protection and Enhancement** identifies and implements stream restoration and protection projects such as riparian plantings, engineered log jams, and conservation easements to improve stream habitat and ecosystem health.
- **Instream Flow Rule Amendment** modifies the instream flow rule's interim domestic reservation of 0.1 cfs to a final level of 0.5 cfs. This helps meet domestic water needs through 2050. As described in Chapter 173-545 WAC, the rule amendment requires instream flow and habitat restoration. This will improve domestic supply in the Icicle Creek subbasin.
- **LNFH Conservation and Water Quality Improvements** focuses on projects to reduce surface water use and improve access to groundwater. These projects may include onsite reuse, an effluent pump back, and wellfield enhancements for year-round benefits. It would also increase streamflow for fish and improve access to reliable water for the hatchery's operations. These projects also improve water quality in Icicle Creek.
- **Fish Passage** improves passage by assessing and removing barriers, so fish have better access to healthy habitats. This could include improved operation at Structure 2 and modification of channel morphology at the Boulder Field. Improved passage will increase the amount of habitat fish can access within the subbasin.
- **Fish Screening** upgrades fish screens on diversions to meet current standards. This will bring the major diverters on Icicle Creek into compliance with Washington State and NMFS screening requirements and bring LNFH into compliance with the screening requirements set in the BiOp (Nation Marine Fisheries Service (NMFS), 2015). These projects reduce fish mortality, which ultimately improves fish passage.

- **Water Markets** creates an Icicle Water Market and seeds it with an initial 1,000 acre-feet of water for agriculture use in the Icicle Creek Subbasin and Wenatchee River Basins during shortages.

Additional projects may be pursued outside of the Icicle Strategy if Alternative 1 is selected as the preferred alternative, such as the IPID Dryden Pump Exchange. However, project beneficiaries may be different and project timelines are unknown.

Alternative 1 addresses all the IWG's Guiding Principles. This suite of projects is expected to cost $82M, provides 89 cfs and 31,958 acre-feet of total water benefit (88 cfs and 28,458 acre-feet of instream benefit).

Alternative 2

The IWG developed Alternative 2 in response to SEPA scoping comments that requested examination of pump station options and omission of the Alpine Lakes Optimization, Modernization, and Automation project. This alternative includes most of the projects from in Alternative 1—with the exception of the Alpine Lakes Optimization, Modernization, and Automation—and adds the IPID Dryden Pump Exchange project.

Alternative 2 includes the following projects:

- **IPID Dryden Pump Exchange** would install a pump station on the right bank of the Wenatchee River near Dryden and a delivery pipeline that would extend through private orchards and driveways to the IPID canals. Water pumped from the Wenatchee River would allow for a corresponding reduction in diversions from Icicle and Peshastin Creeks, which would improve streamflow. The augmented streamflow has the potential to improve reliability of water supply for agriculture, benefit fish passage and habitat, and maintain treaty and non-treaty harvests.
- IPID Irrigation Efficiencies
- COIC Irrigation Efficiencies and Pump Exchange
- Domestic Conservation Efficiencies
- Eightmile Lake Storage Restoration
- Tribal Fisheries Protection
- Habitat Protection and Enhancement
- Instream Flow Rule Amendment
- LNFH Conservation and Water Quality Improvements
- Fish Passage
- Fish Screening
- Water Markets

Additional projects may be pursued outside of the Icicle Strategy if Alternative 2 is selected as the preferred alternative, such as the IPID Dryden Pump Exchange. However, project beneficiaries may be different and project timelines are unknown.

Alternative 2 addresses all the IWG's Guiding Principles. This suite of projects is expected to cost $91M, provides 84 cfs and 27,978 acre-feet of total water benefit (instream and out-of-stream).

Alternative 3

Alternative 3 is a response to SEPA scoping comments that expressed a desire for an alternative that excluded projects within the Alpine Lakes Wilderness Area. Alternative 3 includes most of the projects in Alternative 1, with the exception of the Alpine Lakes Optimization, Modernization, and Automation and the Eightmile Lake Storage Restoration. It calls for a legislative change to waive impacts to instream flows when conservation and pump-exchange-based supplies cannot perfectly meet demand required to provide domestic reliability. For example, conservation supplies are available from April to October in this Alternative, but the Guiding Principle for domestic reliability requires year-round supplies. Because instream flows are at times not met from November to March, this would impair instream flows if legislative approval was not provided. Ecology no longer has the authority to waive these kinds of impacts through an Overriding Consideration of the Public Interest (OCPI) determination under RCW 90.54.020 given clarity from the Supreme Court in cases like *Swinomish* and *Foster/Yelm*.

Alternative 3 includes the following projects:

- IPID Dryden Pump Exchange
- IPID Irrigation Efficiencies
- COIC Irrigation Efficiencies and Pump Exchange
- Domestic Conservation Efficiencies
- Tribal Fisheries Protection
- Habitat Protection and Enhancement
- Instream Flow Rule Amendment
- LNFH Conservation and Water Quality Improvements
- Fish Passage
- Fish Screening
- Water Markets
- Legislative Change for Instream Flow Impacts. Under this project, the IWG would seek a legislative change that would allow impairment to the Instream Flow Rule when increased flow from conservation do not line up temporally with demand. (GP4)

Additional projects may be pursued outside of the Icicle Strategy if Alternative 3 is selected as the preferred alternative, such as the Eightmile Lake Storage Restoration Project. However, project beneficiaries may be different and project timelines are unknown.

Alternative 3 addresses all the IWG's Guiding Principles. This suite of projects is expected to cost $86.9M, provides 71 cfs and 24,378 acre-feet of total water benefit (instream and out-of-stream).

Alternative 4

Alternative 4 was created as a response to SEPA scoping comments that requested increased storage in the Icicle Creek Subbasin as an adaptive measure to climate change uncertainty and to better react to changes in future demand. This alternative has all the same projects as the Base Package presented in Alternative 1, but calls for increasing storage at Eightmile Lake to above the historical high water mark and enhancing storage and release at Upper Klonaqua and Upper Snow Lakes. Conservation was not reduced over that identified in Alternative 1 because it was necessary to meet other Guiding Principles (e.g., LNFH hatchery reliability, agricultural reliability).

- Alpine Lakes Reservoirs Optimization, Modernization, and Automation
- **Eightmile Lake Storage Enhancement** differs from the Eightmile Lake Storage Restoration project included in Alternatives 1, 2, and 5. It calls for increasing the useable storage to approximately 3,500 acre-feet by rebuilding the dam to raise the high-water storage elevation and increasing the available drawdown.
- **Upper Klonaqua Lake Storage Enhancement** takes advantage of potential storage in Upper Klonaqua Lake by installing infrastructure to draw down the lake. Options for drawdown include tunneling, pumping, and siphon. Bathymetry suggests up to 2,448.2 acre-feet of water could be available for release.
- **Upper and Lower Snow Lakes Storage Enhancement** would raise the dam on Upper Snow Lake to increase storage capacity by 1,079 acre-feet.
- IPID Irrigation Efficiencies
- COIC Irrigation Efficiencies and Pump Exchange
- Domestic Conservation Efficiencies
- Tribal Fisheries Protection
- Habitat Protection and Enhancement
- Instream Flow Rule Amendment
- LNFH Conservation and Water Quality Improvements
- Fish Passage
- Fish Screening
- Water Markets

Additional projects may be pursued outside of the Icicle Strategy if Alternative 4 is selected as the preferred alternative. However, project beneficiaries may be different and project timelines are unknown.

Alternative 4 addresses all the IWG's Guiding Principles. This suite of projects is expected to cost $83.8M, provides 132 cfs and 35,385 acre-feet of total water benefit (instream and out-of-stream).

Alternative 5

The IWG developed Alternative 5 in response to continued stakeholder input that suggested completely removing IPID's diversion from Icicle Creek to the Wenatchee River. As part of its irrigation comprehensive plan update, IPID completed a very cursory review of a project that would replace the IID and PID canal systems with a pressurized pipe delivery system supplied by pump stations on the Wenatchee River at three locations, referred to herein as the IPID Full Piping and Pump Exchange project. Alternative 5 includes the same projects as Alternative 1, except the IPID Irrigation Efficiencies project is replaced by the IPID Full Piping and Pump Exchange project. This alternative would not eliminate the need for operation and management of storage within the Alpine Lakes Wilderness. IPID would need to continue to store and release water from reservoirs within the Alpine Lakes Wilderness to ensure water was available in the Wenatchee River for their use because instream flows are insufficient on both Icicle Creek and the Wenatchee River in the summer to meet IPID out-of-stream uses without storage. Alternative 5 would provide up to 195 cfs of instream flow benefit in Icicle Creek in both drought and non-drought years.

Alternative 5 includes the following projects:

- **IPID Full Piping and Pump Exchange** would fully replace the IPID canal systems with a pressurized pipe delivery system. Three intake and pump station facilities would be constructed on the Wenatchee River to supply the new system. The existing surface water diversion facilities on Icicle Creek and Peshastin Creek would be removed. This project would increase stream flow in Icicle Creek by up to 117 cfs, improve reliability of water supply for agriculture, benefit fish passage and habitat, and maintain treaty and non-treaty harvests.
- Alpine Lakes Optimization, Modernization, and Automation
- COIC Irrigation Efficiencies and Pump Exchange
- Domestic Conservation
- Eightmile Lake Storage Restoration
- Tribal Fishery Preservation and Management
- Habitat Protection and Enhancement
- Instream Flow Rule Amendment
- LNFH Conservation and Water Quality Improvements

- Fish Passage
- Fish Screen Compliance
- Water Markets

Alternative 5 addresses all the IWG's Guiding Principles. This suite of projects is expected to cost $174.4M, provides 196 cfs and 55,458 acre-feet of total water benefit (instream and out-of-stream).

Impacts to Resources

The following is a summary of the overall impacts to resources within the project area based on current evaluation. These impacts are organized based on short-term, construction related impacts, and long-term impacts anticipated for the operation and maintenance of projects. Table ES-1 and Table ES-2 provides a summary of impacts to each resource evaluated in this PEIS.

Overall Impacts and Benefits of the Icicle Strategy

The overall impacts of the Icicle Strategy are expected to be beneficial, although some localized adverse impacts could occur from the Program Alternatives. The Icicle Strategy is expected to provide benefit to the Icicle Creek Subbasin, as laid out in the Guiding Principles. The integrated planning approach developed for the Icicle Strategy is intended to improve water resource and the riverine ecosystem on a watershed scale.

Short-Term

Construction activities required for many of the project elements comprising the Program Alternatives would cause short-term impacts. These impacts include erosion and sedimentation, construction dewatering, vegetation removal, construction emissions and dust, noise, aesthetic impacts for equipment and stock piles, and traffic delays. Construction may also temporarily block access to areas near construction sites, resulting in temporary disruption to activities in those areas, such as fishing or recreational use. Additionally, other impacts such as increased noise and dust or aesthetic changes might create a disturbance for recreationalists and wilderness users. Noise and vibrations could also temporary disturb fish and wildlife species. Cultural resources could also be disturbed during construction and access to Usual & Accustomed Fishing sites could be temporary restricted, especially for any construction near the plunge pool in front of the LNFH. These access impacts would be temporary and could be minimized by scheduling construction after the fishing season. Table 4-7 provides short-term impacts of implementation for the five Program Alternatives and the No-Action Alternative.

Implementation of the various projects under the Program Alternatives would be phased overtime depending on the design process, environmental review, and available funding. Because of this, construction impacts for various projects under an alternative are not likely to occur at the same time, minimizing the cumulative impact at any given time. Additionally, some project may be phased specifically to reduce recreational, Indian Trust Assets, and wilderness user impacts.

Table ES-1
Summary of Short-term Impacts of No-Action Alternative and Program Alternatives

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Earth	Construction-related erosion and sedimentation from ongoing projects.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1, greater in Wenatchee corridor
Surface Water Resources	Use of cofferdams and dewatering during construction of on-going project.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1 greater in Wenatchee corridor
Groundwater Resources	Dewatering impacts during construction of ongoing projects.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1 greater in Wenatchee corridor
Water Quality	Construction of ongoing projects could result in temporary water quality impacts. Impacts include risk of erosion and contamination from construction activities.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1 greater in Wenatchee corridor
Water Use	Potential construction related impacts to surface water diversions. Work would be coordinated to minimize impacts.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1 greater in Wenatchee corridor
Fish	Temporary habitat disturbance, construction-related impacts.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1, greater in Wenatchee corridor

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Vegetation	Some vegetation removal from construction of ongoing projects.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1, greater in Wenatchee corridor
Wildlife	Temporary disruption of habitat during construction of ongoing projects.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1, greater in Wenatchee corridor
Threatened and Endangered Species	Temporary disruption of habitat during construction from noise and disturbance. Construction would generally occur outside breeding season, reducing impacts.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1, greater in Wenatchee corridor
Aesthetics	Construction activities and equipment of ongoing projects would generally create impacts on visual settings.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1, greater in Wenatchee corridor
Air Quality	Construction related emissions from ongoing projects including transportation and use of heavy equipment.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1, greater in Wenatchee corridor

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Climate Change	Minor amounts of greenhouse gas emissions related to construction of ongoing projects.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Noise	Increased noise from construction of ongoing projects.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Recreation	Access restriction, nuisance noise, and aesthetics impacts during construction of ongoing projects.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Land Use	Temporary access restrictions during construction of ongoing projects. Private owner access would be maintained.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Wilderness Area	Ongoing projects would likely be outside ALWA. No wilderness impacts are anticipated.	Temporary impacts to wilderness character related to construction activities include noise, construction equipment transport and staging, and presence and housing of construction workers.	Less than Alternative 1	Projects would likely be outside ALWA. No wilderness impacts are anticipated.	Greater than Alternative 1	Less than Alternative 1
Shorelines	Increased potential for shoreline erosion related to ground disturbing activities.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Utilities	Potential temporary disruption in water service related to instream construction activities near diversions.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Transportation	Traffic delays associated with equipment transport and construction of ongoing projects. Least number of helicopter trips during construction.	Similar but greater impacts compared to No-action. Several helicopter trips for transporting construction equipment.	Similar to Alternative 1 Less than Alternative 1.	Less than Alternative 1 Similar to the No-action Alternative.	Greater than Alternative 1 More than Alterative 1.	Greater than Alternative 1 Similar to Alternative 1.
Cultural Resources	Ground disturbing activities and construction work on culturally significant structures could result in impacts. Compliance with regulations and coordination with affected tribes would ensure any potential issues and mitigation measures would be addressed prior to construction.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Indian Sacred Sites	Ground disturbing activities would have the potential to impact sacred sites. Ongoing coordination with potentially affected tribes and compliance with regulations would ensure any potential issues would be addressed prior to construction.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Indian Trust Assets and Fishing Harvest	Potential to temporarily block access to Usual & Accustomed fishing areas.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Socioeconomics	Increased construction jobs from ongoing projects. Impacts would be smallest of all alternatives because fewer projects would be constructed.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1

Table ES-2
Summary of Long-term Impacts of No-Action Alternative and Program Alternatives

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Earth	Some potential for erosion, and sediment transport resulting from long-term operation of ongoing projects. These impacts are expected to be minor.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Surface Water Resources	Ongoing projects would likely increase stream flow by 20 to 30 cfs. Benefits would be localized.	Similar but greater impacts compared to No-action. Would increase instream flow by 88 cfs. Increases expected when flow is naturally at its lowest. Flexibility in flow management to respond to low-flow conditions.	Similar to Alternative 1. Would increase instream flow by 83 cfs. Increases expected when flow is naturally at its lowest.	Less than Alternative 1. Would increase instream flow by 70 cfs. Benefits would not be as adaptable to low flows.	Greater than Alternative 1. Would increase instream flow by 131 cfs. Increases expected when flow naturally at its lowest. Flexibility in flow management to respond to low-flow conditions.	Greater than Alternative 1. Would increase stream flow by 195 cfs. Increases expected when flow is naturally at its lowest.
Groundwater Resources	Groundwater recharge near Icicle Creek is expected to decrease compared to other alternatives. Groundwater recharge could increase in some areas compared with other alternatives because some conservation projects (piping canals or fix leaky pipes) would not be implemented.	Increased groundwater use; increased groundwater recharge near Icicle Creek; reduced groundwater recharge resulting from conservation projects.	Similar to Alternative 1	Similar to Alternative 1	Greater than Alternative 1	Similar to Alternative 1

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Water Quality	Localized benefits from ongoing water quantity and quality improvements. Expected benefits include increased dissolved oxygen and cooler temperatures.	Similar but greater impacts compared to No-action.	Similar to Alternative 1	Similar to Alternative 1	Greater than Alternative 1	Similar to Alternative 1
Water Use	Water use would be relatively unchanged. Localized instream flow benefit from ongoing conservation projects. No water made available for projected domestic growth.	Increased water available for instream and out-of-stream uses. Water available to meet projected domestic growth.	Similar to Alternative 1	Similar to Alternative 1	Greater than Alternative 1	Similar to Alternative 1
Fish	Ongoing projects could provide localized habitat and flow improvements. However, critical low-flow periods would likely persist in some reaches, which would continue to impact habitat availability and passage.	Increased stream flow, passage improvements, and habitat improvements. Flow releases from Alpine Lakes would be managed to provide greatest fisheries benefit and minimize any impacts.	Similar to Alternative 1	Greater than Alternative 1. Less instream flow benefit, OCPI needed, and benefits would not be as adaptable to low flows.	Greater than Alternative 1	Greater benefits than Alternative 1 through increased instream flow

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Vegetation	Localized benefits to riparian vegetation from ongoing projects.	Improvements to riparian habitat resulting from increased flows and riparian habitat restoration efforts. Relatively small negative impacts from increased Eightmile Lake level; however, this is within historical range. Installation of pump station may also have small impacts.	Similar to Alternative 1	Less benefit to riparian vegetation in Icicle Creek than Alternative 1. Impacts associated with Eightmile Lake may not occur under this alternative.	Greater than Alternative 1	Greater benefits than Alternative 1 through increased instream flow improving vegetation
Wildlife	Largely beneficial for wildlife dependent on Icicle Creek because ongoing projects would seek to improve instream flows during low-flow season. Benefit is more limited than under other alternatives. Impacts are less than significant.	Similar but greater benefits compared to No-action. Greater impacts, although impacts are anticipated to be less than significant.	Similar to Alternative 1	Less benefit than Alternative 1. Impacts to wildlife greater than Alternative 1.	Greater benefits and impacts than Alternative 1	Similar to Alternative 1

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Threatened and Endangered Species	Ongoing projects would provide localized habitat and flow improvements.	Similar but greater impacts compared to No-Action. Overall positive impacts from habitat improvements. Minor changes in shoreline associated with Eightmile project and new pump station not anticipated to impact threatened and endangered species.	Similar to Alternative 1	Less habitat improvement than Alternative 1, which is less beneficial to aquatic threatened and endangered species. Less terrestrial habitat impacts Alternative 1.	Greater instream habitat improvement than Alternative 1. Greater terrestrial habitat impacts than Alternative 1.	Similar to Alternative 1
Aesthetics	Anticipated to be largely beneficial for aesthetics because the projects likely to be implemented are expected to improve habitat and upgrade aging and degraded infrastructure.	Similar but greater impacts compared to No-Action. Potential visual impacts from pump station project, which would be mitigated. Less than significant impacts of increased lake bed exposure.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Air Quality	No significant long - term impacts identified	No significant long - term impacts identified	No significant long - term impacts identified. Greater impacts than Alternative 1 due to increased power reliance.	No significant long - term impacts identified. Greater impacts than Alternative 1 due to increased power reliance.	No significant long - term impacts identified. Similar to Alternative 1.	No significant long - term impacts identified. Greater impacts than Alternative 1 due to increased power reliance.

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Climate Change	Water supply shortages and critically low stream flow conditions would likely become worse. Limited ability to respond to climate change-induced impacts.	Increased instream flow and water supplies. Ability to adaptively manage flow to respond to impacts of climate change. Meets 100cfs streamflow goals in 2080 under low, medium, and high climate change scenarios.	Greater impacts than Alternative 1 due to increased power reliance.	Greater impacts than Alternative 1 due to increased power reliance.	Similar to than Alternative 1	Greater impacts than Alternative 1 due to increased power reliance.
Noise	Increased noise related to pump station operation. Construction measures would ensure compliance with Chapter 137-60 WAC.	Similar but greater impacts compared to No-action.	Greater than Alternative 1	Greater than Alternative 1	Greater than Alternative 1	Greater than Alternative 1
Recreation	Increased streamflow resulting from implementation of ongoing projects expected to improve water-based recreation.	Similar but greater impacts compared to No-action. Increased lake levels may have some impacts on current location of campsites and trails at Eightmile Lake. However, these impacts are expected to be limited because lake level increase would be modest.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Greater benefits than Alternative 1 from increased flow; similar impacts for other recreation

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Land Use	Easements or property acquisition could be required for some ongoing projects. Long-term impacts on current land use trends. Development of up to 56.1 acres.	Similar but greater impacts compared to No-action. Potential land use change from market reallocation of water and increased water for domestic supply. Conversion of some upland areas from private to public ownership. Development of up to 254.9 acres.	Similar to Alternative 1	Similar to Alternative 1	Greater than Alternative 1	Similar to Alternative 1
Wilderness Area	Ongoing projects would likely be outside ALWA. No wilderness impacts are anticipated. Maintenance activities by IPID and USFWS in ALWA would remain unchanged.	Long-term impacts to wilderness character would include equipment related to projects in ALWA (i.e. solar panels). Concealing equipment and implementing architectural style to complement the area would minimize impacts.	Similar to Alternative 1	Similar to No Action.	Greater than Alternative 1	Similar to Alternative 1
Shorelines	Long-term impacts on shorelines would likely result from the COIC project, but are anticipated to be less than significant. These impacts would be mitigated by complying with the terms and conditions of local, state, and federal regulations.	Similar but greater impacts compared to No Action. Increased drawdown range at Eightmile lake is expected to impact shorelines, but impacts would be less than significant compared to current conditions.	Greater than Alternative 1	Similar to Alternative 1 Impacts from pump stations will be greater, however there would be no impact resulting from changes to drawdown range at Eightmile Lake.	Greater than Alternative 1	Greater than Alternative 1

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Utilities	No anticipated impacts on water-based utilities associated with this project. Power demand is not expected to significantly increase because of ongoing projects.	Increased water service potential related to increased domestic supply. Power demand is not expected to significantly increase because of projects.	Greater than Alternative 1 because of long-term power reliance.	Greater than Alternative 1 because of long-term power reliance.	Greater than Alternative 1	Greater than Alternative 1 because of long-term power reliance.
Transportation	No long-term impacts to transportation anticipated.	Reduced helicopter supported transport in the Wilderness Area related to IPID maintenance activities	No long-term impacts to transportation anticipated.	No long-term impacts to transportation anticipated.	Similar to Alternative 1	No long-term impacts to transportation anticipated. Similar to Alternative 1
Cultural Resources	For all projects, coordination with DAHP and mitigation measures would be required.	Alpine Lakes dams are eligible for listing under the National Register of Historic Places. Mitigation measures would be required to avoid significant adverse impacts. For all projects, coordination with DAHP and mitigation measures would be required.	Similar to Alternative 1	Less than Alternative 1	Greater than Alternative 1	Similar to Alternative 1

Resources	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Indian Sacred Sites	No expected adverse impacts to Indian Sacred Sites.	Ongoing coordination with potentially affected tribes and compliance with regulations would ensure any potential issues would be addressed prior to construction.	Similar to Alternative 1	Similar to Alternative 1	Greater than Alternative 1	Similar to Alternative 1
Indian Trust Assets and Fishing Harvest	No significant long-term impacts as required by Guiding Principles.	No significant long-term impacts as required by Guiding Principles	No significant long-term impacts as required by Guiding Principles	No significant long-term impacts as required by Guiding Principles	No significant long-term impacts as required by Guiding Principles	No significant long-term impacts as required by Guiding Principles
Socioeconomics	Assumed lowest socioeconomic benefits because fewer projects would be implemented.	Lowest construction costs, job creation, long-term economic benefit, and second-lowest assumed fish increases of Program Alternatives	Highest construction costs, job creation, and long-term economic benefit of Program Alternatives. Second highest assumed fish increases.	Higher construction jobs and long-term economic benefit than Alternatives 1 and 4. Lowest assumed fish increases.	Higher construction jobs and long-term economic benefit than Alternative 1. third highest assumed fish increases.	Lowest construction costs, job creation, and long-term economic benefit of Program Alternatives. Highest assumed fish increases.
Environmental Justice	Ongoing projects are not expected to disproportionately impact minority or low-income communities.	Projects are not expected to disproportionately impact minority or low-income communities.	Projects are not expected to disproportionately impact minority or low-income communities.	Projects are not expected to disproportionately impact minority or low-income communities.	Projects are not expected to disproportionately impact minority or low-income communities.	Projects are not expected to disproportionately impact minority or low-income communities.

Many of the projects proposed under the Program Alternatives could advance under the No-action Alternative. Ongoing projects would likely include work at LNFH to implement water re-use, water quality improvements, and groundwater augmentation. Additionally, Fish Screening Compliance, COIC Irrigation Efficiencies and Pump Exchange, and some fish passage would likely continue. The construction level, short-term impacts for these project elements would be the same under the Program Alternatives and the No-action Alternative. But because fewer projects would likely be implemented, overall construction-related impacts would be lowest under the No-action Alternative compared with other alternatives. IPID and USFWS would likely maintain and upgrade their storage facilities under the No-action Alternative, and construction level impacts could be similar to those discussed in the Program Alternatives.

The short-term impacts identified for Alternatives 1, 2, 3, and 5 are similar because they contain many of the same projects. The most significant difference is there would be fewer construction-related impacts in the Alpine Lakes Wilderness Area under Alternative 2, 3, and 5 and more along the Wenatchee River corridor. This could lead to increased impacts to fish and shorelines with the construction of a Wenatchee River pump stations under Alternative 2, 3, and 5, but fewer impacts to other threatened and endangered species and wilderness users. Alternative 3 would have no construction-related short-term impacts in the Alpine Lakes Wilderness Area.

Alternative 4 would have the greatest construction impacts because it is made up of the most projects. In addition to the short-term impacts identified for Alternative 1 in common with Alternative 4, there would be additional impacts from building two additional storage enhancement projects, and expending storage at Eightmile Lake. In addition to Alternative 4 having more projects, the scale of the storage projects is relatively larger than the scale of other water development projects proposed in Alternative 1.

Long-Term

Implementation of the Icicle Strategy would provide benefit to Icicle Creek Subbasin by meeting the Guiding Principles. The Guiding Principles, which are discussed in detail in Section 1.2, The Icicle Strategy Guiding Principles, of this document, include improved instream flows, improved sustainability of LNFH, protection of the tribal and non-tribal fish harvest, improved domestic supply, improved agricultural reliability, enhancement of Icicle Creek habitat, and compliance with state and federal laws and Wilderness Acts. All Program Alternatives would meet the Guiding Principles and provide these benefits; although there are important differences, which are summarized below. Additionally, all the Program Alternatives would increase resiliency to stream impacts resulting from climate change. Table 4-8 provides an overview of long-term impacts for each Program Alternative and the No-action Alternative.

The No-action Alternative would not meet the goals and provide the benefits prescribed in the Guiding Principles, although some instream flow, LNFH, fish passage, and screening improvements would be made. Under the No-action Alternative, ongoing projects could increase streamflow by approximately 32 cfs, with localized benefit in water quality, fish habitat, and improved riparian vegetation. Impacts of the No-action Alternative would include decreased ability to respond to climate change and conflict between water users would not be resolved. Under the No-action Alternative, IPID would

still manage, operate, and repair their dam sites, so long-term impacts identified by these activities would still likely occur under the No-action Alternative.

Alternative 1 would provide 88 cfs of instream flow benefit and meet all the Guiding Principles. Additionally, Alternative 1 would allow flexibility in flow management and allow the instream flow goal of 100 cfs to be met in 2080 under low, medium, and high climate change scenarios. Additionally, under Alternative 1 there would be net-benefit water quality improvements, increased available water for out-of-stream users, improved habitat benefit for fish and wildlife, and improved water-based recreational opportunities. Impacts of Alternative 1 would include noise disturbance resulting from the operation of a pump station, and aesthetic impacts resulting from increased drawdown at Eightmile Lake and installation of modernized equipment in the Alpine Lakes Wilderness Area (ALWA), which could be minimized by construction design.

Alternative 2 would provide 83 cfs of instream flow benefit and meet all the Guiding Principles. Additionally, Alternative 2 would allow the instream flow goal of 100 cfs to be met in 2080 under low and medium climate change scenarios, but not under a high climate change scenario. Many of the net benefits to water quality, water use, habitat, and recreation that would exist under Alternative 1 would also exist under Alternative 2 because of the commonality of projects. Additionally, Alternative 2 would have many of the same impacts as Alternative 1. The impact of Alternative 2 compared to Alternative 1 is reduced flexibility in flow management that would result from not implementing the Alpine Lake Optimization, Modernization, and Automation Project.

Alternative 3 would provide 70 cfs of instream flow benefit and meet all the Guiding Principles. Many of the net benefits to water quality, water use, habitat, and recreation that would exist under Alternative 1 would also exist under Alternative 3 because many projects are common to both alternatives. In addition, many of the impacts under Alternative 1 would also occur under Alternative 3. The primary impacts of Alternative 3 compared to Alternative 1 would be less resiliency to climate change and no flexibility in flow management.

Alternative 4 would provide 131 cfs of instream flow benefit and meet all the Guiding Principles. Alternative 1 would allow flexibility in flow management and allow the instream flow goal of 100 cfs to be met in 2080 under low, medium, and high climate change scenarios. As with other alternatives, there would also be net benefits to water quantity, water use, and water-based recreation. Alternative 4 would have the greatest impact on wilderness character and recreation in the Wilderness Area. This is because more infrastructure would be built or expanded in the Wilderness Area. Additionally, this would have an increased impact on shoreline vegetation and habitat.

Alternative 5 would provide 195 cfs of instream flow benefit and meet all the Guiding Principles. Additionally, Alternative 5 would allow the instream flow goal of 100 cfs to be met in 2080 under low, medium, and high climate change scenarios. Many of the net benefits to water quality, water use, habitat, and recreation that would exist under Alternative 1 would also exist under Alternative 5 because of the commonality of projects. Additionally, Alternative 5 would have many of the same impacts as Alternative 1.

Environmental Commitments

Environmental commitments are measures or practices to reduce or avoid adverse effects resulting from project operations (long-term impacts). The projects elements proposed in the Program Alternatives are at various stages in the planning process, so the detail of specific mitigation measures varies. Additional measures would be developed during project level environmental review if needed. The following sections summarizes major environmental commitments for the Icicle Strategy.

Earth, Surface Water, Water Quality, Shorelines, and Fish

The primarily long-term impact associated with the Program Alternatives is increased flow, habitat, and improved water quality. Increased erosion and sedimentation resulting from increased streamflow was identified as a potential impact. However, this increased potential for erosion and sedimentation is expected to be non-significant given that increased flows will remain within the natural flow range, which high flows in Icicle creek already have scour forming flows. The potential for these impacts would be mitigated by following the required regulatory permits for construction and operation of projects. Benefits to vegetation, riparian habitat, floodplain function, and the riverine ecosystem are anticipated to also counter act these impacts. Additional impacts include fish and redd stranding associated with releases for the Alpine Lakes. Alpine Lake releases can be timed and managed to minimize these impacts.

Aesthetics, Recreation, and Wilderness

Potential impacts to aesthetics could result from construction of the COIC and the IPID pump exchange projects. The COIC pump exchange is included in all Program Alternatives. Some form of an IPID pump exchange is included in Alternative 2, Alternative 3, and Alternative 5. Potential impacts can be minimized based on siting or use of vegetation screen.

Aesthetic impacts are also possible under the Alpine Lakes Optimization, Modernization, and Automation Project. This project is included in Alterative 1 and Alternative 4. The greatest potential long-term impact is from new equipment installed to automate lake releases. This equipment also has the potential to impact ALWA wilderness character[3]. Designing structures to camouflage into the natural environment and using local construction materials can minimize these impacts. The actual impacts of the drawdown on aesthetics is expected to be less than significant because this conditional already exists, although less frequently.

The Eightmile Lake Storage Restoration Project also has the potential to create visual impacts. This project is proposed under Alternative 1 and 2. One potential impact is the new dam structure. This also has the potential to impact wilderness character. Involving an architect in the design of the facility to ensure it matches the look of the current dam structure and blends into the natural environment will help minimize this impact. The increase in lake level also has the potential to impact current camp locations at Eightmile

[3] As established in the 1964 Wilderness Act, wilderness preservation is "for the protection of these areas, the preservation of their wilderness character."

Lake. However, with the modest rise in lake level, this impact would be minor. A minimum tools analysis would be done to minimize impacts during project construction.

Storage enhancement projects proposed under Alternative 4 have the potential to impact aesthetics, wilderness character, and recreation. These impacts and specific mitigation measures would be addressed in project-level environmental review.

Land-Use

All land acquisitions or easements for projects proposed in the four Program Alternatives would need to provide appropriate compensation in accordance with applicable State or Federal regulations. Any land acquired under the Habitat Enhancement project, which is included in all Program Alternatives, would require a willing seller.

Climate Change

Changes in streamflow and water availability caused by climate change will constrain instream and out-of-stream uses. The Program Alternatives would provide for increased streamflow and the flexibility to adaptively manage flow in response to conditions.

Cultural Resources

Four of the five dams and water release structures at the Alpine Lakes are eligible for listing on the National Register of Historic Places. To reduce cultural resources impacts associated with the Alpine Lakes Optimization, Modernization, and Automation Project and the Eightmile Storage Restoration Project coordination with DAHP would occur to identify appropriate mitigation. With implementation of mitigation, these projects are not anticipated to result in any significant impacts on cultural resources. Mitigation measures might include maintaining some historical infrastructure and ensuring structure design is consistent with the historical structures.

For all projects that involve ground disturbance, additional cultural resource review would be required once specific locations for project elements are identified. Coordination in affected tribes and DAHP would help minimize any potential impacts. Prior to construction, any potential long-term impacts affecting cultural resources would be addressed.

Consultation and Coordination

The concluding sections of this Executive Summary briefly describes the public Involvement process and the numerous agencies coordinated and consulted with leading up to and during the SEPA process for the Icicle Strategy.

Public Involvement

Public involvement allows interested and affected individuals, organizations, agencies, and other governmental entities to be consulted and included in the decision-making process. The IWG has incorporated public involvement into their quarterly meetings, which are open to the public, and have made numerous presentations at conferences, to local community groups, and individual stakeholder groups to raise awareness of the Icicle Strategy and the PEIS process. The IWG co-leads Chelan County and Ecology also solicited comments from the public on the proposed Icicle Strategy through the SEPA

scoping process to help shape the alternatives considered in this document and the analysis of the impacts. Formal and informal input was used.

The SEPA Scoping process began on February 9, 2016, when the co-leads issued a threshold determination of significance on the Icicle Strategy. Scoping is the process of soliciting input on a proposal to define the scope of the EIS. The comments received during the scoping process allowed the co-leads to identify significant issues, identify elements of the environment that could be affected, develop alternatives, and determine the appropriate environmental documents to be prepared.

Under WAC 197-11-410, the co-leads elected to expand the scoping process, and held a public open house in Leavenworth, Washington on April 20, 2016. Approximately 70 participants attended the open house. At the meeting, the co-leads provided a presentation that included an overview of the SEPA process, the Icicle Strategy, and Alternative 1. Additionally, display materials and handouts were available. Public comments were accepted at the meeting and until May 11, 2016.

Draft PEIS Comment Period

Publication and distribution of the Draft PEIS occurred on May 31, 2018. There was a 60-day public comment period extended from that ended on July 30, 2018.

Following the release of the DPEIS, the co-leads hosted a public information session at Ecology's Northwest Regional Office in Bellevue, Washington on June 25, 2018. The purpose of this meeting was to provide an overview of the Icicle Strategy, the alternatives considered, and the DPEIS. The intent of this meeting was to provide western Washington stakeholders the opportunity to learn more about the DPEIS and how to participate in the process. Members of the public informally discussed points of view and were provided information on where to obtain a copy of the DPEIS and how to comment.

The co-leads also hosted a formal public hearing at the Leavenworth Festhalle in Leavenworth, Washington, on June 27, 2018. This meeting included posters, a presentation, and a court recorder who was made available to receive public comment. The purpose of the meeting was parallel to the public meeting held June 25, 2018 and included the same presentation. Materials from the public hearing are still available on the Chelan County website.[4]

During the comment period, the co-leads considered 8,825 comments. Comments received before or after the comment period (May 31 to July 30, 2018) and duplicative comments that were sent by the same sender were not considered. More information about the comments received are provided in Appendix A. Full comments and responses are also provide in Appendix A.

Agency Consultation and Coordination

Chelan County and Ecology are the co-lead agencies responsible for the preparation of the Programmatic Environmental Impact Statement (PEIS) and meeting lead agency obligations required by SEPA. The co-lead agencies discussed the Icicle Strategy with National Marine Fisheries Service, US Fish and Wildlife Service, US Forest Service, US

[4] https://www.co.chelan.wa.us/natural-resources/pages/icicle-strategy-draft-peis-public-hearing

Bureau of Reclamation, US Army Corp of Engineers, Washington Department of Fish and Wildlife, Washing Department of Natural Resources, Washington Department of Archaeology and Historic Preservation, Confederated Tribes and Banks of the Yakama Nation, and Confederated Tribes of the Colville Reservation. Several of these agencies are represented on the IWG. The co-lead agencies will continue to coordinate and consult with these agencies regarding other applicable regulatory requirements as the preferred alternative moves forward to project level environmental review, feasibility, design, and environmental permitting.