

CHAPTER 1.0 INTRODUCTION

1.1 Programmatic SEPA Review

The purpose of this Programmatic Environmental Impact Statement (PEIS) is to evaluate the potential environmental impacts of implementing a comprehensive water resource management plan in the Icicle Creek Subbasin, with the Guiding Principles as the water management objectives. In accordance with State Environmental Policy Act (SEPA), the proposal includes preparation of a PEIS (this document) to identify potential environmental impacts, mitigation strategies, and a preferred alternative.

The alternatives identified as potentially meeting the Guiding Principles are generally not at a project-level environmental review because they are still in the planning phase. In accordance with WAC 197-11-704, this PEIS evaluates non-project actions such as policies, plans, and programs at a programmatic level. However, where project level information is available, the co-lead agencies for this PEIS have attempted to include it. Additionally, the PEIS will serve as a foundational document for future project-level environmental review. Future environmental review is described in Section 1.9.

SEPA applies to all decisions made by state and local agencies in Washington State. Under SEPA, one government agency is typically identified as the lead agency for identifying and evaluating the potential adverse environmental impacts of a proposal. This evaluation is documented and sent to the public and other agencies for their review and comment.

The EIS provides critical information to all agencies in the environmental review and approval process. This information also helps to determine if avoidance, minimization, or compensatory mitigation measures will address any probable significant impacts.

For the Icicle Creek Water Resource Management Strategy (Icicle Strategy), the co-conveners (Ecology and Chelan County) entered into a Memorandum of Understanding to act as SEPA co-lead agencies per Chapter 43.21 RCW to conduct an environmental review of the Icicle Strategy.

See Section 1.9 for an overview of the SEPA process.

1.1.1 Document Organization

This PEIS discusses the development of the Icicle Strategy and analyzes five alternatives for implementing the Icicle Strategy as well as a no-action alternative. This document is organized into five main chapters, a references section, and appendices:

- Chapter 1 provides background information on the proposed Icicle Strategy, describes the program, the purpose and need for the action, relevant background information on the study area, history of water management in the Icicle Subbasin, prior studies and activities dealing with water management issues, and a brief description of public involvement.

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- Chapter 2 presents a description of all proposed alternatives reviewed under this PEIS. The chapter also summarizes how the alternatives were developed and describes alternatives eliminated from detailed evaluation.
- Chapter 3 describes the affected environment and existing conditions in the Icicle Subbasin.
- Chapter 4 evaluates the potential short-term (construction) and long-term (operational) effects and proposed mitigation measures for all alternatives.
- Chapter 5 describes the public involvement, consultation and coordination, and compliance with other laws that have and will occur.
- Chapter 6 will provide references used throughout the documents.
- Comments and Responses are provided in Appendix A, which includes the comments received on the Draft PEIS as well as responses to those comments.

Appendices to accompany information presented in this PEIS are attached at the end of the document.

1.2 Purpose and Need for Action

The purpose and need for this PEIS is the goal of the co-leads and supporting stakeholders to develop an Icicle Creek Water Resource Management Strategy (Icicle Strategy) through a collaborative process that will achieve diverse benefits defined by adopted Guiding Principles for the subbasin. The current water management practices in the Icicle Creek Subbasin fail to consistently meet the demand for instream and out-of-stream water uses, including minimum instream flows for fish, municipal and domestic water supply, and agricultural water supply. 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 and Leavenworth National Fish Hatchery (LNFH) operations. There are additional issues in Icicle Creek surrounding fish habitat and passage, tribal and non-tribal fish harvest, and sustainable operation of the LNFH. 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 comprehensive water resource management within the Subbasin.

Instream Flows: Instream flows in Icicle Creek are an important component of the local and regional environmental value system. Benefits of adequate instream flows include healthy aquatic and riparian ecosystems, protection of Endangered Species Act (ESA) listed fish species, water quality, aesthetics, and recreation. Instream flow protection has been promoted through instream flow rules and watershed planning initiatives, with high importance assigned to improving habitat for salmonids. However, instream flows in late summer often drop below those set in WAC 173-545-040. The rule sets minimum flows in the lower reaches of Icicle Creek at 275 cfs, but in drought years flow can be less than 20 cfs in the historical channel near the LNFH. These low stream flows affect water

quality and limit habitat diversity for aquatic species, and have contributed to exceedances of state and federal standards for temperature. Icicle Creek supports three ESA-listed species: Upper Columbia spring Chinook salmon, steelhead, and bull trout.

Leavenworth National Fish Hatchery: The United States Bureau of Reclamation (USBR) funds the operation and maintenance of LNFH as mitigation for fish losses resulting from the construction of Grand Coulee Dam and creation of the Columbia Basin Project. LNFH is operated by the United States Fish and Wildlife Service (USFWS) on behalf of USBR. Water supply to the hatchery is from a combination of Icicle Creek flows and groundwater wells with reservoir storage (Snow Lakes and Nada Lake) located in the Alpine Lakes Wilderness Area. To ensure current production goals of 1.2 million fish are met annually, LNFH needs a reliable supply of cool, pathogen-free water year-round.

Operations at LNFH have resulted in lawsuits and a Biological Opinion (BiOp) under the ESA Section 7 Consultation process. These actions are discussed in more detail later in this Chapter.

Tribal and Non-Tribal Harvest: The Yakama Nation and the Wenatchi Band of the Colville Confederated Tribes have federally-recognized and adjudicated harvest rights in lower Icicle Creek.

Adult spring-run Chinook salmon return to LNFH between mid-April and mid-July each year. A tribal fishery is permitted during this time if run size is large enough to both meet the hatchery broodstock goal of ~1,200 spawners and provide fish in excess of hatchery needs. The broodstock goal is a function of the hatchery's obligation under U.S. v. Oregon to produce 1.2 million juvenile spring Chinook salmon (Parker, 2014).

The success of the tribal fishery is dependent on the concentration of returning adult salmon in the pool at the base of the fish ladder, the location where the majority of tribal fishing currently occurs (Parker, 2014). Tribal members fish with traditional dipnets or with modern rod-and-reel from scaffolds/platforms erected along the streambank. As demonstrated in Table 1-3, tribal fish harvest has declined considerably since 2001.

Domestic Supply: Icicle Creek and groundwater in the Icicle Creek Subbasin are important water sources for municipal and domestic uses. The City of Leavenworth has a population of ~2,000 (Census, 2010) and is an internationally renowned tourist destination, attracting millions of visitors each year. The City of Leavenworth has asserted water rights to withdraw up to 6.198 cfs from Icicle Creek (3.18 cfs interruptible, 3.02 cfs uninterruptible) and up to 6.68 cfs from groundwater (4.46 cfs interruptible, 2.23 cfs uninterruptible) for municipal use (Varela & Associates, 2018). Chelan County currently supplies exempt wells under the reserve created in WAC 173-545-090. However, these collective urban and rural water rights are not sufficient to support population projections out to 2050. The City of Leavenworth and Ecology have litigation on hold while they find a non-litigious solution to water management in Icicle Creek.

Agricultural Reliability: Agriculture is an important component of the Chelan County economy. In 2012, over 75,000 acres were in agricultural production, generating \$206,000,000 in market value in Chelan County (USDA, 2012). The waters of the Icicle

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Creek Subbasin play an important role in this agricultural production by providing water to IPID and COIC, which supply water to nearly 9,000 acres. These 9,000 acres are predominantly planted in tree fruit. In total, 137 cfs of irrigation diversions are authorized from Icicle Creek.

IPID manages five lakes in the watershed to augment natural water supplies from Icicle Creek during drought and non-drought years. In a drought year, the storage from all the lakes are used to provide water to IPID. In non-drought years, the district drains one lake rotationally for maintenance activities and for additional irrigation supply. Since not all droughts are the same, in some dry years a combination of lakes (1 to 5) are drawn down.

Despite the importance of agriculture and irrigation, there is not enough water to supply all of the irrigation demand. For example, in many drought years, IPID partially curtails its use even with reservoir releases. Additionally, in the Icicle Creek Subbasin and Wenatchee Basin, there are water rights that are regularly curtailed based on low streamflow in the Wenatchee River. On average, these water users face curtailment at least 7 out of every 10 years.

Habitat: The Upper Columbia Revised Biological Strategy (Biological Strategy, 2017) identifies the following factors affecting habitat conditions for ESA-listed salmonids in Icicle Creek:

- Land development downstream of LNFH has affected stream channel migration, recruitment of large wood, and off-channel habitat.
- There is a barrier to migration in the boulder field.
- Water withdrawals in Icicle Creek (primarily between Rat Creek and the hatchery) likely contribute to low flows and high temperatures.
- The Icicle Road upstream of Chatter Creek may confine the stream channel and affect floodplain function in certain places.

Additional passage barriers exist at the hatchery that are used for operation, including water management, broodstock collection, and to maintain the tribal fishery. These are discussed in more detail in Section 1.2.1.2.

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.

1.3 Icicle Creek Subbasin Background and History

Icicle Creek is a major tributary of the Wenatchee River and is a significant water resource subbasin of Water Resource Inventory Area (WRIA) 45 (Wenatchee River Basin). Basin-wide planning is founded on the Instream Flow Rule (1983), adopted Watershed Plan (2006), and the Detailed Implementation Plan (2008).

1.3.1 Location and Setting

Icicle Creek is the largest subbasin in WRIA 45, covering 136,916 acres. Icicle Creek joins the Wenatchee River at RM 25.6, contributing 20 percent of the Wenatchee River's annual flow. Precipitation ranges from 120 inches at the Cascade crest to 20 inches at the mouth of the Icicle. Elevation ranges from approximately 9,000 feet at the Cascade crest to 1,102 feet at the mouth.

The U.S. Forest Service (USFS) manages 87 percent of the land in the Subbasin, of which 74 percent of the subbasin is located within the Alpine Lakes Wilderness Area (ALWA). The remaining 13 percent of land in the subbasin is in other federal government, state, local, or private ownership.

Other than forestry and wilderness protection, land use within the Subbasin includes residential and agriculture uses, which occur in the lower portion of the watershed. The major water diversions are in the lower 5 miles of Icicle Creek for in-basin and out-of-basin irrigation, domestic water use, and fish propagation.

1.3.2 Project Area

The Icicle Strategy focuses on the entire Icicle Creek Subbasin (see Figure 1-1). In this document, the Icicle Creek Subbasin is defined as the Icicle Project Area. However, there are three primary areas within and outside of the Icicle Project Area that could likely be affected by the proposal. These areas include the Alpine Lakes area, Icicle Creek, and the Wenatchee River Corridor downstream of the confluence with Icicle Creek. These areas are described in greater detail below.

1.3.2.1 *Alpine Lakes Area*

The Alpine Lakes Area encompasses the headwaters of Icicle Creek. These include several lakes located within the ALWA, that are actively managed as reservoirs to supply IPID and LNFH. These lakes include Upper and Lower Snow Lakes and Nada Lake, which make up the Snow Lakes system, and Colchuck Lake, Eightmile Lake, Klonaqua Lake, and Square Lake. These Lakes are highlighted on Figure 1-1.

Also, included in the Alpine Lakes Area are the tributaries of Icicle Creek. Of primary interest are those that drain the above listed lakes. These tributaries include French, Leland, Eightmile, and Snow Creeks.

1.3.2.2 *Icicle Creek*

This 31.8-mile area includes Upper and Lower Icicle Creek, from Josephine Lake to the confluence with the Wenatchee River. This area includes most of the water resource diversions, fish passage barriers, and degraded habitat that the Icicle Strategy seeks to improve. This is also the area where critical low flows occur in the late summer and early fall. The location of Icicle Creek can be seen on Figure 1-1.

1.3.2.3 *Wenatchee River Corridor*

The Wenatchee River corridor describes the area downstream of Icicle Creek with its confluence with the Wenatchee River that could be impacted by water management changes in the Icicle Creek Subbasin. This area starts at the location where Icicle Creek is intercepted by the Wenatchee River, slightly upstream where the City of Leavenworth has wells in continuity with the River, and extends downstream to the confluence of the Wenatchee River and the Columbia River near the town of Wenatchee.

1.3.3 History of Water Management

Water supply in the Icicle Creek Subbasin is heavily dependent on snow pack in the upper reaches of the watershed. Combined with storage water from reservoirs in the upper watershed, snowmelt is crucial for summer flows and providing water for out-of-stream uses. The storage in the upper watershed occurs in seven reservoirs located within the ALWA. Four of these reservoirs, Colchuck, Eightmile, Klonaqua, and Square, were built in the 1920s to 1940s by IPID. The water stored in these reservoirs is conveyed in Icicle Creek and its tributaries and diverted for irrigation at RM 5.7. The dams on Upper and Lower Snow Lakes and Nada Lake were originally constructed by Icicle Irrigation District (IID) in the 1930s and later expanded in the 1940s by USBR. The water stored in the Snow Lake system is conveyed in Icicle Creek and its tributaries and diverted for irrigation and fish propagation at RM 5.7 and 5.5, respectively.

Diversions from Icicle Creek were established in the early 1900s. By 1927, a water rights adjudication was underway in the Icicle Subbasin. Generally, adjudications arise when streamflow is insufficient to satisfy all out-of-stream demand every year. Today, there are four large diversions on lower Icicle Creek: IPID (RM 5.7), City of Leavenworth (RM 5.7), LNFH (RM 4.5), and COIC (RM 4.5). The location of these diversions is shown on Figure 1-1. Three of these diverters, IPID, COIC, and the City of Leavenworth, hold adjudicated certificates that were confirmed during the 1927 adjudication.

Adequate streamflow has long been a problem in Icicle Creek. In 1983, Ecology implemented the Wenatchee Instream Flow Rule (Chapter 173-545 WAC), which protects flows in Icicle Creek and other rivers and streams in the Wenatchee Basin. The recommended flows in this rule were revised in 2007 based on watershed planning. The revised rule prescribes flows between 267 and 650 cfs of water in Icicle Creek, depending on the time of year (Figure 1-2). The instream flow rule is discussed in more detail in Section 3.6 of this PEIS. Currently, these instream flows are not always met. Figure 1-3 shows the Wenatchee instream flow rule compared to different flow scenarios from 1981 to 2011 on the mainstem Wenatchee. Flows in Icicle Creek near the historic channel are much lower than in the Wenatchee River, on the order of 60 cfs in average years and less than 20 cfs in drought years.

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Figure 1-2. Chapter 173-545 WAC Prescribed Flows (1983 rule compared to 2007 revised rule).

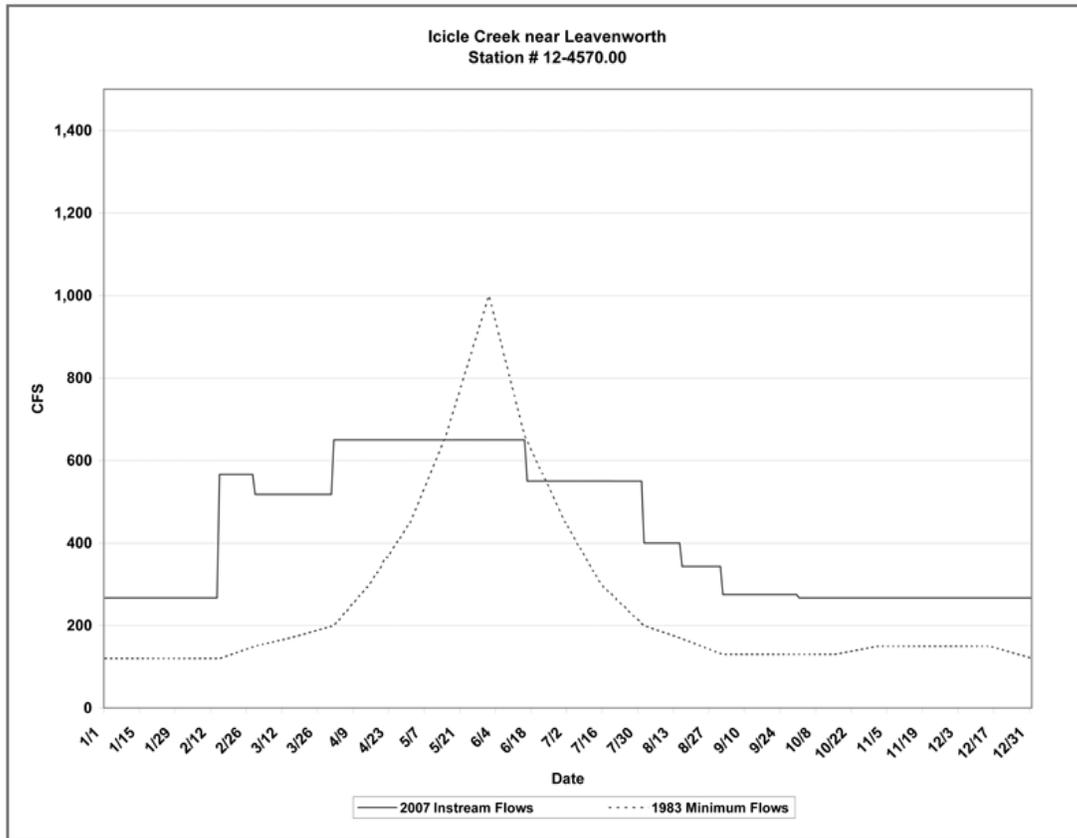
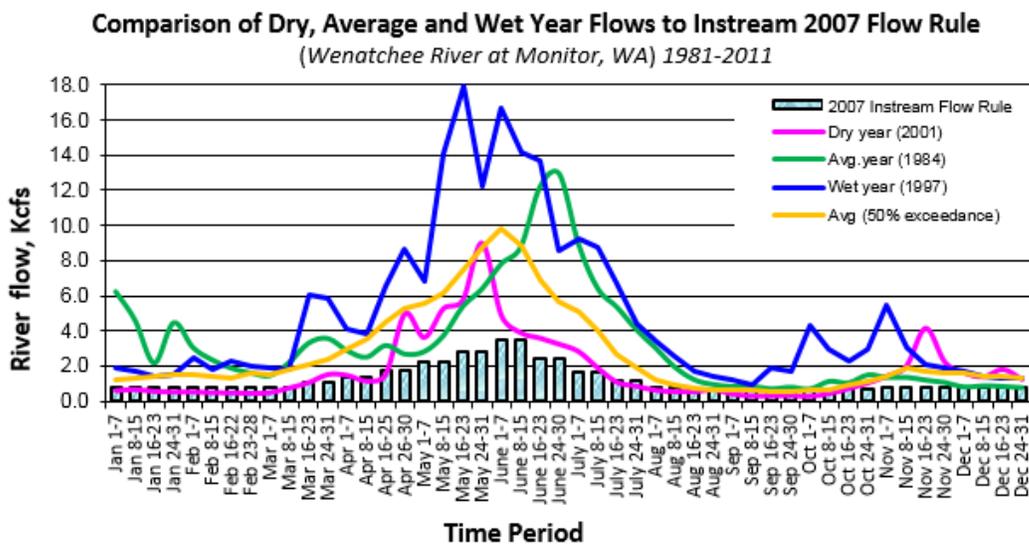


Figure 1-3. Instream Flow Rule Compared to Streamflow



The Icicle Creek Subbasin and the areas downstream that are affected by its water management have been identified as a critical area within the watershed planning process (through the Wenatchee Instream Flow Study, Total Maximum Daily Load (TMDL) Study, and Watershed Assessment) for meeting all of the needs it serves. Improved flow understanding and projects envisioned by the IWG will significantly improve this current instream flow imbalance.

1.4 The Icicle Work Group

To find solutions for water management within the Icicle 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 Icicle Work Group (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 (Table 1-1).

**Table 1-1
List of Icicle Work Group Members**

Organization	Interest
Confederated Tribes & Bands of the Yakama Nation	Tribal Fisheries
Confederated Tribes of the Colville Reservation	Tribal Fisheries
U.S. Bureau of Reclamation (USBR)	Hatchery
U.S. Fish and Wildlife Service – LNFH	Hatchery
NOAA – Fisheries	Fisheries
Washington State Department of Fish and Wildlife	Fisheries & Wildlife
Washington State Department of Ecology	Co-convener/Water Manager/ Water Supply Developer
Icicle and Peshastin Irrigation District	Irrigation Water
City of Leavenworth	Domestic Water
Chelan County	Co-convener/Domestic Water/ Watershed Plan Implementer
Cascade Orchards Irrigation Company	Irrigation Water
Icicle Creek Watershed Council	Environmental
Washington Water Trust	Fisheries/Environmental
Trout Unlimited – Washington Water Project	Fisheries/Environmental
U.S. Forest Service	Land Manager
City of Cashmere	Domestic Water
Cascadia Conservation District	Conservation
Agricultural Representatives (two)	Irrigation Water

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The IWG seeks to find collaborative solutions for water management within the Icicle Creek Subbasin. This includes balancing out-of-stream water uses, such as domestic and agricultural uses, with instream uses, such as fish habitat, recreation, and ecosystem processes while protecting treaty and non-treaty fishing interests. The IWG’s purpose is to develop a comprehensive Icicle Creek Water Resource Management Strategy (Icicle Strategy) that uses best available science to identify and support water management solutions that lead to implementation of high-priority water resource projects within the Icicle Creek Subbasin. The IWG adopted operating procedures that include membership selection, expectations for members, dispute resolution, conflict of interest criteria, subcommittee procedures, and decision-making procedures.¹

The IWG meets quarterly to make decisions on implementing and monitoring progress made on the Icicle Strategy. As needed, the IWG forms subgroups that meet and inform the IWG of the best available science to meet Icicle Strategy objectives. One key subgroup is the IWG Instream Flow Subcommittee, which comprises local, state, federal, and tribal fish biologists that help evaluate how additional Icicle Creek instream flow quantities and habitat improvements made available from project implementation can be maximized for fish benefit in Icicle Creek and its tributaries. A Steering Committee chaired by the Washington State Department of Fish and Wildlife (WDFW) and consisting of eight voting members of the IWG also meets regularly to help implement IWG decisions, coordinate funding efforts, and prioritize emerging issues for IWG consideration.

After 3 years of study, stakeholder coordination, project investigations, and collaboration the IWG determined that the PEIS was the next appropriate step in implementing the Icicle Strategy. This would allow greater input by the public on the Guiding Principles and the potential projects that could collectively meet them, and help understand benefits and impacts associated with implementation of the strategy.

1.4.1 Icicle Work Group Authority

The authority for the IWG comes from the Washington State Legislature in the form of the Watershed Planning Act (Chapter 90.82 RCW) and the Columbia River Basin Water Management Act (Chapter 90.90 RCW). The IWG generally consists of parties who have come together in a collaborative and volunteer manner to help improve Icicle Creek’s ability to meet multiple, and at times conflicting, water needs.

1.4.1.1 Watershed Planning

In 1998, the Washington Legislature passed the Watershed Planning Act (Chapter 90.82 RCW). The purpose of the Watershed Management Act is to conduct watershed scale planning for managing water resources by local entities and stakeholders. The objectives of watershed planning are to “meet the needs of a growing population and a healthy economy statewide, meet the needs of fish and healthy watersheds statewide, and advance these two principles in increments over time.”

¹ http://www.co.chelan.wa.us/files/natural-resources/documents/Planning/icicle_work_group/FINAL%20IWG%20Operating%20Procedures%202016.pdf

1.4.1.2 OCR's Authority

In 2006, the Legislature tasked and funded Ecology to develop new water supplies for both instream and out-of-stream uses. Ecology created OCR whose purpose is to develop new water supplies using a variety of tools/project types, including; storage, conservation, and voluntary regional water management agreements.²

The Legislature provided OCR with five directives (Chapter 90.90 RCW):

- Develop water supplies for instream as well as out-of-stream uses (RCW 90.90.020(1)(a)(ii)).
- Secure alternatives to groundwater for agricultural users in the Odessa subarea aquifer (RCW 90.90.020(3)(a)).
- Find sources of water supply for pending water right applications (RCW 90.90.020(3)(b)).
- Find a new uninterruptible supply of water for the holders of interruptible water rights on the Columbia River mainstem (RCW 90.90.020(3)(c)).
- Develop water sources for new municipal, domestic, industrial, and irrigation water needs within the Columbia River Basin (RCW 90.90.020(3)(d)).

1.5 The Icicle Strategy and Guiding Principles

The Icicle Strategy is a comprehensive water resource management plan that contemplates climate change and is designed to balance and meet out-of-stream and instream water demand both now and into the future. The water management and watershed conditions that led to the Icicle Strategy are discussed in Sections 1.3 and 1.4. The IWG developed the Icicle Strategy using stakeholder input and best available science. The centerpiece 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 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. The following is a list of the Guiding Principles, as developed during the December 2012 work session:

1. Streamflow that:
 - a. Provides passage,
 - b. Provides healthy habitat,
 - c. Serves channel formation function,
 - d. Meets aesthetic and water quality objectives, and
 - e. Is resilient to climate change.

² http://www.ecy.wa.gov/programs/wr/cwp/cr_overview.html

2. Sustainable LNFH that:
 - a. Provides healthy fish in adequate numbers,
 - b. Is resource efficient,
 - c. Significantly reduces phosphorus loading,
 - d. Has appropriately screened diversion(s), and
 - e. Does not impede fish passage.
3. Tribal treaty and federally protected fishing/harvest rights are met at all times.
4. Provide additional water to meet municipal and domestic demand.
5. Improved agricultural reliability that:
 - a. Is operational,
 - b. Is flexible,
 - c. Decreases risk of drought impacts, and
 - d. Is economically sustainable.
6. Improve ecosystem health, including protection and enhancement of aquatic and terrestrial habitat.
7. Comply with state and federal law.
8. Protect non-treaty harvest.
9. Comply with the Wilderness Act of 1964, the Alpine Lakes Wilderness Act of 1976, and the Alpine Lakes Wilderness Management Plan.

Over the following 3-years, these Guiding Principles evolved to seven principles that have both qualitative and quantitative descriptions. The following section, Section 1.2.1, describes the process of fine-tuning these Guiding Principles through scientific study and consensus-based stakeholder negotiations. Section 1.2.2 describes the Guiding Principles as they are today.

1.5.1 Refining Guiding Principles and Developing Metrics

The IWG agreed that before a set of projects could be identified to accomplish the objectives established in the Guiding Principles, quantitative metrics and more qualitative descriptions would be required to help define the magnitude of the gap between current river operations and the values expressed in the Guiding Principles. Through 3-years of scientific study and project feasibility development along with Work Group discussion, the IWG developed metrics for their objectives. Additionally, the IWG honed their list of nine principles into a list of seven: 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, and Wilderness Acts. The following sections describe the process for developing these metrics for each Guiding Principle.

1.5.1.1 Improve Instream Flow

To determine streamflow restoration goals, the IWG formed a technical subcommittee of experts on instream flow and fish habitat to provide technical guidance on establishing instream flow goals for the Guiding Principles. This group is known as the Icicle Creek Instream Flow Subcommittee (ICIFS). Much of the methodology used by the ICIFS to make its recommendation is summarized in its presentation to the IWG in 2014³. To make flow recommendations, the ICIFS reviewed existing reports that discussed flow and habitat in Icicle Creek and reviewed their collective understanding of how to improve flows in Icicle Creek:

- Instream Flow Study Report for Icicle Creek (Cates, 1985)
- Icicle Creek Target Flow Report for Leavenworth National Fish Hatchery (2004)
- U.S. Bureau of Reclamation, Technical Memorandum, Instream Flow Assessment of Icicle Creek, Washington, Ron Sutton and Chelsie Morris (2005)
- U.S. Fish and Wildlife Service, Icicle Creek Fish Passage Evaluation for the LNFH (2013)
- U.S. Fish and Wildlife Service, Icicle Creek Instream Flow and Fish Habitat Analysis for the LNFH (2013)
- U.S. Bureau of Reclamation, LNFH Icicle Creek Rapid Geomorphic Assessment (2014)

The effort was complicated because different portions of Icicle Creek and its tributaries are used by different fish species and have different limitations (e.g., flow, passage, and habitat). To address these differences, the ICIFC researched the flow and habitat information as well as fish utilization in different portions of the river. Based on this research, the IWG identified the following target reaches:

Reach 1 – RM 5.7 to headwaters (upstream of major diversions)

Reach 2 – RM 5.7 to 4.5 (IPID/City of Leavenworth point of diversion to LNFH/COIC point of diversion)

Reach 3 – RM 4.5 to 3.9 (LNFH/COIC point of diversion to Structure 2)

Reach 4 – RM 3.9 to 2.7 (the historical channel)

Reach 5 – RM 2.7 to 0.0 (downstream of LNFH outflow to the Wenatchee River confluence)

The ICIFC then documented fish presence and life history in each of the reaches. Table 1-2 and Figure 1-4 illustrate the presence and life history of each species in Icicle Creek.

³ <http://www.co.chelan.wa.us/natural-resources/pages/icicle-creek-instream-flow-committee>

**Table 1-2
 Focal Fish Species by Reach**

Reach	River Mile	Life History & Stage by Species
1	Headwaters to RM 5.7	Steelhead – P, S, R Rainbow trout – S, R Bull trout – P, S, R Cutthroat trout – R
2	RM 5.7 to RM 4.5	Steelhead – P, R Bull trout – P
3	RM 4.5 to RM 3.9	Steelhead – P, R Bull trout – P
4	RM 3.9 to RM 2.7	Steelhead – P, R, S Bull trout – P Lamprey – P
5	RM 2.7 to RM 0.0	Steelhead – S, R Bull trout – P Lamprey – P

Note – P = Passage, S = Spawning, R = Rearing
 Assumptions: 1) No spring Chinook salmon assessment; 2) Assumed steelhead production is present

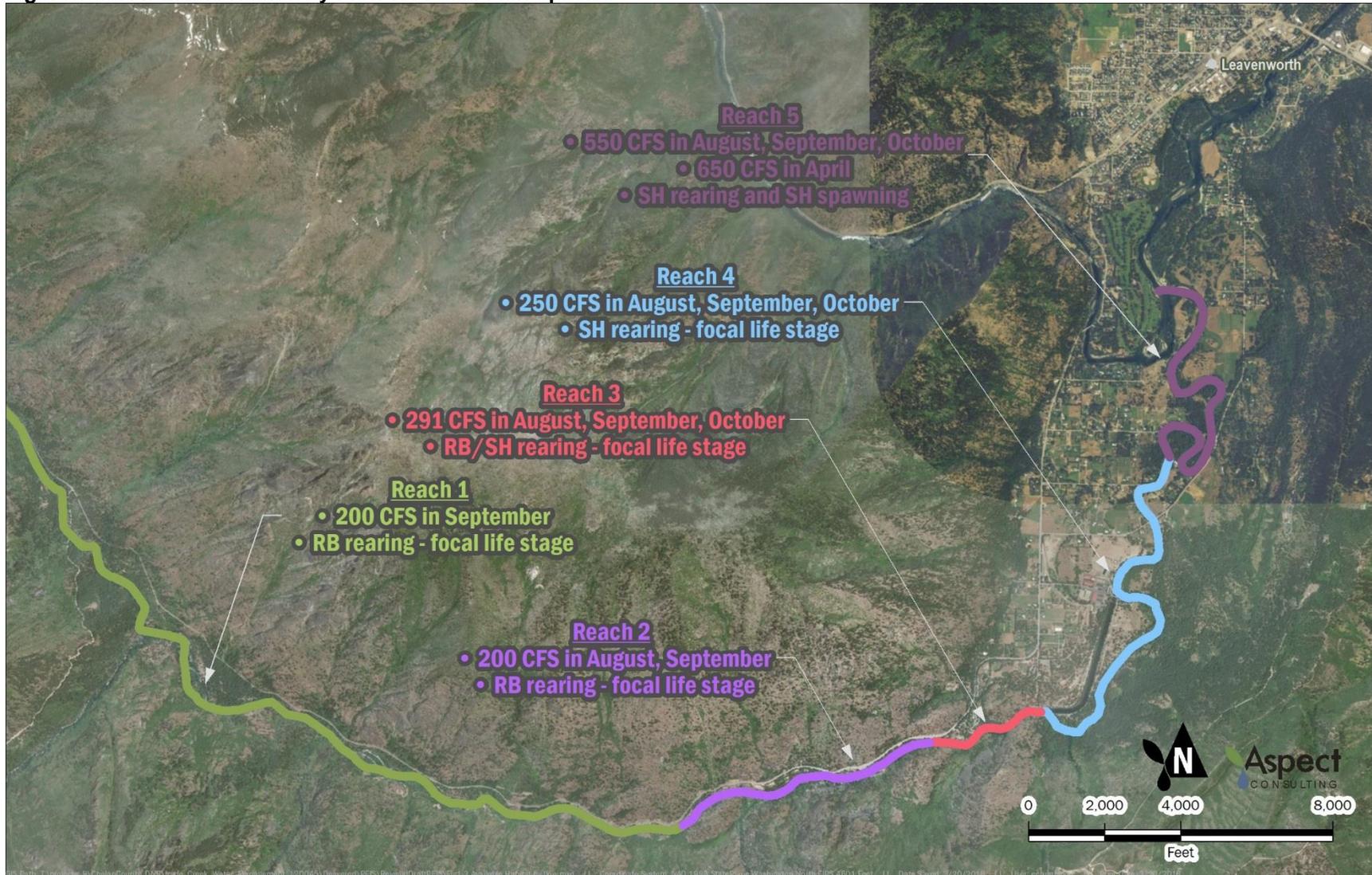
Figure 1-4. Focal Fish Species and Relevant Life Stages Periodicity within Icicle Work Group Study Reaches

	Life stage	Migration	Spawning	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Steelhead, Rainbow trout	Adult	✓													
	Rearing		✓												
Bull trout	Adult/Subadult	✓													
	Rearing														
Cutthroat trout	Adult	✓													
	Rearing		✓												
Lamprey	Adult	✓													
			✓												

(Source: USFWS 2013 draft)
 Note: Gray shading indicates utilization for each month.

For each reach, the ICIFS summarized available habitat flow relationships for likely target species by reach as weighted usable area (WUA) by reach (Figures 1-5a through 1-5e). WUA is the stream surface area weighted by habitat suitability variables, such as velocity, depth, and substrate.

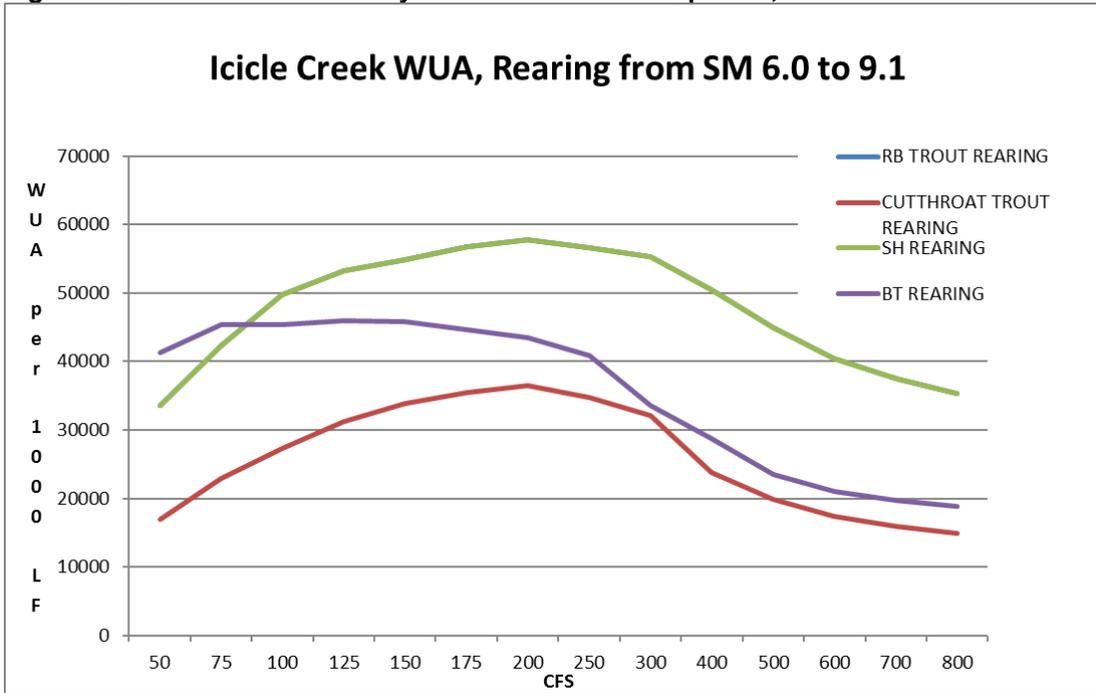
Figure 1-5a. Available Habitat by Flow for Focal Fish Species



Notes: CFS = cubic feet per second; RB = Rainbow Trout; SH = Steelhead

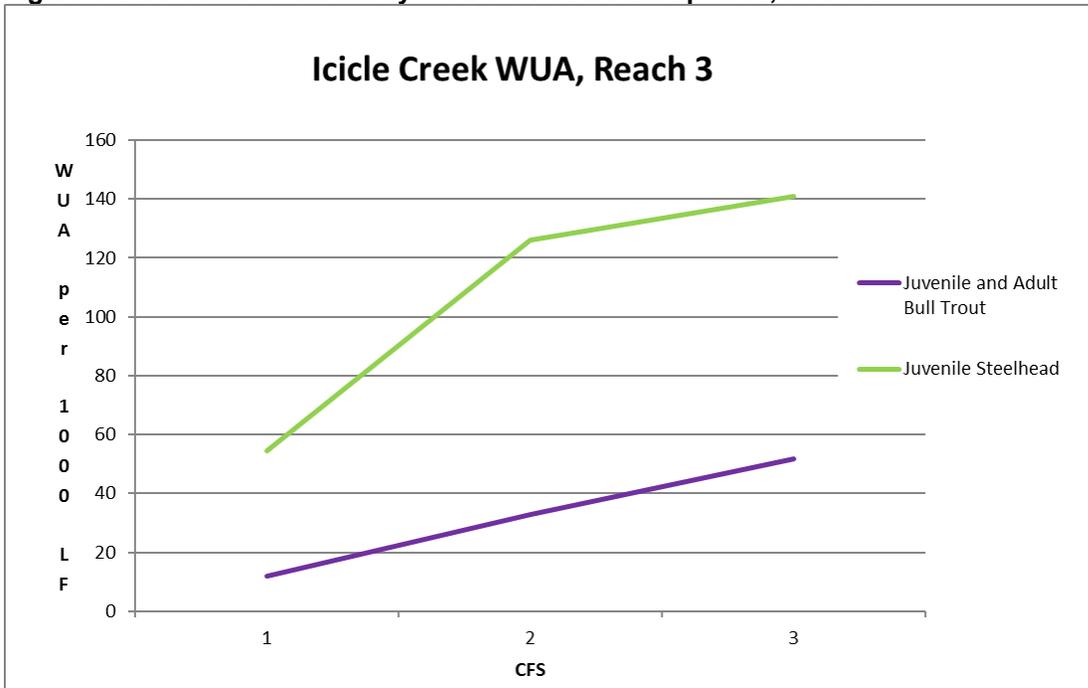
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Figure 1-5b. Available Habitat by Flow for Focal Fish Species, Reach 1 and 2



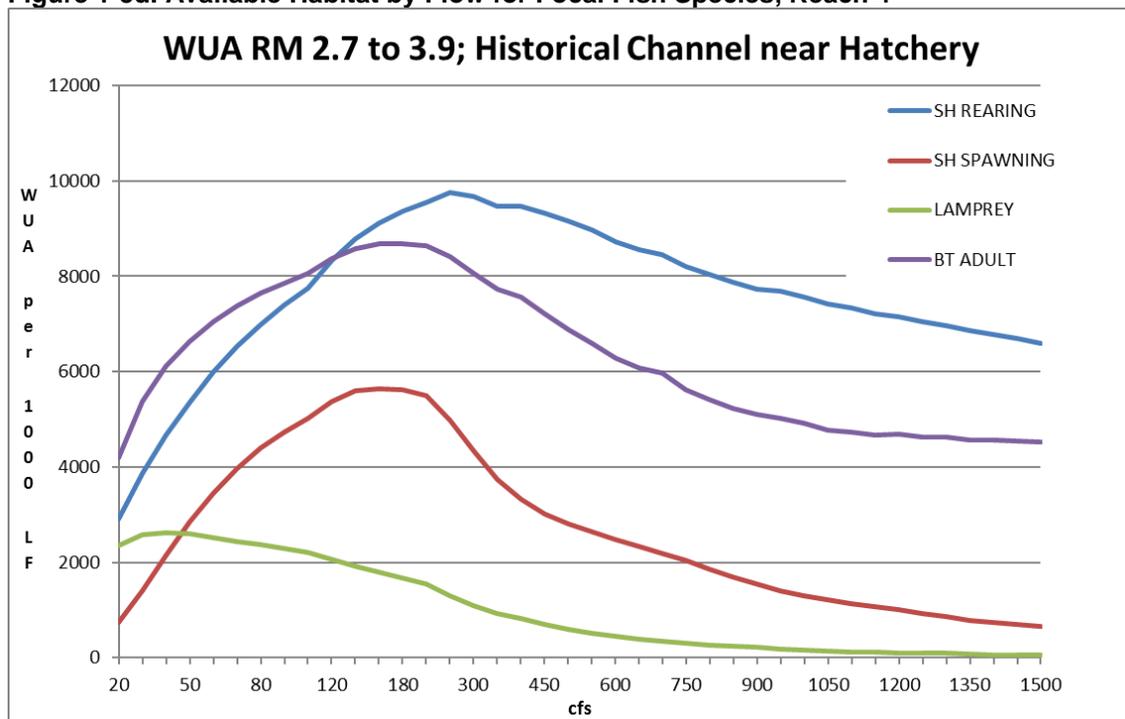
Source: US Army Corp of Engineers, 1985
 Notes: LF = linear feet; BT = Bull Trout

Figure 1-5c. Available Habitat by Flow for Focal Fish Species, Reach 3



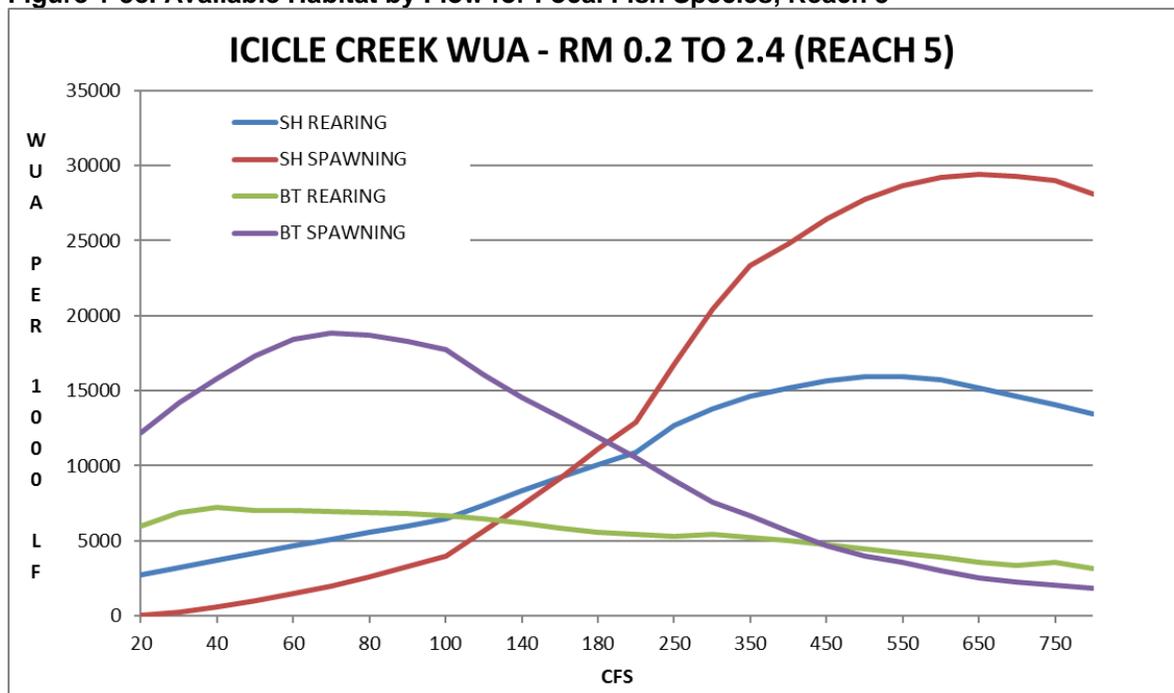
Source: Montgomery, 2004

Figure 1-5d. Available Habitat by Flow for Focal Fish Species, Reach 4



Source: USFWS, 2013

Figure 1-5e. Available Habitat by Flow for Focal Fish Species, Reach 5



Source: USBOR, 2005

After considering all of this information, the ICIFS decided to select a key reach of the river, fish species, and fish life stage on which to base flow recommendations. This approach presumed that if projects were constructed that met that reach/fish/life stage pairing, then the health of the rest of the Icicle Creek fishery would also be proportionately improved. Flows necessary to improve steelhead rearing in the historical channel (Reach 4) became the reference to evaluate flow improvement targets.

Maximum habitat benefit (100 percent WUA) for steelhead rearing in Reach 4 would be achieved with a flow of 250 cubic feet per second (cfs) and the IWG adopted this as their long-term goal. However, the IWG recognized a diminishing return on investment above 100 cfs when considering additional habitat achieved for each 1 cfs of flow improvement. The IWG also recognized that funding may be a constraint, at least initially, to achieve the highest level of flow improvement. Therefore, the IWG endorsed an initial flow restoration target of 100 cfs, which increases WUA by nearly four-fold compared to the current low flow scenarios, while maintaining the long-term restoration goal of 250 cfs. The IWG envisions the short-term goal to be achievable within approximately 10 years, and the long-term goal to be achievable in approximately 50 years.

1.5.1.2 Improve Sustainability of LNFH

The IWG recognizes that improving sustainability of LNFH is important to the watershed. This includes ensuring the hatchery provides healthy fish in adequate numbers, is resource efficient, achieves improved water quality, and does not impede fish passage. In determining metrics for this Guiding Principle, the IWG deferred to fish production goals established in *U.S. v. Oregon*, which is an ongoing federal lawsuit regarding fishing rights, and consulted with Work Group members who have expertise in hatchery operations, ichthyology, and watershed processes. Additionally, concurrent with the adoption process of a Guiding Principle for a sustainable hatchery by the IWG, NOAA Fisheries was developing a new biological opinion for the hatchery, which is discussed in more detail in Section 1.5.2.

Based on the instream flow and habitat restoration goals, and the potential for conservation and source upgrades at the hatchery that would assist in maximizing fish health, the IWG set several metrics for this Guiding Principle. These metrics include a water conservation goal of 20 cfs to be left in the historical channel, operating/modifying the passage barriers at Structure 2 and LNFH diversion (called Structure 1) to minimize passage impediments, and ensuring cool, pathogen-free water for hatchery operations. The location of Structure 2 and LNFH diversion are provided on Figure 1-1.

1.5.1.3 Protect Treaty/Non-treaty Harvest

The fishery of the Lower Icicle Creek is a traditional fishing site for the Yakama and Colville Tribes (Wenatchi band) traditionally known as the Wenatshapam fishery. Both tribes exercise federally recognized fishing rights at this location, targeting adult Chinook salmon returning to the LNFH, generally from May to late July. The Wenatshapam fishery serves as important cultural and subsistence resources, and is one of the few locations in the Upper Columbia River where tribal spring Chinook harvest occurs. The rights of the Yakama and Wenatchi band to the Wenatshapam fishery has been upheld and affirmed in *US v. Oregon*. All changes to water management in Icicle Creek must maintain this fishery.

In addition to the tribal fishery on Icicle Creek, the area is popular for recreational fishing. Consequently, the IWG has set protecting the non-treaty fishery as a Guiding Principle of the Work Group. Trout fishing occurs in the stream from near the IPID footbridge to Leland Creek, and throughout the Leland Creek catchment. The trout fishery is open from late May through the end of October and the primary trout species caught is rainbow trout. There is also a non-tribal, hatchery spring Chinook season that occurs on Icicle Creek from mid-May through July when the number of returning salmon are sufficient to meet broodstock collection goals at the LNFH. The average number of anglers participating in the spring Chinook fishery is approximately 2,688 (WDFW Creel Survey, 2016). WDFW does not conduct surveys of the trout fishery, so the average number of participating anglers is unknown.

Generally, the flow and habitat improvements endorsed by the IWG in other Guiding Principles were thought to have a neutral to positive effect on the tribal and non-tribal fishery. However, over the past several years, there have been documented declines in catch per unit effort (CPUE) in the tribal harvest. Per data provided by the Yakama Nation, tribal harvest peaked in 2001, and has been declining since. Catch numbers from 2014 indicate a 90 percent decline from the 2001 peak harvest (Table 1-3). As such, any further modifications to Icicle Creek could have unintended consequences and would need to be monitored closely. Therefore, the IWG sponsored some initial evaluations (e.g., a bathymetry survey of the current fishing area and sediment transport study) and included an adaptive management program as part of the Guiding Principles to ensure that this important fishery is not adversely affected.

**Table 1-3
Icicle Creek Spring Chinook Fishery**

Return Year	Trapped @ Hatchery	Sport Harvest	YN Harvest	CCT Harvest	Percent Tribal Harvest	Remaining in River	Total Run
1999	2,103	108	175		7.2	45	2,431
2000	4,457	1,606	3,238		34.2	163	9,464
2001	6,259	2,260	5,075		33.6	1,488	15,082
2002	6,459	1,201	3,796		30.9	828	12,284
2003	4,825	935	1,852		22.7	549	8,161
2004	2,308	347	863		23.1	214	3,732
2005	2,560	103	1,063		28.0	67	3,793
2006	1,957	529	588		18.7	73	3,147
2007	1,708	115	751		28.6	48	2,622
2008	3,229	347	1,036		21.2	283	4,895
2009	3,232	640	617	210	13.2	195	4,684
2010	11,307	993	683	310	5.2	237	13,220
2011	4,970	873	233	365	3.8	77	6,153
2012	3,749	971	287	123	5.6	131	5,138
2013	2,094	323	42		1.6	134	2,593
2014	4,375	TBD	547		10.4	357	5,279

Note – all fish are of hatchery origin
YN = Yakama Nation; CCT = Colville Confederated Tribes
Blank boxes represent absence of data

1.5.1.4 Improve Domestic Supply

For long-term economic and water security for both urban and rural residents, and to settle existing litigation between the City of Leavenworth and Ecology, the IWG made meeting current and future domestic water supplies through at least 2050 a priority.

To determine domestic need through 2050, the IWG relied on the Wenatchee Watershed Plan (2006) to predict rural development in the Icicle Creek Subbasin. The Wenatchee Watershed Plan projected 31 new homes in the Icicle Creek Subbasin through 2014. The Wenatchee Watershed Plan predicted demand in the Icicle subbasin for additional rural development at 4.7 homes per year. From 2014 to 2050 (36 years), approximately 169 additional homes are anticipated for this time period. The total projected rural residential demand through 2050 is 200 homes. Based on average indoor use of 200 gallons per day, as estimated in the Wenatchee Watershed Plan, and an estimated consumptive outdoor water use during the critical low flow month of September of 0.15 acre-feet (Aspect, 2013), the per unit rural domestic demand is 0.37 acre-feet per unit. The total rural domestic demand through 2050 is estimated at 74 acre-feet.

The water need for the City of Leavenworth was determined in two phases. The first phase was the determination of current need, as demonstrated in litigation over water rights with the Department of Ecology. This litigation is over the rights to 800 acre-feet of water. The second phase was to determine the future demand through 2050 using the City of Leavenworth Water System Plan (2011). This plan predicts the additional future water need at 867 acre-feet. Based on the average per unit use of 304 gallons per day, or 0.34 acre-feet per year (Water System Plan, 2001), this would provide water to 2,546 new residential and commercial connections (Table 1-4). The total water needed to meet future demand thru 2050 in the City of Leavenworth is 1,667 acre-feet.

Table 1-4
Projected Municipal & Domestic Water Demand through 2050

	acre-feet/unit ¹	Projected & Current Need (acre-feet)	Total Additional Units
City of Leavenworth	0.34	1,667	2,546
Exempt Wells, Icicle Basin ²	0.37	74	199

¹City of Leavenworth gpd/unit is the City of Leavenworth Water System Plan (2011)

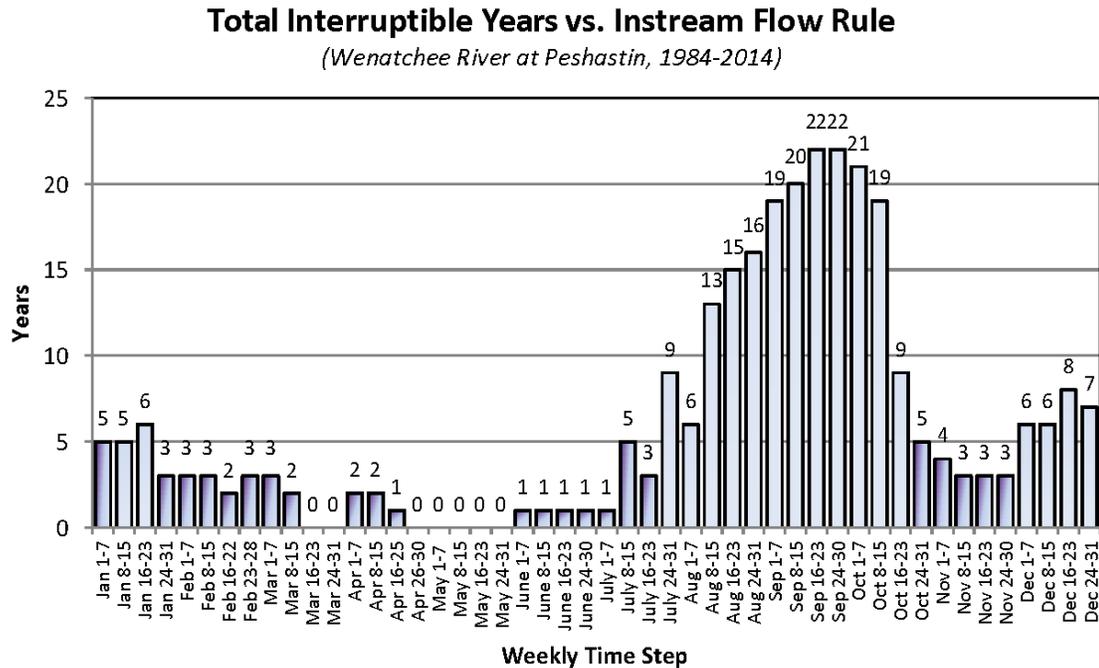
²Exempt Wells use is Wenatchee Reserve Account Review (Aspect Consulting, 2013)

1.5.1.5 Improve Agricultural Reliability

Improving agricultural reliability is focused on giving interruptible water users a firm water supply. An interruptible water user is a water user whose water right has a later priority date than the instream flow rule, making the water right junior to the instream flow rule. An instream flow rule, which is discussed in more detail in Section 1.4.2, is a water right to protect environmental flows in a river or stream. If a water right is junior to the instream flow rule, it can only be used when the instream flow rule is met. In Washington water law, a water user can only exercise their water right when senior water rights in the basin are fully satisfied. To determine the extent of the interruptible water user issue, we reviewed all water right holders with an interruptible provision within the Wenatchee Basin and found 47 interruptible water users. Of these 47 interruptible rights,

34 have irrigation as a purpose of use. This equates to 5.6 cfs and 1,150 acre-feet per year. Figure 1-6 shows when and how often the instream flow rule is not met and interruptible water users are told to cease diversions in the Wenatchee Basin (bars represent number of interruptions for a specific week out of a 30-year record (1984-2014)).

Figure 1-6. Time Frame and Frequency Instream Rule is Not Met in the Wenatchee River



In addition to providing water to interruptible water users, the IWG decided to look for opportunities to improve infrastructure and operations for agricultural water users with major diversions on Icicle Creek. These infrastructure improvements have focused on modernizing and repairing the dams owned and operated by IPID, and improving operations for COIC. These infrastructure improvements add to long term reliable water supplies for agriculture users especially in drought years when use has been curtailed, which endangers commercial agriculture.

1.5.1.6 Enhance Icicle Creek Habitat

The IWG adopted habitat enhancement as a Guiding Principle in response to recommendations for habitat and passage improvements in the Wenatchee Watershed Plan. To identify potential habitat and passage improvements the IWG relied on their ICIFC to conduct a reach-by-reach assessment of passage barriers and habitat conditions. This reach-by-reach approach resulted in identifying the boulder field located at RM 5.6 and several structures related to operations of LNFH as passage barriers. The LNFH passage barriers include Structure 5, Structure 2, and Structure 1, however some of these barriers have dual functions. For example, Structure 5 is an intentional barrier that protects the tribal fishery, another Guiding Principle. Similarly, Structure 2 protects the historical channel from flows above 2,600 cfs that would otherwise degrade existing habitat. The IWG considered options on where barriers should be considered for modification, removal, or retention given, in some cases, their multi-purpose functions.

Additionally, the group identified several habitat improvement opportunities in lower Icicle Creek and the historical channel (Reach 4 and Reach 5). Chelan County and the IWG have commissioned more habitat and passage studies to identify and prioritize habitat restoration and passage improvement projects, which are discussed in the *Lower Icicle Creek Geomorphic and Hydraulic Assessment for the Identification of Protection and Restoration Actions* prepared by Natural Systems Design for the County (Natural Systems Design, 2017).

1.5.1.7 Comply with State and Federal Law, and Wilderness Acts

All actions taken by the IWG must comply with state and federal law. All members of the Work Group agreed that a project cannot move forward if it is out of compliance with laws. Laws of specific interest include:

- The Wilderness Act
- The Alpine Lakes Area Management Act
- The Clean Water Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Fish and Wildlife Coordination Act
- National Historic Preservation Act
- Chapter 90.03 RCW – State Surface Water Code
- Chapter 90.44 RCW – State Groundwater Code
- Chapter 77.57 RCW – Fishways, Flow, and Screening

Table 5-22 in Chapter 5 provides a complete list of permits and laws applicable to the proposed projects under the Icicle Strategy, and Section 1.9 describes permits, actions, and laws related to the Icicle Strategy.

1.5.2 Final Guiding Principles

The result of the processes described above was the fine-tuning of the Guiding Principles into what they are today. As discussed above, this involved combining some principles, adding qualitative descriptions, and adding quantitative metrics. Below is the description of the IWG’s Guiding Principles today, after 3-years of scientific study and negotiation.

1.5.2.1 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, fish life 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 drought year and non-drought year minimum flows, as well as an interim and long-term flow restoration goal.

During drought years, the instream flow goal is set at 60 cfs. To meet drought year goals, a minimum of 40 cfs will need to be protected instream, assuming a drought year base flow of 20 cfs.

The short-term, non-drought year goal is 100 cfs minimum flows, which would provide 90-percent WUA for steelhead. The long-term goal was set was at 250 cfs (100 percent WUA for steelhead). A maximum flow of 2,600 cfs can pass through Structure 2. Based on work conducted by the IWG's Instream Flow Subcommittee, this flow maximum will remain in place to preserve habitat function.

1.5.2.2 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. Meeting this goal requires sufficient, diverse water source availability to maximize fish health, with groundwater supplies providing cool, pathogen free water. This principle calls for a 57 cfs supply for fish production from groundwater and surface sources. This principle also calls for LNFH to conserve at least 20 cfs compared to current usage. It also includes appropriately screened diversions and minimizing unintended barriers to fish passage.

1.5.2.3 Protect Treaty/Non-treaty Harvest

Treaty harvest by the Yakama Nation, the Colville Confederated Tribes, 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 CPUE and maintain multispecies harvest opportunities.

As part of this principle, the IWG is developing a Tribal Impacts Assessment and Adaptive Management Plan that addresses attraction flows, sediment transport, fish migration/straying, and site access and amenities.

1.5.2.4 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 2.5 to 5 cfs for peaking. 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.

1.5.2.5 Improve Agricultural Reliability

With agriculture vital to the economic 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.

1.5.2.6 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.

1.5.2.7 *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 alternatives and projects for the Icicle Strategy. Section 1.9 provides a more detailed description of applicable permits and laws.

1.5.3 Current Water Resources Conditions in the Icicle Subbasin

Seasonal low flows in lower Icicle Creek between the major diversions and the hatchery return are a common problem. Figure 1-7 shows low flow conditions that commonly occur during late summer. These low flows diminish water quality and limit habitat diversity for salmonids and are the leading issues in the Icicle Creek Subbasin. Water withdrawals in Icicle Creek (primarily between Rat Creek and the hatchery) likely contribute to low flows and high summer temperatures in lower Icicle Creek. Icicle Creek has exceeded state and federal water quality standards for temperature and dissolved oxygen (DO)/pH. Salmonid populations are at risk because of limited habitat diversity and quantity, obstructions, and increased sediment loads. The change in the landscape and vegetation after the 1994 Rat Creek Fire has contributed to increased sediment loads in Icicle Creek (MWG, 2006).

Figure 1-7. Low Flows at Structure 2 in 2001 (20 cfs)



As described in the previous section, Chapter 173-545 WAC sets flow requirements in lower Icicle Creek. Additionally, Chapter 173-545 WAC provides for a reservation of water for future uses. Based on Chapter 173-545 WAC, the control point for stream flow targets in the Icicle Subbasin is at the East Leavenworth Bridge. This control point is monitored by Ecology Gage 45B070. There is also a USGS gage located upstream of the major water right diversion at RM 5.8. All water rights issued after the establishment of the instream flow rule are considered junior to the rule and must not be exercised when instream flows at the Ecology gage are not met (unless the water right is debited from the reserve).

1.6 Prior Investigations and Activities in the Icicle Basin

This PEIS builds on a foundation of historical planning and scientific studies completed in the Icicle Subbasin. The following sections provide brief summaries of this work, which is incorporated by reference into this evaluation. The References section at the end of this document can be used to obtain greater detail.

1.6.1 Watershed Plan

As previously discussed, the Washington State Legislature passed the Watershed Management Act (formed under ESHB 2514; Chapter 90.82 RCW) in 1998. Chelan County, the Wenatchee Reclamation District, and the City of Wenatchee assembled late in 1998 and determined they would pursue watershed planning under Chapter 90.82 RCW. The Wenatchee Watershed Planning Unit (WWPU) formed in 1999; Chelan County was designated Lead Agency for grant management purposes and to provide administrative, facilitation, and technical support to the process. Participation on the WWPU has always been open to include “anyone who has an interest in the Wenatchee River Watershed” (WWPU, 2003). Active Planning Unit members are grouped as governmental or non-governmental based on their ability to implement specific and tangible elements of the plan. Much of the watershed planning work in WRIA 45 has been (and continues to be) performed by several key technical subcommittees under the direction of the Planning Unit. These committees address technical and policy issues associated with each of the technical elements and develop alternative approaches for the Planning Unit’s consideration. The Water Quantity/Instream Flow/Water Storage, Water Quality, and Habitat Technical Subcommittees include a broad range of representation from those with special technical expertise or an interest in the subject area.⁴

The Wenatchee Planning Unit produced the Wenatchee Watershed Plan in 2006. This plan identifies issues with water quality, water quantity, instream flow, and habitat within the watershed and provides recommendations for addressing those issues. The Planning Unit produced a Detailed Implementation Plan in 2008 to provide implementation pathways for the recommendations in the Watershed Plan. The Planning Unit has also commissioned several reports and studies to address water management in the basin.

⁴ http://www.co.chelan.wa.us/files/natural-resources/documents/Planning/Wen_Planning/Wen_Watershed_Plan/text/final_watershed_plan.pdf

1.6.2 Biological Opinion

In 2006, a Biological Assessment (BA) for Operation and Maintenance of LNFH was conducted by the U.S. Fish and Wildlife Service (USFWS, 2006). The focus of the BA was to provide updated information on the hatchery's operation and maintenance, and an updated assessment on the potential effects of the hatchery on federally listed, proposed, and candidate species as well as designated critical habitat. The BA outlined the project location, affected action area, foreseeable future actions in the Icicle Creek Watershed (including the Icicle Creek Restoration Project and LNFH's Water Supply System Rehabilitation Project), operation and maintenance of the LNFH (historical and current), description of species and critical habitat, current condition of the habitat, integration of species and habitat condition, analysis of potential effects to ESA-listed species, analysis of potential effects to the current condition of the habitat, cumulative effects, and effect determination and response requested. The critical species and habitat included bull trout. The BA included an assessment of the current condition of the habitat, including water quality, habitat access and elements, channel condition and dynamics, flow and hydrology, and watershed conditions. The results of the assessment indicated that of the species and habitat considered, the bull trout habitat had an indicator of degraded and was determined to be adversely affected by current LNFH operations. This resulted in formal consultation with National Marine Fisheries Service (NMFS).

Consultation with NMFS resulted in a Biological Opinion published in May 2015. Key proposed operations, maintenance, and construction at LNFH required in this Biological Opinion included:

- Install recirculating aquaculture system (RAS) tanks to reduce surface water needs
- Reduce surface water diversions by as much as 20 cfs annually
- Work towards collective instream flow goal of 100 cfs in Icicle Creek
- Evaluate to determine the efficiency and scope of expanded use of Snow Lake and Nada Lake Supplemental Reservoirs as a means to ensure flow for the LNFH's surface water right and improve instream flows outside of the current supplementation period
- Reduce use of Structure 2 for recharge by exploring effluent pump back and development of well fields
- Discontinue use of Structure 2 for aquifer recharge in August
- Limit diverted quantities at Structure 2 if certain flow requirements aren't met in September
- Limit use of Structure 2 in March when adult steelhead are detected
- Screen Structure 1 so it meets current NMFS screening standards

Many of these elements were integrated into the Guiding Principle for a sustainable LNFH (Section 2.1.2.2). The Biological Opinion set an 8-year timeline to accomplish these upgrades.

LNFH and NMFS re-opened consultation and prepared a new Biological Opinion as a result of the Wild Fish Conservancy v. Irving case, which concluded in the U.S. District Court, Eastern District of Washington remanding the Biological Opinion for not fully considering climate change. This Biological Opinion was released by NMFS in 2018.

1.6.3 Habitat, Passage and Instream Flow Studies

Several entities have worked on or commissioned reports regarding fisheries and instream flows in the Icicle Subbasin. These entities include Chelan County, Ecology, LNFH, as well as numerous local and non-profit organizations. These investigations are summarized in this section. Full reports can be accessed from Chelan County's Icicle Work Group webpage.⁵

1.6.3.1 Icicle Water Temperatures (All Reaches)

There are several salmonid species in lower Icicle Creek that could be impacted by changes in water temperature. Bull Trout require cooler water than most other salmonid species, preferring temperatures between 9 and 13 °C. Other salmonids found in lower Icicle Creek have a tolerance for higher temperatures, being found in waters up to 22 °C (Ringel, 2007).

USFWS' Mid-Columbia River Fisheries Resource Office (MCRFRO) has monitored water temperature in Icicle Creek since 2005 when Ecology set a TMDL for temperature to evaluate the impact of LNFH operations on stream temperatures (Ecology, 2005⁶; Fraser, 2015). Temperature loggers are deployed upstream, adjacent, and downstream of LNFH and in two tributary streams (Snow Creek and Jack Creek) (Hall and Kelly-Ringel, 2011).

For the Wenatchee Basin, mean summer and 7-Day Average Daily Maximum (7DADmax) values were calculated for each site and day using the running average of the previous 7 days (Hall and Kelly-Ringel, 2011). Between 2005 and 2010, the warmest mean high 7DADmax overall was 20.4 °C (range 19.4 to 22.1 °C), occurring in the Wenatchee River. The warmest mean high 7DADmax within Icicle Creek was 19.4 °C (range 18.9 to 19.8 °C), occurring downstream of the LNFH. The warmest mean high 7DADmax upstream of LNFH influence was 18.5 °C (range 17.4 to 19.8 °C) occurring upstream of Snow Creek.

The summer season coolest mean high 7DADmax of 15.8 °C (range 14.7 to 17.3 °C) occurred in Jack Creek. Within the LNFH operational influence, the summer season coolest mean high 7DADmax of 16.9 °C (range 16.2 to 18.3 °C) occurred in the LNFH spillway pool. In Snow Creek, the mean high 7DADmax for the years sampled was 17.3 °C (range 15.9 to 18.5 °C).

1.6.3.2 Instream Flow Study and Report for Icicle Creek (Reach 1)

In 1985, the U.S. Army Corps of Engineers produced an instream flow study in support of a hydropower feasibility study on Icicle Creek. This study used Instream Flow Incremental Methodology (IFIM) to study flows and consider the potential impacts to

⁵ <http://www.co.chelan.wa.us/natural-resources/pages/icicle-work-group?parent=Planning>

⁶ <https://fortress.wa.gov/ecy/publications/documents/0503011.pdf>

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fish habitat that could occur as a result of changes in instream flow caused by the potential project. The primary species of interest for this report were rainbow trout, cutthroat trout, brook trout, and bull char (bull trout). The results found that some spawning and juvenile habitat occurs in Reach 1 for all species listed above. Table 1-5 provides details of optimum flows for each species in Reach 1.

Table 1-5
Optimum Flows by Species and Life Stage for Reach 1

Species	Life Stage	Optimum Flow (cfs; approx.)
Rainbow Trout	Spawning	400
	Adult	500
	Juvenile	200
Cutthroat Trout	Spawning	400
	Adult	250
	Juvenile	200
Brook Trout	Spawning	400
	Adult	100
	Juvenile	100
Bull Trout	Spawning	400
	Adult	125
	Juvenile	125
Whitefish	Spawning	300
	Adult	500
	Juvenile	200
Steelhead	Spawning	400
	Adult	-
	Juvenile	200
Spring Chinook	Spawning	250
	Adult	-
	Juvenile	175

1.6.3.3 Icicle Creek Boulder Field Fish Passage Assessment (Reach 2)

In 2013, EcoAssets and Trout Unlimited produced an assessment of passage at the boulder field (RM 5.6). The purpose of this study was to document the extent of anthropogenic impact on fish passage and identify fish passage options at this location. The study found that the “Anchor Boulder”, which is the largest boulder in the boulder field, is the primary impediment to passage in this reach. The study also found evidence that there are anthropogenic impacts on the development of the boulder field and suggested several alternatives to improve passage, including channel profile adjustment, roughened channel, various types of fishways, and constructed riffle.

1.6.3.4 Icicle Creek Target Flows (Reach 3)

Montgomery Water Group produced a report in 2004 for LNFH on target flows. The purpose of the report was to summarize the analysis of target flows for the reach of Icicle Creek downstream of the LNFH diversion (Reach 3) because of low flows during late summer. The primary concerns with flow through this reach were passage and rearing habitat. This study found that passage is likely in Reach 3 at flows as low as 20 cfs,

which was consistent with the findings of a similar report produced in 2001 (USFWS, 2001). This study also found that maximum habitat benefit was likely for adult and juvenile bull trout and steelhead at 291 cfs. However, an optimal flow was not estimated for this reach because of data gaps.

1.6.3.5 Icicle Creek Fish Passage Evaluation for the Leavenworth National Fish Hatchery (Reach 4)

In 2013, the U.S. Fish and Wildlife Service conducted a fish passage evaluation for the LNFH to characterize physical and hydraulic conditions associated with a range of streamflow's at Structures 1, 2, and 5, and open-channel flows in the historical channel in Icicle Creek adjacent to the LNFH (Anglin et al., 2013). These structures are used to operate LNFH: Structure 1 is the surface water diversion located at RM 4.5, Structure 2 bifurcates flows at RM 3.9 to direct part of Icicle Creek into the hatchery channel for groundwater recharge and some into the historical channel, and Structure 5 is a barrier structure operated for broodstock collection and to impede upstream migration during tribal harvest.

Results of this study indicated variable limitation of fish passage associated with unique conditions involved with each structure or location. Passage criteria, species periodicity, and stream flows ranging from 90 percent to 10 percent exceedance flow (Icicle Creek) were integrated by month to identify depth and velocity passage limitations at the structures and in the historical channel. Detailed tables were generated to allow managers and stakeholders to determine when passage limitations occur, and whether options exist to eliminate barriers or improve passage conditions at these sites. Because fish passage is not a binary situation, interpretation of the results and development of improved fish passage options should be conducted jointly by technical experts, managers, tribes and other stakeholders to determine actions that will meet the multiple goals for Icicle Creek.

Key outcomes of this study included the installation of independent radial gates and the re-operation of Structure 2 to improve passage, continuation of capturing and moving non-target fish species at Structure 5, as well as velocity targets at both structures. Additionally, this report suggested improvements to the design and location of the fishway at Structure 1 and recommended maintaining 60 cfs in the historical channel for improved passage conditions.

1.6.3.6 Lower Icicle Creek Reach Assessment (Reach 5)

In 2005, USBR produced an Instream Flow Assessment of Icicle Creek, Washington. The purpose of the study was to characterize the relationship between stream flow and fish habitat in Icicle Creek downstream from the LNFH (Reach 5). This assessment included a Physical Habitat Simulation (PHABSIM) and IFIM to assist the Planning Unit with instream flow recommendations for Icicle Creek. The primary outcome of this report was WUA charts for each life stage and species of interest. The study found optimum flow between 70 cfs (bull trout) and 670 cfs (steelhead) for spawning species of interest, and approximately 50 cfs (bull trout) and 240 cfs (steelhead) for juvenile species of interest.

In 2017, a geomorphic and hydraulic assessment of the lower 4.3 miles of Icicle Creek, starting from the confluence with the Wenatchee River and extending up-valley through the Historic Channel at the LNFH, was completed to provide a scientific basis for identification and development of stream restoration and protection actions for lower

Icicle Creek (NSD, 2017). The assessment included a review of background information, field surveys, and computer modeling to characterize existing conditions. Hydraulic modeling used to evaluate reach hydraulics and floodplain connectivity incorporated bathymetric survey data and floodplain topography based on 2015 LiDAR data. Habitat Suitability Modeling examined the value of existing habitats related to juvenile Chinook salmon and steelhead rearing, and adult steelhead spawning.

Results of this assessment found that rearing habitat in lower Icicle Creek is poor and limited by lack of cover due to widespread loss of large wood in the system and lack of connectivity to off-channel habitat areas during high flows. The assessment identifies and prioritizes project opportunities by sub-reach designed to protect existing floodplain, increase rearing habitat by providing cover and improving floodplain connectivity, and restore riparian vegetation.

1.6.4 Climate Change

The IWG is considering whether the Guiding Principles can be met in response to long-term changes in water supply associated with climate change. Four climate change evaluations are considered in this PEIS, including work by USFS, OCR/WSU, the Icicle Watershed Council/Trout Unlimited, and the UW Climate Impacts Group. Below is a summary of these reports. Section 3.12 discusses climate in more depth.

1.6.4.1 USFS Report

The USFS published a report on climate change in the North Cascades region in 2014 to better understand upcoming resource management issues related to climate change in the North Cascades. In the Pacific Northwest, the current warming trend is expected to continue, with average warming of 2.1 °C by the 2040s and 3.8 °C by the 2080s; precipitation may vary slightly, but the magnitude and timing are uncertain. This warming will have far-reaching effects on aquatic and terrestrial ecosystems. Hydrologic systems will be especially vulnerable as North Cascades watersheds become increasingly rain dominated, rather than snow dominated, resulting in more autumn/winter flooding, higher peak flows, and lower summer flows. This will greatly reduce suitable fish habitat, especially as stream temperatures increase above critical thresholds. In forest ecosystems, higher temperatures will increase stress and lower the growth and productivity of lower elevation tree species on both the western and eastern sides of the Cascade crest, although growth of high elevation tree species is expected to increase. Distribution and abundance of plant species may change over the long term, and increased disturbance (i.e., wildfire, insects, and invasive species) will cause rapid changes in ecosystem structure and function across broad landscapes, especially on the east side of the Cascades. This in turn will alter habitat for a wide range of animal species.

1.6.4.2 Columbia River Basin Long-term Supply and Demand Forecast Report

OCR has a legislative mandate to produce a Supply and Demand Forecast once every 5 years to understand future water supplies and demands that factors in changes to climate, regional and global economics, Columbia River hydrology and hydropower operations and irrigation practices/technology. Previous editions were published in 2006 and 2011.

This section focuses on the 2016 report that provides a forecast to help OCR strategically fund water supply projects by improving understanding of where additional water supply is most needed, now and in the future. This most recent forecast offers a generalized, system-wide assessment of how future environmental and economic conditions will likely change water supply and demand over the next 20 years. The report evaluates surface water supply and demand for the Columbia River Basin, including the Wenatchee Basin. The impacts of climate change, regional and global economic conditions, and state-level water management actions on surface water supplies and irrigation demands were evaluated. Irrigation, municipal, and hydropower demands were forecasted, as well as instream flow requirements for fish stock status and habitat utilization, fish habitat condition, and stream flow. These evaluations were made for the entire Basin as well as by WRIs. The current and future forecasts will build on and expand current knowledge and understanding and serve as a planning tool to maintain and enhance the region's economic, environmental, and cultural prosperity.

Icicle Creek is in WRIA 45 (Wenatchee). The tributary surface water forecast for WRIA 45 is characterized by substantial increases in flow from fall through early spring, and decreases in flow in June and July. Instream flow requirements are the largest water demand, with smaller irrigation demand and even smaller municipal demand. In WRIA 45, the Supply and Demand Forecast predicts a shift in crops, which will increase irrigation demand in May and decrease demand in late summer and fall, with little change in June and July. Modeling of curtailment of interruptible irrigation water rights indicated that curtailment occurred in 90 percent of the years between 1977 and 2006. The forecast shows more frequent and higher magnitude of curtailment events during the early irrigation season. Additionally, there is a predicted 11 percent increase in demand by 2035.

1.6.4.3 Icicle Creek Watershed Council

Icicle Creek Watershed Council (ICWC) has conducted several studies examining the water budget in response to climate change. This work assumed a 35 percent decrease in streamflow (compared to 1994) as a result of climate change. This research found that reductions in streamflow would require additional inputs of up to 60 cfs in September, a critical low flow month, to offset the impacts of climate change in Icicle Creek. Examining the storage available in the upper Icicle Creek Watershed, the ICWC concluded that supplying 60 cfs from storage was possible to offset impacts of climate change with the assumed 35 percent decrease in streamflow.

1.6.4.4 UW Climate Impacts Group Icicle Creek Study

UW Climate Impacts Group issued a report in 2017 that examines the changing streamflow in Icicle and Peshastin Creeks as the result of climate change. This analysis used off-the-shelf hydrologic climate change data sets. The objective was to develop estimates of projected changes in monthly streamflow for the seven alpine lakes and changes in daily streamflow for Icicle and Peshastin Creeks. Projections for the alpine lakes have allowed the IWG to assess how the alternatives perform under current and future climate conditions, which is discussed in detail in Section 3.12 and 4.12. The goal described in the Guiding Principles appear attainable based on this analysis, therefore additional refinement of the models did not occur at this stage of analysis. The daily flow projections allow an understanding of changes in extremes (high and low flows) and their implications for water management.

1.6.5 Water Storage

1.6.5.1 *Water Storage Report, Wenatchee River Basin*

This report provided a summary of potential water storage projects and other water resource management strategies intended to increase water supply and instream flow in the Wenatchee River Basin. The Wenatchee River Basin is part of Ecology's WRIA 45, which is expressed by the drainage basin for the Wenatchee River. The primary water needs in the Wenatchee River Basin include irrigation, municipal and domestic water supply, and instream flows for fish passage and habitat. This report builds on information provided in the Multi-Purpose Water Storage Assessment in the Wenatchee River Watershed (MWG 2006) and other planning studies that have identified opportunities for improved management of water resources in the Wenatchee River Basin. A comparison of the costs and benefits of potential water storage projects with other water management strategies, such as water conservation on irrigation systems and acquisition of water rights, is also included. This report was prepared for Chelan County under a grant from the Columbia River Water Management Development Account administered by Ecology.

This report provides a preliminary summary of potential water storage projects and other water resource management strategies intended to improve the availability of water in the Wenatchee River Basin for both instream and out of stream water needs. This section includes a brief summary of the projects and strategies that were evaluated in this report.⁷

1.6.5.2 *Needs and Alternatives Analysis*

The Needs and Alternatives Analysis for Icicle Creek Subbasin Storage Study (2007), reviewed reach-by-reach water supplies and demands in the Subbasin. This analysis split Icicle Creek into four reaches. Work by the IWG recognizes five reaches, splitting the reach identified as Reach 3 in this study into two separate reaches, with Structure 2 being the new dividing point. Water needs were estimated by comparing the available water supply to the water demands in the Icicle Subbasin. The water demands include irrigation diversions, municipal and domestic demand, LNFH diversions, and instream flows.

Reach 1, the most upstream reach of Icicle Creek, has little demand because of lack of population in this reach and no other diversions. The primary water demand is the instream flow needs. A surplus of water occurs during the spring melt, while a deficit occurs in August through October during the period of annual low flows. However, the flows in this reach are natural and slightly enhanced by discharge from high alpine lakes operated by the Icicle and Peshastin Irrigation District.

Reach 2 has a large seasonal demand coming from the Icicle and Peshastin Irrigation Districts at their diversion dam (RM 5.7). Reach 2 also contains the City of Leavenworth's surface water diversion (RM 5.7). Snow Creek flows into Icicle Creek in this reach and its water supply was added to the water supply provided by Icicle Creek. A surplus of water occurs during the spring melt, while a deficit occurs in August through October during the period of annual low flows. Slight deficits also occur in January through April. The primary need is for additional water in August and September.

⁷ http://www.co.chelan.wa.us/files/natural-resources/documents/Planning/icicle_work_group/Basin_Wide_Studies/2011WenStorageRpt.pdf

Reach 3 has a large demand from the LNFH and a seasonal demand from the Cascade Orchards Irrigation Company (both at RM 4.5). This reach spans the IWG reaches identified as Reach 3 and Reach 4. Although the LNFH demand is non-consumptive, Reach 3 flow is reduced. This document provides proposed flows for Icicle Creek and do not represent the flow that may be provided by LNFH in this reach as a result of negotiations with USFWS and NOAA Fisheries.

Reach 4 has no major diversions but all non-purveyor domestic water use, and all non-district irrigation use are assumed to take water from Icicle Creek in this reach because the majority of the population is located within this reach. The LNFH outflow adds supply to Icicle Creek at RM 2.7. Domestic irrigation demands are small enough that neither can be visibly seen on the graph. A surplus of water occurs during the spring melt, while deficits occur in August through October during the low flow period. Deficits also occur during the February through April time period due to icing. The primary need is for additional water in August and September.⁸

1.6.6 IPID Pump Exchange

A Pump Exchange project was examined as an alternative water supply to the Icicle and Peshastin Irrigation Districts, moving their Icicle Creek diversion to the Wenatchee River, which would increase streamflow in Icicle and Peshastin Creeks downstream of the current diversions. In 2012, Anchor QEA produced the Peshastin Irrigation District (PID) Pump Exchange Project Appraisal Study (Anchor, 2012) which evaluated five alternatives and selected a preferred alternative (Alternative 1) along with a second (Alternative 5) as a backup. In 2014, Forsgren and Associates produced a report for Trout Unlimited examining six pump station locations for IPID, including those examined in the Anchor report and additional locations at Monitor, the Cashmere Wastewater Treatment Plant, the Cashmere Mill Site, and at the Dryden Reclamation District Diversion. In 2015, Anchor QEA attempted to combine the findings of these studies into a report titled Summary of Additional Analysis, Icicle and Peshastin Irrigation Districts Pump Exchange (Anchor, 2015). The two most feasible plans proposed to pump water from the Wenatchee River immediately west of Dryden, Washington and near Leavenworth, Washington. Although both plans had pros and cons, they were both estimated to cost approximately \$8.5 million.

Chelan County received grant funding in 2016 from the Salmon Recovery Funding Board to proceed with preliminary design and feasibility of the pump station. The work proposed under this grant would result in preliminary design of a preferred pump exchange project that would deliver water from the Wenatchee River to the PID Canal to provide instream flow benefit in Peshastin Creek during the late summer. The preliminary design would consider the potential for designing the project to be scalable to expand delivery to IID to benefit Icicle Creek in the future, if appropriate. The preliminary design work would also evaluate operations and determine whether supplemental flows from the IID Canal could be reduced and whether operational discharges of Icicle Creek water to Peshastin Creek could be reduced.

⁸ http://www.co.chelan.wa.us/files/natural-resources/documents/Planning/icicle_work_group/Icicle_Studies/DraftNeedsandAlts.pdf

1.7 Fish Recovery Efforts

The Wenatchee Watershed is home to a variety of aquatic species, including the following salmonids: spring- and summer-run Chinook salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*O. nerka*), steelhead/rainbow trout (*O. mykiss*), westslope cutthroat trout (*O. clarki lewisi*), and migratory and resident bull trout (*Salvelinus confluentus*). The documented, presumed, and potential distributions of anadromous salmonids in the Icicle Creek Subbasin are shown in Figure 1-8. Pacific lamprey (*Entosphenus tridentatus*) and re-introduced coho salmon (*O. kisutch*), two species of cultural importance to the Yakama Nation and Colville Confederated Tribes, are also present in the Wenatchee Basin.

Much of the planning, protection, and restoration/enhancement work in WRIA 45 has focused on the needs of salmonids listed under the ESA. Upper Columbia River spring-run Chinook salmon were listed as endangered in 1999 (64 FR 14308), Upper Columbia River steelhead were listed as endangered in 1997 (62 FR 43937) and reclassified as threatened in 2006 (71 FR 834), and Columbia River bull trout were listed as threatened in 1998 (63 FR 31647). NOAA Fisheries adopted the *Upper Columbia Spring Chinook and Steelhead Recovery Plan* (UCSRB, 2007) as its recovery plan for these species. Table 1-6 provides a list of priority projects from the recovery plan, as identified in appendix M1 of the report. As illustrated in the status column, the IWG and their partners have completed several of the identified projects. The USFWS finalized its recovery plan for bull trout in 2015 (USFWS, 2015).

Figure 1-8. Icicle Creek Subbasin Distributions of Anadromous Salmonids

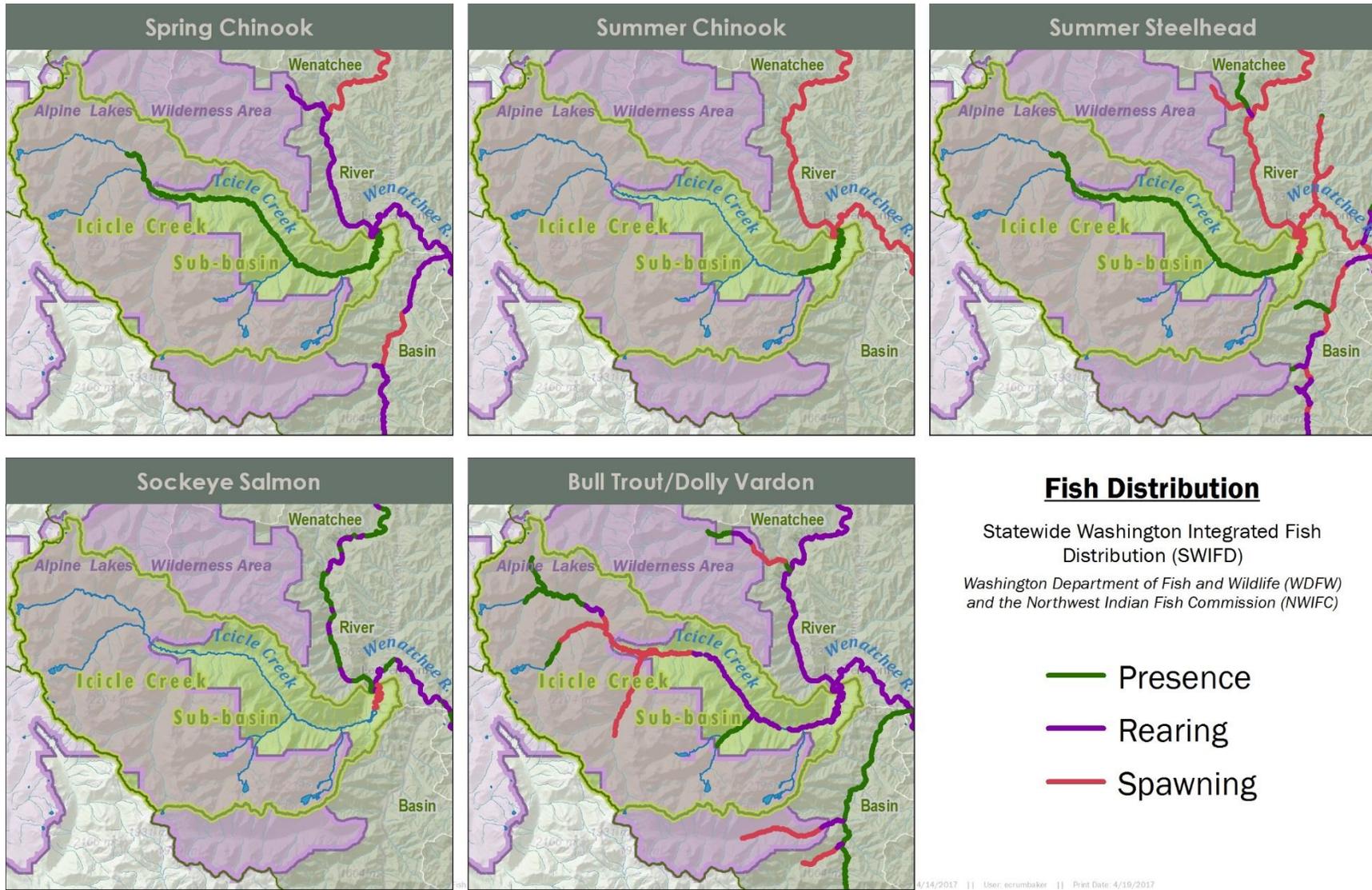


Table 1-6
Icicle Creek Projects Identified in the Upper Columbia Spring Chinook and Steelhead
Recovery Plan

Project Name	Status	Ecological Concern
USFWS LNFH Icicle Creek Restoration Project	Active	1 Habitat Quantity - Anthropogenic Barriers
ICTU Icicle Creek Reach Level Analysis	Completed	
CCNRD Icicle Revegetation	Completed	4 Riparian Condition - Riparian Vegetation
CCNRD Wenatchee Instream Flow Habitat Project	Completed	
CDLT Lower Icicle Creek Habitat Conservation	Completed	5 Peripheral and Transitional Habitats - Floodplain Condition
CDLT Icicle Creek Conservation Opportunities Outreach	Completed	
CCNRD Lower Icicle Riparian Initiative	Completed	4 Riparian Condition - Riparian Vegetation
TU-WWP Icicle Creek Alternatives Analysis	Conceptual	9 Water Quantity - Decreased Water Quantity
CDLT Icicle Creek Copper Notch Conservation Easement	Completed	5 Peripheral and Transitional Habitats - Floodplain Condition
USFS Icicle Creek Minimum Roads Analysis and Road System Improvements	Proposed	
CCNRD Icicle Irrigation District Efficiencies	Proposed	
CDLT Lower Wenatchee Leavenworth Audubon Center Acquisition	Completed	5 Peripheral and Transitional Habitats - Floodplain Condition
TU-WWP - Icicle Creek Boulder Field Assessment	Completed	1 Habitat Quantity - Anthropogenic Barriers
CCFEG Salmon Lifecycle Landscape	Completed	
TU-WWP Icicle Boulder Field Passage Design	Proposed	

1.8 Litigation Related to Water Management in the Icicle Creek Subbasin

Several water management challenges and conflicts have led to the development of the IWG and subsequently the Icicle Strategy, as laid out throughout this chapter. Many of these issues revolve around conflict over limited water resources, insufficient instream flows, and the need to meet future water demand. These conflicts have led the IWG to believe an integrated water resource management approach is the best option to address insufficient streamflow and conflict over water rights. Below is a synopsis of some of this conflict bared out through past litigation in the Icicle Creek Subbasin.

City of Leavenworth v. Washington State Department of Ecology

The City of Leavenworth's surface water certificate authorizes an instantaneous quantity (Qi) of diversion of 1.5 cfs from Icicle Creek. According to the City, the certificate does not list a specific time limit or maximum annual quantity (Qa) and contends that the Qa should be 1,085 acre-feet per year, which is based upon year-round, continuous diversion. Ecology states the City of Leavenworth has previously agreed to limit Qa to 275 acre-feet per year based upon a prior settlement before the PCHB. The City of Leavenworth filed a declaratory judgment action in Chelan County Superior Court seeking a determination of maximum Qa. In 2012, the court ruled in favor of Ecology, which the City of Leavenworth appealed to the Court of Appeals. Subsequently, the City of Leavenworth and Ecology have agreed to stay the litigation, or temporarily put on hold, while Ecology and the City of Leavenworth worked cooperatively to identify and fund projects in the Wenatchee River Basin that would augment Leavenworth's water rights for future growth.

Wild Fish Conservancy v. Salazar et al

USFWS operates a surface water diversion from Icicle Creek to supply water to the Leavenworth National Fish Hatchery for various uses. In 2009, the Wild Fish Conservancy and a local resident, Harriet Bullitt, filed a complaint for declaratory and injunctive relief in the Eastern District of Washington, United States District Court against Kenneth Salazar (in his official capacity as the Secretary of the United States Department of Interior), USFWS, USBR, United States Department of Interior (DOI), and LNFH on the basis that they have allegedly violated the State of Washington's Water Code by diverting water into the hatchery channel. The U.S. District Court, Eastern District of Washington, and the Ninth Circuit Court of Appeals ruled in favor of the defendants (2013).

Wild Fish Conservancy v. Irving et al

Additional litigation has occurred between Wild Fish Conservancy and LNFH regarding the adequacy of the Biological Opinion. The U.S. District Court, Eastern District of Washington order granted in part and denied in part the plaintiff's and defendant's motions. The court found that the Biological Opinion was arbitrary and capricious because it failed to discuss the potential effects of climate change. However, the court sided with LNFH and NMFS regarding whether an environmental impact statement was required for the Biological Opinion. The Biological Opinion was remanded back to NOAA to address climate change impacts.

Wild Fish Conservancy v Washington State Department of Ecology

In 2010, Wild Fish Conservancy and Center for Environmental Law and Policy (CELP) appealed Ecology's issuance of a Clean Water Act (CWA) Section 401 Certification for LNFH. Based on this litigation, Ecology rescinded the January 2010 Section 401 Certification and is currently working on issuing a new certification.

Center for Environmental Law and Policy v. USFWS

In CELP v. USFWS (2016), CELP and Wild Fish Conservancy sued the LNFH for allegedly operating without an NPDES permit. In this case, the courts found that the hatchery's National Pollutant Discharge Elimination System (NPDES) permit expired in 1979, and that the hatchery has been discharging pollutants into Icicle Creek without an NPDES permit since that time, in violation of the CWA. A new NPDES permit and 401 Certification was issued in December 2017. CELP has filed an appeal to the 401 Certification, which is currently pending before the PCHB (Center for Environmental Policy and Wild Fish Conservancy v. Dep't of Ecology and U.S. Fish and Wildlife Service; PCHB No. 17-109.)

1.9 Overview of SEPA Process

SEPA applies to all decisions made by state and local agencies in Washington State. Under SEPA, one government agency is typically identified as the lead agency for identifying and evaluating the potential adverse environmental impacts of a proposal. This evaluation is documented and sent to the public and other agencies for their review and comment.

Under SEPA, project proponents are asked to complete an environmental checklist. The checklist asks questions about the proposal and its potential impacts on the environment. After the checklist has been completed, the lead agency reviews it and other information about the proposal. If more information is needed, the lead agency can ask the applicant to conduct further studies. Public meetings and outreach events are used to share information about the proposal and seek feedback from interested parties. When a proponent has gathered and submitted enough information about their proposal, the lead agency will make a threshold determination:

- A determination of non-significance – also called a DNS – if it finds the proposal is unlikely to have a significant adverse environmental impact.
- A determination of significance if the information indicates the proposal is likely to have a significant adverse environmental impact. This requires the preparation of an EIS that evaluates the environmental impacts of the proposal and reasonable alternatives.
- A determination of mitigated non-significance – also called an MDNS – if it finds the proposal, with specific mitigation measures, would allow a DNS. This would allow the proposal to be clarified, changed, or conditioned to include those mitigation measures.

The EIS provides critical information to all agencies in the environmental review and approval process. This information also helps to determine avoidance, minimization, or compensatory mitigation measures to address any probable significant impacts.

For the Icicle Strategy, the co-conveners (Ecology and Chelan County) entered into a Memorandum of Understanding to act as SEPA co-lead agencies per Chapter 43.21 RCW to conduct an environmental review of the Icicle Strategy.

The following timeline lists the SEPA review process for the Icicle Strategy:

- February 2016: submitted SEPA checklist and issued threshold determination of significance; launch PEIS SEPA scoping
- April 2016: Public meeting
- May 2016: End of SEPA scoping comment period
- June 2016 to Spring 2018: Develop draft PEIS
- Spring 2018: Publish draft PEIS with a 60-day comment period
- Summer 2018: Public meeting in Leavenworth
- Winter 2018/2019: Issue final PEIS
- Winter 2018/2019: Begin project level environmental review or permitting

1.9.1 SEPA Scoping

SEPA scoping launched on February 9, 2016. The lead agencies, Ecology and Chelan County, elected to expand the scoping process in accordance with WAC 197-11-410 to promote interagency cooperation, public participation, and innovative ways to streamline the SEPA process. To support this, a public open house was held in Leavenworth, Washington on April 20, 2016, and public comments were received through May 11, 2016. Comments received during this period can be reviewed at: <http://www.co.chelan.wa.us/natural-resources/pages/icicle-strategy-sepa-comments> (Appendix B).

1.9.2 SEPA PEIS

At the conclusion of the SEPA scoping process, the co-lead agencies reviewed and summarized the scoping comments submitted. The co-lead agencies decided to consider several different alternatives based on comments received during the scoping process, including the base package (a suite of projects previously identified by the IWG that can meet the Guiding Principles), along with a no-action alternative, and three other alternatives that were responsive to the scoping comments. The alternatives considered are described in Chapter 2 of this document. Descriptions of the affected environment can be found in Chapter 3, with analysis of potential impacts, cumulative impacts, and mitigation measures discussed in Chapters 4 and 5.

1.9.3 Next Steps in the Environmental Review Process

In considering future project implementation, government agencies responsible for project - level environmental review and permitting on projects covered by this PEIS will perform one of the following actions under WAC 197-11-600:

- Rely on the analysis presented in this PEIS unchanged.
- Issue an addendum “that adds analyses or information about a proposal but does not substantially change the analysis of significant impacts and alternatives” in the PEIS.
- Prepare a Supplemental Project EIS if there are “substantial changes to a proposal so that the proposal is likely to have significant adverse environmental impacts” or there is “new information indicating a proposal’s probable significant adverse environmental impacts.” “A new threshold determination or SEIS is not required if probable significant adverse environmental impacts are covered by the range of alternatives and impacts analyzed in the existing environmental documents.”

1.9.3.1 Project Level Environmental Review

If the IWG receives authorization and funding to carry the Icicle Strategy forward, the first steps in the process would be to undertake additional project definition, design, modeling, feasibility study review, and other appropriate technical analyses. Once the projects and actions have received adequate definition and design, they would undergo project-level environmental review. Projects for which adequate environmental review is covered in the PEIS, the permitting agency may decide to adopt the PEIS analysis and proceed to permitting. However, projects that may have new or additional significant adverse impacts not analyzed in the PEIS would require additional project-level review. The project-level environmental review could include detailed analysis of impacts and development of project-

specific mitigation, including an assessment of the anticipated effectiveness of mitigation measures to avoid or attenuate impacts. Projects carried forward would comply with permit requirements, as described in Section 1.9 of this chapter.

1.9.3.2 NEPA Requirements and Integration

The National Environmental Policy Act (NEPA) requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions (EPA, 2016⁹). Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. Agencies also provide opportunities for public review and comment on those evaluations.

NEPA is required on projects with a federal permitting nexus. Several projects under the various alternatives may require federal permitting and a federal level environmental review. NEPA can occur concurrently with the SEPA process. Conversely, SEPA and NEPA can occur on separate timelines. When this occurs, the subsequent review can adopt the finding of the previous review. For example, if NEPA precedes SEPA, the findings of the NEPA analysis can be adopted (WAC 197-11-610). Alternatively, in some instances a federal agency may use existing SEPA documents to meet NEPA requirements depending on the adopted NEPA policies of that agency, as was the case with USBR adopting the SEPA review of the Lake Roosevelt Incremental Storage Releases project.

If SEPA is conducted before NEPA, the SEPA process does not predetermine the NEPA process. Should a project or a suite of projects selected as part of the Preferred Alternative through this EIS or future SEPA process not be selected as a preferred alternative through a NEPA process, the IWG operating procedures require that the project be replaced by another project to meet the Guiding Principles. This is also the case if any project is determined to be fatally flawed based on cost, permitting, project -level environmental review, or other means. If this occurs, additional SEPA review would be conducted as required under Chapter 197-11 WAC.

For projects related to LNFH, the USBR and USFWS are currently reviewing proposals on Snow Lake valve replacement and automation, screening and upgrading the intake structure, water conservation measures at LNFH, and groundwater development. USBR has already initiated an Environmental Assessment (EA) for the Snow Lake Valve Replacement Project and is considering additional EA and EIS work for the other projects.

For projects that require USFS permitting or approval, the co-leads anticipate USFS may serve as lead agency. This decision will be made by applicable federal agencies depending on federal permitting requirements and federal agency coordination.

1.9.3.3 Summary Timeline of All Environmental Review

The process of environmental review of Icicle Strategy projects is ingrained in each step of the various projects. As indicated in Table 1-7 some aspects of environmental review, such as weighing the impacts of each step on consistency with the Guiding Principles, are taken into consideration on a continuous basis and are always underlying any decision made. Other, more specific aspects of the environmental review process are enacted at key junctures in a project's timeline. The SEPA process began at the end of 2015 and will progress through

⁹ <https://www.epa.gov/nepa>, accessed September 15, 2016

2018. At the same time, meetings with local, state, and federal government agencies occurred to put together a package of interagency agreements and common goals to incorporate into the SEPA scope. The various steps in the Environmental Review can be seen in Table 1-7.

**Table 1-7
Environmental Review Timeline**

Task	Description	Dates
IWG Process		
IWG Meetings	Determine framework for resolving any additional guiding principle deficiencies, project selection, and environmental review	Quarterly, 2012- Present
Guiding Principle Metric Resolution	Resolve any unmet guiding principle metrics to allow project selection and level of investment determination	2012 through Mid-2017
Integrated Project List Deliberation	IWG Steering Committee or Project Subcommittee weighs benefits, risk, impacts, and consistency with Guiding Principles	2012 through Present
Environmental Review		
SEPA Scoping	SEPA Scoping	January 2016 through June 2016
Lead Agency Determination	Meet with local, state, federal agencies to determine leads, scoping goals, interagency agreements, existing documents	January 2016 through June 2016
Determination of Significance	Distribute DS and all studies assembled to-date to agencies and the public	February 2016
Publish scoping comments/summary	Identify key issues to be addressed in Programmatic EIS	June 2016
Data Gaps	Identify and resolve data gaps, supplemental environmental studies	June 2016 through April 2017
Develop Programmatic EIS	Develop draft document, including Guiding Principles, Alternatives, and Affected Environment	June 2016 through June 2017
Draft PEIS Internal	Draft PEIS to lead agencies	June 2017
Circulate Draft EIS for Comment	Draft PEIS circulated for 60-day comment period	May 2018 through July 2018
Public Comment	PEIS Comment period closes	July 2018
Produce Final Programmatic EIS	PEIS Final document published	January 2019
Finalize NEPA Integration Strategy	Budget and coordinate NEPA integration strategy	December 2018 through April 2019
Begin Project Level Environmental Review	Project Level EIS's will likely follow same steps above, although other options exist (e.g., SEPA Addendum, Adoption of PEIS)	January 2019 through December 2020
Project Development		
Begin Feasibility Studies	Feasibility study funding is provided in the 2015-2017 OCR Capital Budget, federal budget matches needed for some projects	2015 through May 2018

1.9.3.4 Future Opportunities for Public Input

Public review and comment is an important part of the IWG decision making process. The public is a valuable stakeholder and the IWG aims to make decisions that benefit the greatest number of people. A 90-day comment period on scoping for the Programmatic EIS took place from February to May 2016. In addition, a draft of the Programmatic EIS will be circulated for a 60-day comment period. Additional comment periods will be scheduled and

conducted for subsequent NEPA and project level environmental reviews and permitting. IWG meetings are also open to the public and IWG members make numerous presentations to stakeholder groups on the Icicle Strategy.

1.10 Related Permits, Actions, and Laws

This section describes key federal and state regulations applicable to the Icicle Creek Strategy and program alternatives.

1.10.1 Endangered Species Act

The Endangered Species Act of 1973 (ESA; 16 United States Code [USC] 1536) is a federal law designed to protect and prevent the extinction of species of fish, wildlife, and plants, and their critical habitats, that are listed as threatened or endangered under the Act. The ESA is administered by the USFWS for terrestrial species and some freshwater fish species and NMFS for anadromous fish and marine species, collectively referred to as “the Services.”

Under the ESA, it is unlawful for anyone to take a listed animal without a permit. “Take” is defined as harassment, harm, pursuit, hunting, shooting, wounding, killing, trapping, capturing, or collecting or attempting to engage in any of these activities. The USFWS and NMFS are Icicle Creek Work Group members and part of their respective roles is to ensure consistency with applicable state and federal laws, including the ESA. This has been established as one of the Guiding Principles of this program evaluation. In addition, any individual projects with the potential to result in take of a species protected under the ESA would undergo consultation with the Services prior to project implementation. For additional information about coordination with the Services specific to the Icicle Creek Strategy, refer to Chapter 5, *Consultation and Coordination*.

1.10.2 Magnuson-Stevens Fishery Conservation and Management Act

Section 305(b)(2) of the Magnuson-Stevens Act (MSA) requires federal agencies to consult with NMFS on activities that may adversely affect essential fish habitat (EFH). EFH is defined in the MSA as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. A federal action agency, or its official designee, must determine whether its actions may adversely affect EFH. If the agency determines that an action may adversely affect EFH, the action agency must prepare an EFH Assessment. If the action would not adversely affect EFH, then the agency should document this determination in its record. Any individual projects with the potential to result in adverse effects on EFH would undergo consultation with NMFS prior to project implementation. For additional information about coordination with NMFS specific to the Icicle Creek Strategy, refer to Chapter 5, *Consultation and Coordination*.

1.10.3 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) was enacted in 1934 and amended in 1958 (Public Law 85-624) and provides for equal consideration of wildlife conservation in coordination with other features of water resource development programs. Consultation with USFWS and WDFW would be required during implementation of water resource development portions of the program (e.g., plans to control or modify any stream or other body of water). This consultation is typically conducted concurrently with other regulatory review or permitting processes under NEPA, ESA, and CWA compliance. Also, WDFW is an Icicle Creek Work Group member and part of its role is to ensure consistency with applicable state and federal laws, including the Fish and Wildlife Coordination Act.

1.10.4 Clean Water Act

The CWA (33 USC 1251 *et seq.*) was enacted in 1972 and is the primary federal law regulating discharges of dredged or fill material and pollutants into waters of the United States. The EPA has established water quality standards for the discharges of dredged or fill material and pollutants under the regulatory provisions of the CWA, as summarized below. The CWA is jointly implemented by the EPA and the U.S. Army Corps of Engineers (USACE).

1.10.4.1 Section 401, Water Quality Certification

Section 401 of the CWA requires that any project with the potential to result in discharge to waters of the United States obtain a water quality certification permit. In the State of Washington, individual projects with the potential to result in discharge to waters of the United States would require a water quality certification permit from Ecology.

1.10.4.2 Section 402, National Pollutant Discharge Elimination System

Section 402 of the CWA requires permission for any construction activities resulting in disturbance to 1 acre of land or greater or for any point source discharges from a municipal, industrial, or commercial facility into a surface water of the United States. Permissions must be obtained through the NPDES permit and be consistent with water quality standards set forth by the CWA. NPDES permits are also administered by Ecology in the State of Washington.

1.10.4.3 Section 404 Permit Program

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. An individual permit is required for potentially significant impacts, whereas a general permit, issued on a nationwide, regional, or state basis, may be suitable for discharges that have only minimal adverse effects. Individual projects with the potential to result in the placement of dredged or fill material into waters of the United States, including wetlands, would require a permit from USACE.

1.10.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their actions on cultural resources, including archaeological resources, historic properties, and traditional cultural properties. Federal agencies must undergo a process of consultation with the State Historic Preservation Office and potentially affected federally recognized tribes to ensure the potential for impacts on these resources are appropriately minimized. Individual projects led by a federal agency or requiring a federal permit or approval will undergo Section 106 evaluation. Within the State of Washington, the State Historic Preservation Office is the Washington State Department of Archeological and Historic Preservation (DAHP). Section 106 could apply to any of the projects that receive federal funding or a federal permit, or take place on federal land.

1.10.6 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (25 USC 3001-3013) provides a process for federal agencies and museums receiving federal funding to return certain Native American cultural items to lineal descendants, establishes a process for the protection of the inadvertent discovery of Native American cultural items on federal and tribal lands, and provides penalties for noncompliance and illegal trafficking. Individual projects involving federal agency permits or approvals would be required to comply with this law.

1.10.7 National Archaeological Resources Protection Act

The National Archaeological Resources Protection Act (16 USC Chapter 1B) governs the excavation of archaeological sites on federal and Native American lands and the removal and disposition of archaeological collections from those sites. Individual projects occurring on federal lands would be required to comply with this law.

1.10.8 Executive Order 13007: Indian Sacred Sites

Executive Order 13007 requires federal agencies to promote access to and protection of American Indian sacred sites. Sacred sites can only be identified if tribes or an appropriately authoritative representative of a Native American religion has informed the agency of the existence of a site.

1.10.9 Executive Order 11988: Floodplain Management

Executive Order 11988 requires federal agencies to reduce the risk of floodplain loss, minimize the adverse impacts of floods, and restore and preserve the natural functions provided by floodplains. Individual projects involving federal permits or approvals will further ensure consistency with this executive order.

1.10.10 Executive Order 11990: Protection of Wetlands

Executive Order 11990 requires federal agencies to ensure their actions minimize the destruction, loss, or degradation of wetlands and preserves or enhances the beneficial

values of wetlands. Any wetland losses associated with individual projects would be addressed through evaluation and permitting consistent with the Clean Water Act.

1.10.11 Executive Order 12898: Environmental Justice

Executive Order 12898 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. The effects of individual projects involving federal permits or approvals will result in further evaluation of the potential for disproportionate impacts on these populations.

1.10.12 Wilderness Act

The Wilderness Act of 1964 created the National Wilderness Preservation System and establishes regulations for the management and use of wilderness areas on federal lands. The Wilderness Act prohibits permanent roads or commercial enterprises, except where they provide for recreation or other purposes of the Act, and generally prohibits the use of motorized equipment; however, certain nonconforming uses are permitted as described within the act, including access to non-federal inholdings and for the maintenance and reconstruction of existing water infrastructure, such as dams.

1.10.13 U.S. Forest Service Special Use Permit

The USFS special-use authorization is a legal document, such as a permit, lease, or easement that allows occupancy, use, rights, or privileges on USFS land. The ALWA is jointly administered by the USFS Okanogan-Wenatchee and the Mt. Baker-Snoqualmie National Forest management.

Upper and Lower Snow Lakes and Nada Lake are owned and operated by USFWS. IPID owns easements that encompass Klonauqua, Square, Colchuck, and Eightmile Lakes. All of these lakes are located in the ALWA. IPID and the USFWS have existing water rights, easements, and access agreements with the USFS that allow the lakes to be used for storage and release of water. These agreements include the right to conduct maintenance activities within the ALWA. Depending on ownership and easement authority at the various lakes, additional special use permits may be required.

1.10.14 Governor's Executive Order 05-05

Any state-funded capital construction projects or land acquisition projects for the purpose of capital construction require Governor's Executive Order 05-05 (GEO 05-05) review. This order requires all state agencies to integrate DAHP, the Governor's Office of Indian Affairs, and concerned tribes into the capital improvement project planning process to protect the public interest in historic and cultural sites. Consultation with DAHP is typically conducted by the responsible federal agency; however, this directive ensures coordination for capital improvement projects regardless of federal involvement. GEO 05-05 could apply if any of the projects receive state capital improvement funds.

1.10.15 Washington State Archaeological Protection

Washington State law (Revised Code of Washington 27.53.060) requires a permit from DAHP prior to the disturbance of any known archaeological sites and provides for

criminal penalties for activities conducted without having obtained a written permit prior to beginning such activities. Individual projects with the potential to disturb known archeological sites would be required to comply with this law.

1.10.16 Hydraulic Project Approval

The WDFW administers the Hydraulic Project Approval (HPA) program under the State Hydraulic Code (Washington Administrative Code 220 – 110), which is specifically designed to protect fish life. Construction projects or other activities in or near state waters require an HPA. Individual projects with the potential to affect state waters and fish will require an HPA.

1.10.17 Washington State Department of Natural Resources Aquatic Use Authorization

An Aquatic Use Authorization is required from Washington State Department of Natural Resources (WDNR) for use of state-owned aquatic lands. State-owned aquatic lands are navigable lakes, rivers, streams, and marine waters. WDNR may also require surveys or a legal description of the property, a plan of development/operations, bonds, and insurance. SEPA approval and the HPA need to be completed prior to WDNR issuing the Aquatic Use Authorization. Individual projects requiring an aquatic use authorization will undergo review by WDNR.

1.10.18 Joint Aquatic Resources Permit Application

To streamline the environmental permitting process, multiple regulatory agencies have combined their processes into one application called the Joint Aquatic Resources Permit Application (JARPA). Relative to the Icicle Creek Strategy, the JARPA can be used to obtain local, state, and federal approvals for compliance with the Shoreline Master Program, Ecology’s 401 Water Quality Certification, HPA, the WDNR Aquatic Use Authorization, and the USACE’s Section 404 review for individual projects requiring these permits and approvals.

1.10.19 Reservoir Storage Permit

A Reservoir Storage Permit issued by the State of Washington is required for any impoundment that is either 10 feet or more in depth or can retain 10 or more acre-feet of water regardless of whether the impounded water is on-channel or off-channel. Reservoir Storage permits are regulated under RCW 90.03.370, and authority to issue Reservoir Storage Permits resides with Ecology. The permitting process is similar to water rights permit application processing in that there is no statutory timeline for a decision by Ecology; permits are processed in order of priority date. Expedited permitting (e.g., cost reimbursement) is an avenue for those seeking accelerated permit processing. Reservoir Storage Permits are often confused with Dam Safety Permits, which are required for construction of dams capable of storing 10 acre-feet of water above natural grade (WAC 173-175-020), and many storage projects require both permits. Similarly, Reservoir Storage Permits are not used in place of water rights permits (permit for beneficial use of water). Separate permit authorization is required for diversion / withdrawal and use of source water.

1.10.20 Dam Construction Permit

A Dam Construction Permit is issued by the State of Washington and is required for any impoundment that stores 10 acre-feet of water or more (WAC 173-175-020). The state can exempt some dams that meet this threshold provided they are less than 6 feet tall. Impounded volumes are measured based upon the maximum potential storage volume that could be released in the event of dam failure, and in many instances this volume is dictated by the crest of the dam (rather than spillway) relative to natural grade. Dam Construction Permits are issued by the Dam Safety Office (DSO) of Ecology. The permitting process involves evaluation of dam purpose, operational class, dam size, downstream hazard classification, federal regulatory nexus, and other factors. Once constructed, dams must be operated and maintained in accordance with DSO requirements and are subject to periodic inspection by the state (WAC 173-175-200).

1.10.21 Water Right Permit

A Water Right Permit (water right) is issued by the State of Washington and is required in order to use waters of the State. A water right is a legal authorization to use a predefined non-wasteful quantity of public water for a designated purpose that must qualify as a beneficial use (e.g., irrigation, domestic, fire flow, fish propagation, etc.). Water right authorizations may be either a claim, permit, or certificate; however, permits and certificates are the only forms of new authorizations issued. Uses of water below a set quantity or for certain uses may be exempt from permitting. Once a permit is issued, the permittee has a prescribed time window to put their authorized quantity to beneficial use. The quantity put to beneficial use represents the “perfected” quantity that may be certificated. Once certificated, some portions of water rights authorization may be changed, which may be advantageous; however, authorized quantities may also be forfeited (relinquished) because of unexcused periods of non-use. The extent and validity of a water right is triggered when an applicant applies to change a water right, and Ecology investigates whether a water right exists to change. Ecology may also review the extent and validity of a water right when an entity with pre-existing water rights seeks a new water right. Part of Ecology’s review of a change to a water right also includes environmental review of potential impacts through a SEPA evaluation. Water rights applications are reviewed and approved in order of priority date—meaning they are processed sequentially based on the date the application is accepted by Ecology. Options for expedited application processing are available. In order for Ecology to issue a Water Right Permit, the proposal must meet a four-part test including: 1) water is available (both legally and physically), 2) the permit is for beneficial use, 3) will not impair other rights, and 4) not contrary to the public interest.

1.10.22 County Shorelines Management Act Permit (Shoreline Substantial Development or Conditional Use Permit)

Compliance with the Shoreline Management Act (Chapter 90.58 RCW) is required for development in proximity to water bodies of a certain size. In Chelan County, these water bodies include lakes greater than 20 acres and streams and rivers over 20 cfs. Shoreline Management Act jurisdiction also includes upland areas associated with these

waterbodies—specifically lands within 200 feet of ordinary high water mark, floodways, some floodplains, and associated wetlands. Shoreline permitting applies to new structures (buildings, docks, etc.), grading, and other activities. Unless exempted from permitting under RCW 90.58.030(3), there are three typical shoreline permitting pathways that involve both local jurisdiction (e.g., Chelan County) and Ecology. In incorporated areas, such as City of Leavenworth, city zoning and comprehensive plans regulate shoreline permitting. These are the Substantial Development Permit, Shoreline Conditional Use Permit, and Variance. The Shoreline Substantial Development Permit is issued by Chelan County and is required for any activities that constitute substantial development as defined in the adopted Shoreline Management Program. Substantial Development Permit decisions made by Chelan County are not reviewed by Ecology but are filed by the State. Conditional Use Permits and Shoreline Variances are issued by Chelan County but are also review and approved by Ecology. Conditional Use Permits are issued in circumstances where a particular shoreline use is not preferred or outright allowed but may be permitted based on circumstances. In contrast, Variances are provided in cases when particular use is allowed but an alternative numerical development standard, such as maximum building height, minimum setback, etc., is allowed.

1.10.23 Critical Areas Review

Critical areas review is required by the Growth Management Act that establishes standards for use and development of lands based on the existence of critical areas such as critical aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas, and wetlands. Zoning designations that affect critical areas are provided in Chapters 11 and 13 of the Chelan County Code for unincorporated areas. Cities (i.e., Leavenworth), regulate zoning and critical areas through their own zoning regulations and comprehensive plans.

1.10.24 Building, Fill, and Grading Permits

Any site improvement (development), including grading and structural improvements, require a County building permit per Chelan County Code Chapter 14 for unincorporated areas. Cities (i.e., Leavenworth), these activities are regulated through zoning and comprehensive plans.

1.10.25 Water System Plans

Water system planning is required under Part 2 of Chapter 246-290 WAC for any community public water system meeting certain thresholds set forth in WAC 249-290-100. An update to water system planning documents is required at least once every 10 years or if a system proposes to make infrastructure changes that change the number of connections, expands the service area identified in previous planning documents, or expands the geographic area not previously approved. Water system plans, and water system plan updates, are reviewed and approved by Washington State Department of Health.

1.10.26 Instream Flow Rule Amendment

Washington State relies on notice-and-comment rulemaking related to instream flows. Chapters 90.22.010, 90.22.020, and 90.54 RCW provide the framework for establishing or

modifying instream flows. Prior to modifying instream flow rules, Ecology must provide public notice and conduct a public hearing in the same county where the water body is located.

1.10.27 Construction Stormwater General Permit and Stormwater Pollution Prevention Plan

Coverage under a Construction Stormwater General Permit is required for construction activities that meet certain thresholds. Typically, the threshold for permit coverage includes clearing, grubbing, and excavating activities that disturb 1 or more acres and discharges to waters of the State. Currently, the State of Washington has a Construction Stormwater General Permit through the NPDES that covers all areas of Washington State with the exception of federal operations and Indian Country. This permit was issued on November 18, 2015 and expires on December 31, 2020. Construction site operators with sites subject to minimum thresholds may apply for coverage under the state permit by submitting a Notice of Intent (NOI) to Ecology a minimum of 60 days prior to anticipated discharge. Public notice is also required. Once coverage is obtained, operators must develop a Stormwater Pollution Prevention Control Plan (SWPPP), implement Stormwater Best Management Practices (BMPs), and perform sampling at discharge monitoring locations. Coverage under the permit requires that monthly Discharge Monitoring Reports (DMR) be submitted to Ecology with the exception that high turbidity discharge events be reported within 24 hours.

1.11 Documents Adopted under SEPA

An extensive body of work has been completed to better understand water management issues in the Icicle Subbasin and to explore the feasibility of potential solutions to benefit water users and fish. Pursuant to provisions of the SEPA Rules (WAC 197-11-630), Ecology and Chelan County are adopting the following documents as part of this PEIS to meet a portion of Ecology's responsibilities under SEPA:

- Anchor Environmental, L.L.C., 2007, Preliminary Draft, Needs and Alternatives Analysis, Icicle Creek Sub-Basin Storage Study
- Anchor QEA, 2011, Water Storage Report, Wenatchee River Basin
- Anchor QEA, 2012, IPID Pump Exchange Project Appraisal Study
- Anchor QEA, 2015, Icicle and Peshastin Irrigation Districts Pump Exchange, Summary of Potential Operations and Maintenance Funding Strategies.
- Anchor QEA, 2015, Icicle- Peshastin Irrigation District (IPID) Pump Exchange (Dryden Alternative) Summary of Additional Analyses.
- Anchor QEA, 2015, LNFH Tribal Fishery Analysis, 2015 (draft)
- Anchor QEA, 2017, Cascade Orchards Irrigation Company – Conceptual Design Update

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- Anchor QEA, 2017, IPID Conservation Plan – Full Piping Improvement Option
- Anchor QEA, 2018, IPID Comprehensive Water Conservation Plan
- Anchor QEA/Aspect Consulting, 2015, Eightmile Lake Restoration and Expansion Appraisal Study,
- Aspect Consulting, 2014, Conservation Plan Survey
- Aspect Consulting, 2014, Upper Klonauqua Lake Conceptual Review
- Aspect Consulting/Anchor QEA, 2015, Alpine Lakes Optimization and Automation Appraisal Study, 2015, LNFH Effluent Pump Back Preliminary Assessment.
- Chelan County Natural Resources Department & Anchor Environmental, LLC, 2007, Peshastin Subbasin, Needs and Alternatives Study
- EcoAssets and Associates, 2013, Icicle Creek Boulder Field Fish Passage Assessment,
- Golder Associates, 2005, WRIA 45 Summary of Groundwater/Surface Water Interaction and Groundwater Resource Reference
- Icicle Creek Target Flow Report for Leavenworth National Fish Hatchery, 2004, Montgomery Water Group
- LNFH, 2009, Proposed Flow Management Operations for 2009-2014
- Montgomery Water Group, 2004, Water Management Plan for Leavenworth National Fish Hatchery
- Montgomery Water Group, 2006, Multi-Purpose Water Storage Assessment in the Wenatchee River Watershed
- Montgomery Water Group, Pacific Groundwater Group, and EES, 2003, Wenatchee River Basin, Watershed Assessment
- National Marine Fisheries Service – Biological Opinion (referred to above in Section 1.6.2)
- Nelson, Mark, Andy Johnsen, and R.D. Nelle, 2009, Seasonal Movements of Adult Fluvial Bull Trout and Redd Surveys in Icicle Creek
- Northwest Power and Conservation Council, 2004, Wenatchee Subbasin Plan
- Ringel, B.K., 2006, Progress Report, Icicle Creek Water Temperatures, November 1, 2005 - October 31, 2006.
- Sutton, Ron and Chelsie Morris, 2005, Technical Memorandum, Instream Flow Assessment of Icicle Creek, Washington
- The Watershed Company, 2005, Lower Icicle Creek Reach Level Assessment

- Trout Unlimited/Forsgren Associates, 2014, IPID Instream Flow Improvement Options Analysis, 2014,
- USBOR, 2010, Groundwater Conditions at LNFH
- USBOR, 2017, DRAFT Snow Lake Water Release Control Valve Replacement Environmental Assessment
- USBR, 2012, Leavenworth National Fish Hatchery Final Value Analysis
- USBR, 2014, LNFH Groundwater Model Update Technical Memorandum
- USBR, 2014, LNFH Icicle Creek Rapid Geomorphic Assessment
- USDA, 2014, Climate Change Vulnerability and Adaptation in the North Cascades Region
- USFWS, 2006, Biological Assessment for Operations and Maintenance of Leavenworth National Fish Hatchery
- USFWS, 2010, LNFH Low Flow Contingency Plan
- USFWS, 2012 Leavenworth National Fish Hatchery, National Pollutant Discharge Elimination System Discharge Monitoring Reports
- USFWS, 2013, Icicle Creek Fish Passage Evaluation for LNFH
- USFWS, 2013, Icicle Creek Instream Flow and Fish Habitat Analysis for LNFH
- USFWS, 2015, Biological Assessment of Operation and Maintenance of Leavenworth National Fish Hatchery
- USFWS, 2017, Biological Assessment of Operation and Maintenance of Leavenworth National Fish Hatchery
- USFWS, 2017, Leavenworth Fisheries Complex Implementation Plan, 2017
- Varela and Associates, 2011, City of Leavenworth, Water System Plan
- Varela and Associates, 2018, City of Leavenworth, Water System Plan
- Washington State Department of Ecology & Anchor QEA, LLC, 2010, Draft Feasibility Study, Campbell Creek Reservoir
- Waterfall Engineering et. al., 2016, Icicle Creek Boulder Field Fish Passage Design,
- WDFW, 2017, Alpine Lake Flow Augmentation Pilot Study 2017, Icicle Creek Tributary Monitoring Report
- Wenatchee Watershed Planning Unit, 2006, Wenatchee Watershed Management Plan
- Wenatchee Watershed Planning Unit, 2008, Wenatchee Watershed Planning, Phase IV—Detailed Implementation Plan