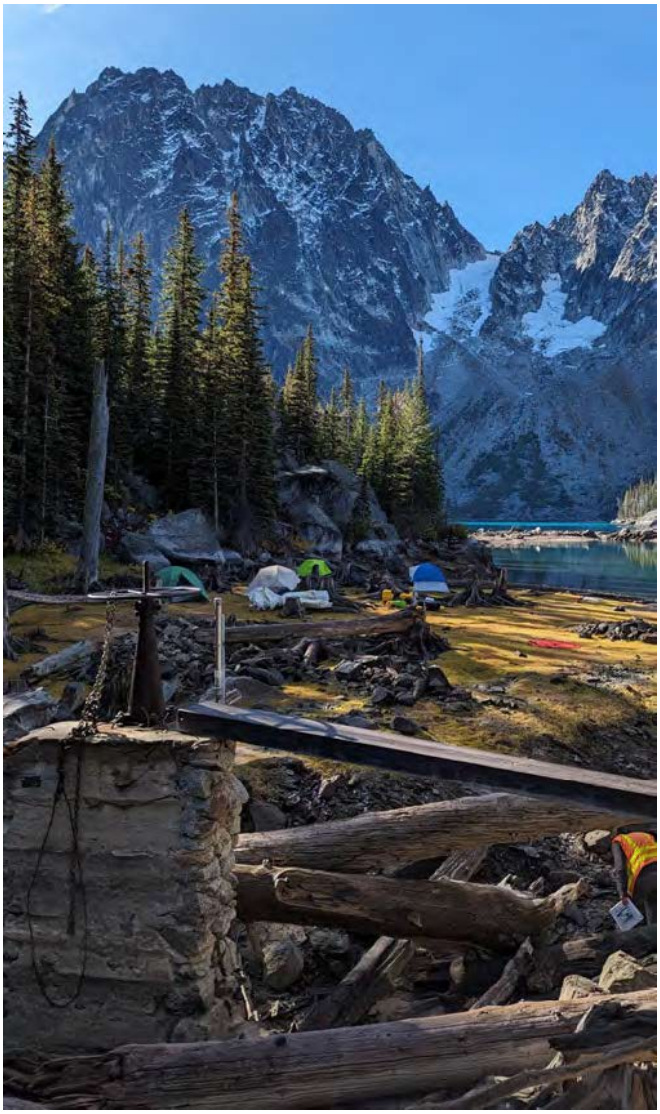
Bureau of Reclamation WaterSMART Grants No. R25AS00013

Drought Response Program:
Drought Resiliency Projects for Fiscal Year 2025

Icicle Creek Decision Support Tool



Colchuck Lake at dam release site

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EXECUTIVE SUMMARY

Date: October 6, 2024
Applicant: Chelan County Natural Resources Department
City: Wenatchee
County: Chelan
State: Washington

Applicant Eligibility Requirements: Category A Applicant- County Government
Task Area: C
Category: A
Funding Group: I (up to $750,000 in federal funds)
Total Project Cost: $526,140
Funding Request: $263,070

Project Summary

The project includes development of the Icicle Creek Decision Support Tool for water managers to optimize lake releases of stored water to maximize benefits for irrigation, fish propagation, and instream flows. Icicle Creek, is a major tributary to the Wenatchee River in the Wenatchee subbasin near the City of Leavenworth in Chelan County, Washington. The Decision Support Tool will assist the Icicle Work Group implement its Icicle Strategy and provide a sophisticated methodology for water management and decision-making on Icicle Creek. WaterSMART funding will support continued implementation of the Icicle Strategy 2020 Action Plan and create the first phase of a centralized data portal and Decision Support Tool. The project includes data collection, planning for a hydrology model, planning for optimization of lake releases, and development of the software platform for the Decision Support Tool. The project, will lay the foundation for improvement of the sequencing and magnitude of alpine lake releases in the Icicle Creek Basin.

Proposed Project Timeline

The proposed project is anticipated to take 2 years to implement, with the start date being dependent on the grant award. The project will begin with development of monitoring quality assurance project plans (QAPPs) in Spring 2025. Assuming grant award in Summer 2025, data monitoring will begin in 2025, followed by development of a hydrology modelling plan, coordination with the Icicle Work Group (IWG) regarding lake release optimization priorities, and reporting on Decision Support Tool updates in 2026 and into 2027.

Federal Facility

The Leavenworth National Fish Hatchery (LNFH) is located on Icicle Creek and relies on Icicle Creek for its water supply. LNFH was constructed as tribal fishery mitigation due to the construction of Grand Coulee Dam on the Columbia River and the subsequent loss of upriver salmon migration above Grand Coulee Dam. LNFH is funded by the US Bureau of Reclamation (BOR) and managed by the US Fish and Wildlife Service (USFWS). Both BOR and USFWS are members of the Icicle Work Group and will be among the primary developers and users of the Decision Support Tool. The LNFH relies on lake releases from its Snow and Nada Lakes reservoirs for hatchery operations and must coordinate with other water managers in Icicle Creek to ensure adequate supply hatchery operations as well as improve instream flows in Icicle Creek.

PROJECT LOCATION

Icicle Creek, located on the eastern slope of the Cascade Mountain Range, drains a 214 square-mile basin. Icicle Creek is a tributary to the Wenatchee River and provides 19 percent of total Wenatchee River summer low flows (IFSC, 2014). Icicle Creek originates from the outlet of Josephine lake (4,680 feet above mean sea level [amsl]) and receives tributary streamflow from Leland Creek, French Creek, Jack Creek, Eightmile Creek, and Snow Creek prior to its

confluence with the Wenatchee River at 1,115-feet-amsl. Many of the tributary creeks (Leland Creek, French Creek, Eightmile Creek, and Snow Creek) originate from Alpine Lakes that have been co-managed as reservoirs for more than 100 years. The Icicle Peshastin Irrigation District (IPID) and the USFWS together operate a total of seven alpine lakes in the Icicle Creek basin for water supply. Flows released from Square, Klonaqua, Eightmile, and Colchuck Lakes are managed by IPID and allow IPID to maintain irrigation diversions and meet instream flow obligations. Flows released from Snow and Nada Lakes are managed by US Fish and Wildlife Service to maintain their diversion for the Leavenworth National Fish Hatchery. Icicle Creek Decision Support Tool Project Area Range Coordinates:

Longitudinal Range	47°34'19.02"N	47°34'46.31"N
Latitudinal Range	120°50'46.98"W	120°39'55.05"W

Figure 1. Icicle Creek sub-basin

TECHNICAL PROJECT DESCRIPTION

Under the WaterSMART Drought Response Program grant, Chelan County Natural Resources Department (the County) proposes to develop a Decision Support Tool for optimizing alpine lake releases within the Icicle Subbasin, including sequencing and magnitude of releases. The

Decision Support Tool will use real-time data to inform storage releases to provide the following benefits: 1) improve instream flow and water quality for ESA-listed species in both drought and non-drought years; 2) optimize plunge pool hydraulics to support the spring Chinook Tribal Fishery in Icicle Creek; 3) meet IPID irrigation needs 4) meet Leavenworth National Fish Hatchery (LNFH) fish rearing needs; and 4) track and report on significant water conservation to help mitigate for declining snowpack and base flow under climate change.

Chelan County and the Washington State Department of Ecology's (Ecology) Office of the Columbia River (OCR) co-convened the Icicle Work Group (IWG) in December 2012 to find solutions for water management within the Icicle Subbasin. The original meeting of the Icicle Work Group was facilitated by a Bureau of Reclamation value planning team. 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. The leadership of the IWG and the co-leads have created an opportunity through the Decision Support Tool for instream flow improvement and resiliency for out of stream users, including domestic, hatchery, irrigation, and tribal interests.

The effort proposed under this grant is necessary to inform a Decision Support Tool, and includes the following: compiling existing data, collecting additional monitoring data, developing a hydrology model plan, coordinating with the Icicle Work Group to establish protocols and priorities for the decision support tool, and developing a Phase 1 decision support tool comprised of a centralized data portal/dashboard for viewing and accessing data and informing decision making.

The Alpine Lakes are a series of natural high-altitude lakes that feed Icicle Creek.. Five of these lakes were modified in the early 1900s to be managed reservoirs to supplement stream flow when diversions are in use. Reservoir infrastructure at Colchuck, Eightmile, Klonaqua, and Square Lakes are owned and operated by Icicle-Peshastin Irrigation District (IPID) while Snow Lakes infrastructure is owned and operated by the US Fish and Wildlife Service (FWS) The major inputs to the Icicle Creek system include releases from the Alpine Lakes which feed into tributaries of Icicle Creek and surface runoff from precipitation. The major outputs from the Icicle Creek system include four major diversions with maximum diversion rates including the City of Leavenworth (6.2 cfs), IPID (117 cfs), Leavenworth National Fish Hatchery (LNFH, 42 cfs), and Cascade Orchard Irrigation Company (COIC, 11.9 cfs). The table below presents quantities of lake releases and major diversions from the last 10-years, as available.

Table 1. 10-year Average Annual Water Supply Summary

Year	Lake Release Total (acre-feet)[1]	City of Leavenworth (acre-feet)	IPID (acre-feet)	LNFH (acre-feet)	COIC (acre-feet)	Total Water Diverted/ Released
2014	1,151[3]	1,175	25,456	36,198[4]	2,001	65,981
2015	7,201	950	29,189	36,198[4]	2,065	75,603
2016	6,427	850	29,283	36,198[4]	1,853	74,611
2017	6,469	990[2]	26,033	36,198[4]	1,822	71,512
2018	3,281	990[2]	27,027	36,198[4]	1,829	69,325
2019	5,925	990[2]	24,540	36,198[4]	1,677	69,330

2020	1,151	990[2]	30,260	36,198[4]	1,906	70,505
2021	6,451	990[2]	28,637	36,198[4]	Not Available	72,276
2022	5,300	990[2]	26,219	36,198[4]	Not Available	63,407
2023	17,897	990[2]	27,307	36,198[4]	Not Available	82,392
					Total Average Annual	71,494

1. Total lake release includes release from Colchuck, Eightmile, Klonaqua, Square, and Snow Lakes. Total quantity is estimated by IPID and Aspect.
2. Diversion data for the City of Leavenworth from their Icicle Creek source is not readily available. The 2018 Water System Plan for City of Leavenworth documents total use from 2014-2016 which is presented here. For later years, an average use of 990 AF was assumed.
3. Release occurred from Klonaqua but the quantity was not measured. 1,151 acre-feet from Eightmile was released.
4. Assume 50 cfs continuous year-round.

Table 2. Water Rights of Major Diverters on Icicle Creek

Water Right Holder	Water Right ID	Annual Quantity – Qa (acre-feet)	Instantaneous Quantity – Qi (cfs)
City of Leavenworth	Adjudicated Certificate No. 4	1,100	1.52
City of Leavenworth	SWC-8105	1,085.95	1.50
City of Leavenworth	S4-28122	636 (90 ac-ft primary, 546 ac-ft supplemental)	3.18
COIC	CS4-35001J@1 (Parent right: S4*-35001JWRIS)	4,012.6	11.9
IPID	SWC 1082	---	34.38
IPID	S4-CV1P224	---	1.7525
IPID	S4-*35002ABBJ2	---	81.5775
LNFH	CS4-01824C@2 (Parent right: S4-*05671CWRIS)	27,482	42

The County will utilize funds from this grant opportunity to complete the following tasks:

Task 1: Data Assembly and Collection

Under this task the County will combine existing data with new streamflow, stream temperature, and meteorology data collected as part of this project. This basin-wide and multi-agency dataset will inform development of an updated conceptual model and hydrologic modeling plan (described in Task 2 below). Data will be made available to the IWG and the public in the first phase of the Decision Support Tool (see Task 4 below), and data collection activities will be documented in the project final report (Task 5 below).

Data collection will consist of three subtasks:

A. Coordination with other data collecting entities
B. Development of a monitoring Quality Assurance Performance Plan (QAPP) for this effort, building on the Programmatic QAPP already created.
C. Monitoring in the Icicle Creek Basin across two summer-fall seasons.

Task 2: Hydrology Modeling Plan

Informed by the data collection in the previous tasks, a hydrology model of the Icicle Creek Basin will simulate runoff into the alpine lakes and streamflow in Icicle Creek downstream under a range of hydrologic conditions (e.g., below-average snowpack or summer drought). Model estimates of basin-wide runoff will be the foundation upon which the Decision Support Tool optimizes releases from the alpine lakes. At present, development of a hydrology model is premature, as we wish to complete the data collection efforts to inform model scale, type, and parameters. We envision planning for its creation in this phase of work and model construction in a later phase.

The County proposes to develop a "Hydrology Modeling QAPP" to describe future hydrology modeling of the Icicle Creek Basin. This document will be structured to follow and expand upon the structure of modeling sections in the Washington Department of Ecology QAPP template. The Hydrology Modeling QAPP will be created as a stand-alone document and appended to the project final report (Task 5). Progress on its development will be presented in two workshops with the IWG.

Task 3: Planning for Lake Release Optimization

The Streamflow Management Committee has been achieving significant progress towards meeting the 60 and 100 cfs Guiding Principles with incomplete data, antiquated structures, projects under development but not yet constructed, and no optimization framework. Despite these obstacles, each year we see real improvement in instream flow over the formerly near-dry riverbed in Icicle Creek near LNFH.

An additional investment needed to ensure instream flow goals are met is sufficient planning and decision-making around lake releases so there is a repeatable set of expectations amongst lake managers, stream gage monitors, the Icicle Workgroup and the public. Since the IWG was formed in 2012, we're already seeing re-education and rework of previously-decided concepts, goals, and decisions simply from turnover in agency staff. A formal written decision-making framework agreed to by all the key parties will help form a baseline of expectations and ensure consistency in implementation. There are good parallels to follow on this path, including the Yakima Basin System Operations Advisory Committee (SOAC) in the Yakima Basin immediately to the south of the Icicle, that are effective at optimizing multiple lake releases to address complex objectives.

Task 4: Decision Support Tool, Phase I

The County proposes to use WaterSMART funding to create "Phase 1" of the Decision Support Tool. In Phase 1, the tool will have two parts. First, the County will create a database to store the data from historical, present and planned (e.g., Task 1) monitoring. This will hold flow, lake release, lake volume, meteorology, snow, diversion, and temperature data. It will accept data via manual upload or automatic telemetry from sensors deployed in the Basin. Second, the County will make these data available (either to the public or only to authorized users) via a user interface (i.e., a webpage) so that interested stakeholders can visualize historical and real-time data. Intuitive, graphical, map-based, and customizable displays of data will enhance the efficiency and transparency of decision-making pertaining to water releases from the alpine lakes. The Yakima Basin teacup website maintained by Reclamation is one guide on how a user interface and data can be readily accessible to the public and lake managers.

The County already maintains a robust website for the Icicle Strategy containing historical studies, storymaps for public information, videos on project goals and implementation, and other relevant information, therefore we are equipped with the skill and foundation to add this new powerful tool.

Task 5: Reporting

The County will produce a final report that describes data collection and coordination and planning of lake releases, as an update to the 2020 Action Plan. This report will document the decision-making framework and considerations around lake releases. Importantly, it will help future IWG members understand the foundation for basin operations, responsibilities, and management choices.

Large portions of this project will be documented in the Monitoring QAPP, Tracer Study QAPP, Hydrology Modeling QAPP, and Decision Support Tool User Manual, and so these will be summarized and included as attachments. All of this content will also be available on the Icicle Strategy website maintained by the County.

Applicant Category and Eligibility of Applicant

The Chelan County Natural Resource Department is a County government and is therefore eligible as a Category A applicant.

EVALUATION CRITERION

E.1.1. Evaluation Criterion A. Severity of Drought or Water Scarcity and Impacts

- *Describe recent, existing, or potential drought or water scarcity conditions in the project area.*
    - *Is the project in an area that is currently suffering from drought or water scarcity, or which has recently suffered from drought or water scarcity?*

A statewide Washington drought was declared in April 16th, 2024, and is still ongoing at the time of this application. Low snowpacks and a dry and warm spring and summer spurred the Department of Ecology to declare a drought emergency in most of Washington, including Chelan County. Statewide droughts that include Chelan County have also been declared in 1977, 1988, 2001, 2005, 2015, 2019, 2021, 2022, and 2023 (Caroline Mellor, Washington State Drought Lead, personal communication).

The Wenatchee watershed, including the Icicle sub-watershed, is located east of the Cascades in eastern Washington and covers almost half of Chelan County. The area is arid and drought prone. According to historical US Drought Monitor data found at https://climatetoolbox.org/tool/Historical-Water-Watcher, Chelan County experienced severe streamflow and precipitation drought in 2001, 2005, 2009, 2014, 2021, 2023, and 2024, and extreme drought in 2015. The U.S. Secretary of Agriculture (USDA) federally recognized the extreme drought year of 2015, which led to historically low flows, irrigation curtailments, and record high stream temperatures (Marlier et al 2017). Climate scientists speculate 2015 drought may be "a harbinger of things to come" under climate change (Marlier et al 2017).

- *Describe any projected increases to the severity or duration of drought or water scarcity in the project area resulting from changes to water supply availability and climate change.*

Climate change models suggest ongoing climate change will result in increased severity of water scarcity and water supply availability in Chelan County and Icicle Creek. Historically, 67% of runoff in the Wenatchee watershed has been produced by snowmelt, but ongoing and projected climate change will likely decrease snowpacks (Mauger et al 2017, Hall et al 2022). Climate change modeling conducted by the University of Washington Climate Impacts Group show decreased snowpack, followed by less pronounced spring high flow, and decreased flows throughout the melt season in summer in Icicle creek (Mauger 2017, Hall et al 2022). For example, models predict a 73 – 85 percent decrease in August flow by the 2070s (Mauger 2017). *The 2021 Columbia River Basin Long-Term Water Supply & Demand Forecast* predicts a 12.0 cfs decrease in the lowerst 7-day average flow by 2040, and a 30% increase in frequency of July and August irrigation curtailments (Hall et al 2022).

The extreme drought year of 2015 may be a glimpse into the future, as climate models predict 2015 conditions will become routine by 2070 (Mauger et al 2017, Marlier et al 2017). 2015 was a year with record low snowpack, high air temperatures, record high stream temperatures, and low base flows that led to WA Ecology ordering an irrigation curtailment. There were also three presidential disaster declarations in Chelan County in 2015; two due to wildfires, and one due to flooding and landslides following a late fall rain on snow event.

- *What are the ongoing or potential drought or water scarcity impacts to specific sectors in the project area if no action is taken, and how severe are those impacts?*

The need for the Icicle Strategy, which includes the proposed Decision Support Tool, emerged because the Icicle Creek Subbasin failed to consistently meet the demand for instream and out-of-stream uses (IWG 2019). This has been demonstrated by minimum instream flows established in Chapter 173-545 WAC not being met, interruptible water users not receiving irrigation water, and litigation over water rights between the City of Leavenworth and the Washington Department of Ecology (Ecology). This ongoing drought and water scarcity impacts agriculture, the environment, recreational tourism and availability of drinking water in the Wenatchee watershed. The 2021 Columbia River Basin Long-term Water Supply and Demand Forecast projects water demands will only increase with an estimated 6% increase in agricultural demands and 523 ac-ft increase in summer residential water use (Hall et al 2022). Projected 2040 impacts of water scarcity and ongoing climate change combined with increasing demands include watershed 2040 projections include a 12.0 cfs decrease in minimum flow, and a 30% increase in water curtailments (Hall et al 2022). In short, water supply will decrease, and water demand will increase, presenting a problem for both in-stream and out-of-stream uses.

Icicle Creek water is used by the Leavenworth National Fish Hatchery for fish propagation, the City of Leavenworth for drinking water, and for irrigation of the lower Wenatchee Valley. State-adopted instream flow rules also apply to meet the needs of ESA-listed species. In the case of declining water supplies, drinking water will be prioritized for surface water users. However, drought lowers the water table and threatens water availability of well users, and disputes over drinking water rights have occurred in the face of increasing scarcity (see bullet below).

Ongoing and potential increases in drought also have environmental impacts such as increased wildfire and decreased habitat quality for ESA-listed salmonids in the Wenatchee watershed

(spring Chinook, summer steelhead, and bull trout). Lower base flows shrink available habitat, forcing fish into smaller and less diverse habitat (Gaines et al 2013). Drought conditions are also associated with higher stream temperatures, which would reduce habitat quality. Interacting effects of drought (i.e. dry conditions, tree stress, increased insect outbreaks) may also contribute to increasing wildfire severity and area burned (Halofsky 2020). Fire risk in Chelan County is already high relative to other counties across the nation (FEMA fire risk map). Increased fire severity in turn can cause fish mortality due to heating effects of fire, or from adverse post-fire conditions such as stream heating, reduced water quality, and post-fire erosion and debris floods (Burton T.A. 2005)

- *Whether there are local or economic losses associated with current water conditions that are ongoing, occurred in the past, or could occur in the future.*

Drought causes economic losses for farmers in Chelan County as well as the people they employ. Agriculture is the number one employment sector in Chelan County in 2020 and accounted for 21.3% of jobs (Meseck 2022). An online survey of Washington State farmers revealed impacts of the 2015 drought and associated irrigation curtailments included average losses of 61.2 percent for fruit and 56.3 percent for field crops (McLain 2015). Therefore, climate change projections including the 12 cfs decrease in low flow and 30% increase in irrigation curtailments will likely lead to economic losses to farmers, which will trickle down to a loss of jobs in the agricultural sector.

- *Whether there are other water-related impacts not identified above.*

As mentioned, Icicle creek is used for the Leavenworth Hatchery, irrigation, and drinking water for the City of Leavenworth and is subject to Department of Ecology's instream flow rules. A recent settlement agreement in November of 2023 ended a ten-year legal dispute between the City of Leavenworth and the Department of Ecology over water rights. The Icicle Strategy, of which this project is a part, helped facilitate negotiations between the City and Ecology to reach the settlement. However, further drought and low flows, coupled with rapid growth in the City of Leavenworth, could instigate future disputes. Increased irrigation curtailments could also potentially cause a conflict between water users of the different sectors concerning the subjective importance of economic and environmental priorities.

E.1.2 Evaluation Criterion B. Project Benefits

E.1.2.2. Sub-Criterion B.2. Project Benefits (Task C only)

- *How will the project improve the management of water supplies? Will the project increase efficiency, increase operational flexibility, or facilitate water marketing? If so, how will the project increase efficiency or operational flexibility for drought resiliency?*

The Decision Support Tool will use real-time hydrology and temperature data to make decisions regarding amount, timing and duration of alpine lake releases. This will increase ecological resiliency by augmenting low flows and potentially decreasing temperature by drawing deeper in the lake, and/or timing releases to avoid peak temperatures in the lake. This will in turn increase ecological resiliency of the Icicle watershed by counteracting lower base flows and higher stream temperatures projected under climate change.

- *How will the tool or resulting information be applied, and who will use the tool or data developed?*

The Icicle Creek Decision Support Tool will be used by the Icicle Work Group steamflow management committee to release water from the reservoirs consistent with the goals and objectives established under the Decision Support Tool. As members of the streamflow management committee and owners of the reservoir infrastructure, IPID and USFWS will adjust releases following the Decision Support Tool and in coordination with each other. As a result of supporting and meeting the Icicle Strategy Guiding Principles, the project will have numerous benefits to the Icicle Basin and stakeholders. The IWG represents the major stakeholders within the basin and are presented in Table 3 below. The IWG members are geographically dispersed across Icicle Basin and across various interests, each with direct and indirect benefits as a result of this project. The IWG members are anticipated to be the primary users of the proposed decision support tool, particularly those on the Streamflow Management Subcommittee (County, FWS, Colville, Yakama, Ecology, and IPID).

Table 3. 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 (FWS) – Leavenworth National Fish Hatchery (LNFH)	Hatchery
NOAA – Fisheries	Fisheries
Washington State Department of Fish and Wildlife (WDFW)	Fisheries & Wildlife
Washington State Department of Ecology	Co-convener/Water Manager/ Water Supply Developer
Icicle and Peshastin Irrigation District (IPID)	Irrigation Water
City of Leavenworth	Domestic Water
Chelan County	Co-convener/Domestic Water/ Watershed Plan Implementer
Cascade Orchards Irrigation Company (COIC)	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

- *Will the project make new information available to water managers? If so, what is that information and how will it improve water management? Provide a qualitative description of the degree/significance of the associated benefits.*

The Decision Support Tool will also help to meet the improved coordination and management guiding principle both by creating new data streams and making existing data streams more readily available to key decision makers and stake holders through a dashboard. Current operations of the lake releases require manual adjustments to the releases and manual weekly data analysis to understand streamflows and lake levels during the irrigation season. The introduction of a centralized database for real-time data availability and forecasting capabilities will allow all members of the IWG to coordinate and track water supplies more efficiently and effectively. The information presented in the dashboard will include real-time streamflow, lake release, lake level and temperature, stream temperature, climate, snowpack and diversion data in reference to the guiding principle goal values, and will ultimately include outputs from the hydrology model for various scenarios to allow the IWG to make informed decisions on lake releases.

- *How soon following completion of the project will the tools or information be able to be used?*

The first phase/year of the project will largely focus on data collection and preparation to inform the decision support tool. Following installation of data monitoring equipment and at least one season of data collection, the Decision Support Tool will be able to provide direct benefits to water managers in the basin across various sectors with the improved access to real time information within 2-3 years.

- *Describe how widespread and significant the project benefits are expected to be.*

The Decision Support Tool will allow for significant and widespread benefits across the subbasin. Currently, the Streamflow Management Subcommittee relies on multiple publicly-available websites to view streamflow data, periodic email communication to document changes in lake releases, and bi-weekly and annual manually updated graphs with partial information. This current workflow has been implemented in the 2023 and 2024 seasons and, while it is an improvement from previous workflows, there are still major limitations in optimizing lake releases. For example, in 2023 the lakes released too much water early in the season, and by the end of the season there was no storage available resulting in streamflow that dipped below the guiding principle of 60 cfs. Additionally, in 2024, while there was water still available in one of the lakes in the late season, the water was not released by request of Washington Department of Fish and Wildlife (WDFW) due to concerns related to bull trout spawning on a tributary creek, and so flow again dipped below the guiding principle of 60 cfs.

Sub-Criterion B.3.a. Climate Change

- *Does the proposed project have a conservation or management component that will promote healthy lands and soils or serve to protect water supplies and its associated uses?*

The proposed project contributes to climate change resiliency by mitigating against projected decreases in low flow. The Decision Support Tool will use real time data to guide future automation of lake releases and potentially increase typical historical channel low flows from 10-

20 cfs to 60- 100 cfs (Figure 2). The need for the proposed Decision Support Tool specifically emerged because current water management operations in the Icicle watershed fail to meet in stream and out-of-stream uses, and the threat of climate change projects baseflows and water availability will only decrease (IWG 2019). This project will use real-time data to maximize efficiency of lake releases to meet out-of-stream demands, which will in turn provide benefits to in-stream flow and mitigate against declining water supply under climate change. The Streamflow Decision Support Tool Action Plan, which is an update to the Icicle Strategy, presents specific data on how the Decision Support Tool can guide lake releases that improve streamflow even if 2015 droughts become more typical (Aspect 2020). The future Decision Support Tool will monitor key hydrologic stations to benefit summer low flows and help meet the 60 cfs (drought year) and 100 cfs (non-drought year) Instream Flow Guiding Principles (Aspect 2020). Currently, the historic channel low flows typically reach 10-20 cfs (Figure 2).

The Decision Support Tool will also optimize lake releases for municipal water supply, irrigation, the LNFH, and the tribal fishery. The efficient use of alpine lake reservoir water will help meet these needs and reduce the frequency of irrigation curtailments, as well as reduce the potential for future water conflicts.

- *Does the proposed project contribute to climate change resiliency in other ways not described above?*

The project will also increase climate resiliency of bull trout spawning in Icicle tributaries and steelhead spawning in the Icicle Creek Historic Channel. The Decision Support Tool will take into account lake water temperature in order to minimize any downstream heating effects to tributary streams that currently occur under current operations (Granger 2020). This, in addition to increases in baseflows, will increase ESA-listed bull trout and steelhead species resiliency by mitigating against projected increases in stream temperature under climate change.

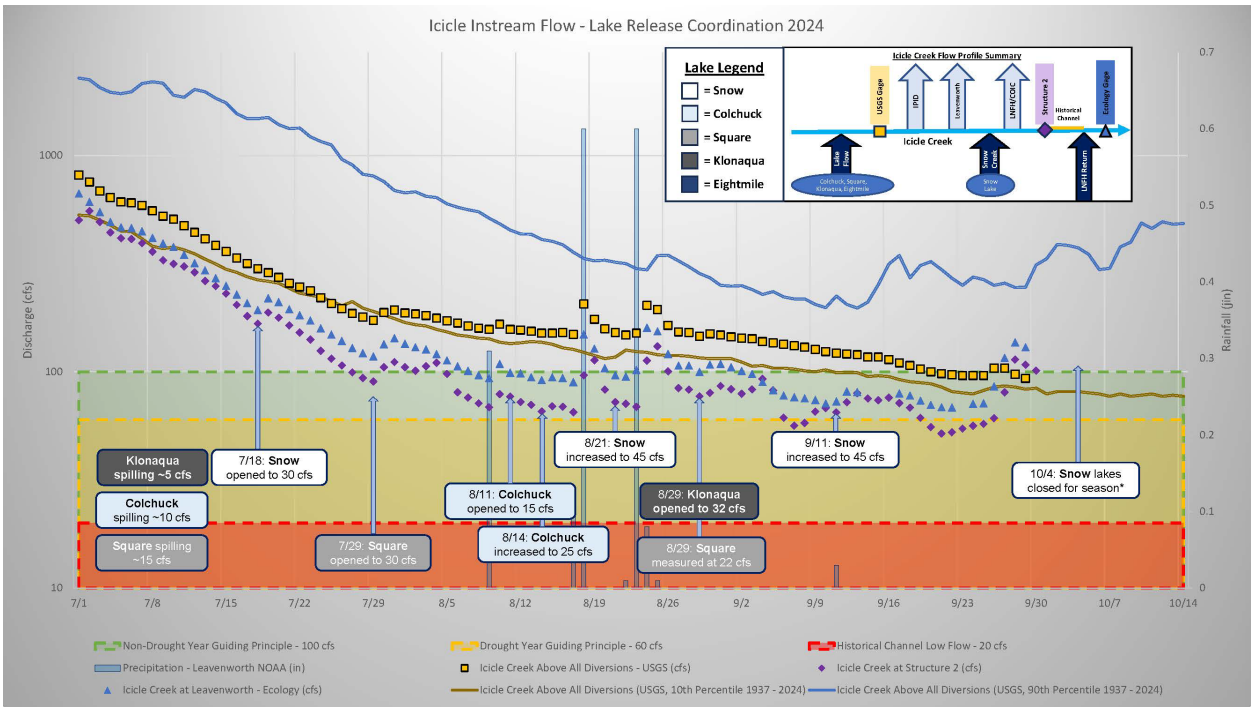

Figure 2. Lake release coordination greatly typical low flow in the historic channel (Icicle Instream Flow Figure 1)

Sub-Criterion B.3.b. Ecological Benefits

- *Does the project seek to improve the ecological resiliency of a wetland, river, or stream in the face of climate change?*

Low flows in Icicle Creek are a chronic problem with a high amount of water diversions (total IPID and LNFH water rights equal 110 cfs, Aspect 2024). The most impacted reach between RM 4.5 and 2.7 can drop below 10 cfs (Figure 2). The effects of climate change predict baseflows will further decline by 13-53% (Mauger 2017). Average August stream temperature is also projected to increase by 1.5°C in Icicle Creek (NorWEST Stream Temperature Scenarios GIS shapefile)

The proposed project will increase ecological resiliency by using updated technology to optimize alpine lake release flows in order to help meet low flow targets established by the IWG, and maximize streamflow and water quality benefits to Icicle Creek and its tributaries. These low flow targets (based on habitat needs of focal fish species, discussed under ESA-listed species bullet) are to maintain baseflows at or above 100 cfs in non-drought years and 60 cfs for drought years within the Icicle Creek historic channel (historic channel). The historic channel in the natural alignment that runs adjacent to the hatchery channel, is both below the LNFH diversion and above the return flow, and as such is more impacted by water withdrawals than other reaches (Icicle Work Group, 2019). Under current operations, baseflows in the Icicle Creek historic channel can reach 10 cfs (Aspect 2024). The 2019 Pilot project (which involved manually adjusting gates to mimic future automation during a drought year) revealed that augmentation releases accounted for nearly all of the volume needed to meet the 60 cfs target in the historic channel (Aspect 2020). The proposed Decision Support Tool will use real-time data to help

guide these augmentation releases for maximum benefit and to help close the gap between current low flows in the historic channel and the 60 cfs/100 cfs low flow target.

The crux of the Decision Support Tool is to support future automation of lake releases that improve low flow conditions now, with ongoing climate change, and under increasing development and water demand. The Alpine Lakes Optimization, Modernization, and Automation project will replace aging dam infrastructure from 1920s with automated gates that can be operated from a distant computer. In addition to responding to real-time hydrologic flow and temperature data, the Decision Support Tool will allow managers to respond to longer term hydrologic changes under climate change. This will result in adjustments in level, amounts, and timing of automated releases based on the both seasonal and long-term hydrologic changes. This will in turn result in streams that are ecologically resilient to projected decreases in low flow levels.

Currently, each of the five alpine lakes are equipped with a small, antiquated dam and low-level outlet control gate that were installed in the 1920s to store water for irrigation and fish propagation. Flow released from Square, Klonaqua, Eightmile, and Colchuck lakes allow IPID to maintain irrigation diversions and meet Ecology mandated instream flow obligations, while flows released from the Snow Lakes and Nada Lake supply water to LNFH and allow the USFWS to meet instream flow obligations. Because of the time and costs required to adjust head gates (which must be done manually by hiking or helicopter in to high alpine lakes) adjustments are generally made at the beginning and end of the season. This results in a large, peaky, and unnatural flux of flow (typically beginning in mid to late August) that is gravity fed and has a massive effect on the hydrology and water quality of Icicle Creek tributaries that originate in Alpine Lakes (i.e. Leland Creek, French Creek, Eightmile Creek, and Snow Creek) and the Icicle Creek historic channel. Furthermore, lake releases typically come from just one lake in a single year (with releases from an additional lake in a drought year). Therefore, the lake outlet stream has an even larger unnatural peak than if flow was taken from multiple lakes. For example, USFWS French Creek discharge monitoring in 2019 revealed that French Creek streamflow spiked 23.0 cfs almost instantaneously on August 15th, from 9 to 32.0 cfs, directly following a release from Klonaqua lake (Granger 2020).

The future Streamflow Decision Support Tool will capture real-time flow and temperature data, to make decisions regarding automated lake releases based on a set of management rules that were established after the 2016 and 2017 pilot years (Aspect 2020). Management rules that will improve ecological resilience include balancing shortfalls in target stream flows, reducing impacts and meeting flow targets in tributary streams, and ramping rates that don't exceed 5-10 cfs per week (to minimize flashy hydrograph impacts).

Water temperature will also be included in management rules in order to consider water quality benefits bull trout (i.e. optimum rearing temperature, spawning temperature, Dissolved oxygen and pH levels, Aspect 2021). Lake releases from Square and Klonaqua lake have been shown to result in associated increases in temperatures of 1 to 3 °C in outlet tributary streams (Granger 2020). Temperature monitoring has also shown Square and Klonaqua lake are stratified, with significantly cooler temperatures deeper in the lake (Roumasset et al 2019). Automation of lake

releases may include drawing from these deeper temperatures to help stabilize water temperatures and potentially mitigate against warming water temperatures under climate change. Regardless, lake temperature will be a metric considered in the Decision Support Tool to optimize benefit (Aspect 2021).

- *Identify ecological benefits expected to result from project implementation.*

The Decision Support Tool will lead to more natural stream flows by supporting lake release automation that allows for more frequent, optimized releases than historical operations. The Decision Support Tool will guide augmented water releases (i.e. water releases beyond out-of-stream uses and purely for instream benefit) from the Alpine Lakes. These augmented releases would enhance instream flows in tributaries to Icicle Creek, Icicle Creek itself, and the Wenatchee River to the confluence with the Columbia River. Instream flow benefits from coordinated lake releases in 2023 were 54 cfs (instantaneous), 27.8 cfs (average), and 4,580 ac-ft total (Aspect 2024). In the future, these coordinated lake releases will be automated, and informed by the proposed Decision Support Tool, which will use real-time data to fine-tune lake releases to optimize ecological benefits across reaches (Aspect 2021). The proposed project will develop optimization protocols and water management rules that will form the backbone of the Decision Support Tool. These protocols and management rules will be based on maximizing ecological benefit in tributary streams and the historic channel, and on meeting the 60 cfs drought year and 100 cfs non-drought year flow targets in the Icicle creek historic channel.

Management rules for Decision Support Tool will consider numerous ecological benefits in addition to meeting instream flow targets (Aspect 2021). For example, ramping rates for stored water releases will blend into the natural hydrograph of each tributary in order to minimize introduction of a flashy hydrograph, and minimize both fish and amphibian stranding. Instead of an unnatural and massive burst of flow at the start of lake releases (typically early to mid-August), automation will allow for slower drawdowns from multiple lakes to meet IPID and LNFH needs. Rivers adjust their morphology (width, depth, slope, and channel pattern) and composition in response to the water and sediment supplied from the drainage basin. Controlled flows interrupt the natural transfer of water and sediment and in turn interrupt habitat forming processes, riparian establishment, and nutrient transfer. Therefore, by striving to mimic natural flows, the proposed Decision Support Tool will lead to natural rates of floodplain inundation and drawdown that will benefit nutrient transfer and riparian habitat, as well as lead to sediment sorting and habitat formation that follows a natural hydrograph. For example, the large mid-summer flow pulses that characterize current operations also lead to pulses of sediment, and may inundate “nursery sites” of riparian seeds that rely on a natural drawdown to fully establish. Therefore, through supporting a more natural hydrograph, the Decision Support Tool will lead to ecological benefits to both riparian and instream habitat in tributary streams and the Icicle Creek historic Channel.

- *Will the proposed project reduce the likelihood of a species listing or otherwise improve the species status?*

This project contributes to the likelihood of delisting of the following ESA-listed species: spring Chinook (*Oncorhynchus tshawytscha* - Endangered), steelhead trout (*Oncorhynchus mykiss* - Threatened) and bull trout *(Salvelinus confluentus* - Threatened). Icicle tributaries just downstream of alpine lakes (i.e. French Creek, Leland Creek, and Klonaqua Creek) are bull trout spawning and rearing habitat. The Icicle Creek historic channel (i.e. Icicle Creek RM 2.9 – 3.7) is steelhead spawning and rearing habitat as well as bull trout migration and sub-adult rearing habitat. Spring Chinook spawning and rearing habitat is found in the lower reaches of Icicle Creek (i.e. RM 2.9-0). Because flow augmentation and the Decision Support Tool are mostly focused on the Icicle tributaries and the historic channel, bull trout and steelhead are the focal species for the project. However, flow and temperature benefits in the Icicle creek historic channel will be conveyed down to lower Icicle creek and benefit spring Chinook.

This project will address the highest ranked limiting factor and priority action category for ESA-listed species recovery in the Icicle watershed, as identified in the Prioritization Strategy of the Upper Columbia spring Chinook and steelhead recovery plan (UCRTT 2020, available as a web map). Specifically, the project addresses Rank 1 (unacceptable) summer base flows and will result in instream flow enhancement in the historic channel, which is a priority action category. Therefore, the proposed project will contribute to delisting of steelhead by increasing summer baseflows in the historic channel, and of spring Chinook by increasing summer baseflows in the lower Icicle.

However, the IWG went above and beyond recommendations in the Salmon Recovery Plan in the proposed project by basing flow improvement targets on specific needs of ESA-listed life stages present during the flow augmentation period (August – September). The proposed flow improvement targets (i.e. 60 cfs in a drought year, 100 cfs in a non-drought year) are based on the flows necessary to improve steelhead rearing in the historical channel as estimated by Weighted Usable Area (WUA) curves for the system. WDFW also created field-based WUA curves for bull trout spawning habitat in Leland Creek and Klonaqua Creek to inform management rules that will, in addition to the flow improvement targets for the historic channel, govern the Decision Support Tool. Results of this effort indicate peak spawning for bull trout in Leland Creek, which typically occurs from late summer to early fall, would occur at 40.0 cfs with the steepest climb in WUA between 3 and 25 cfs (Granger et al 2024). The proposed project will use this information and additional data to further develop water management rules in order to optimize lake releases for bull trout spawning in the Icicle tributaries.

Stream temperature is an important metric to consider for ESA-listed salmonids as climate change threatens to increase stream temperatures beyond tolerable limits (Gaines 2013). This is especially true for bull trout, whose temperature preferences are several degrees colder than either steelhead or spring Chinook (EPA 2003). The IWG has funded target temperature studies to inform the automation effort to maximize potential temperature benefits to bull trout. A WDFW study showed that currently lake releases from Square lake and Klonaqua lake represent relatively warm inputs to Leland Creek and Klonaqua Creek, respectively (Granger 2020). A study coordinated by the County showed both Square and Klonaqua lakes are stratified, with surface water peaking at 18 °C in both lakes, and deeper water (8 – 13 meters deep) not reaching above 10°C. Therefore, the future Streamflow Decision Support Tool will monitor lake water temperature, and optimize the temperature of alpine lake releases to benefit bull trout spawning. Releases will consider Bull Trout life stage goals in the Icicle Creek tributaries, which are bull

trout rearing temperature of <15°C, spawning temperature of <9°C from July to December, as well as optimum dissolved oxygen and pH levels.

Lastly, and as discussed in the previous bullet, the proposed project will support the Alpine Lakes Optimization, Modernization and Automation project that will allow for more frequent, optimized lake releases that better mimic the natural hydrograph. For example, automation can reduce the peaks and valleys of historical releases in a way that is more normative and beneficial for fish. This will likely help support survival and productivity of bull trout spawning in Icicle tributaries, as well as benefit steelhead rearing in the historic channel.

Sub-Criterion B.3.c. Other Benefits

- *Will the project benefit multiple sectors and/or users?*

As part of the IWG's overall initiative, the proposed project will benefit all basin stakeholders, including those members of the IWG listed in Table 3 above, through improved management of the Icicle Creek. The stakeholders come from various interest groups including tribal fishers, fish hatchery, domestic and municipal water users, agricultural users, environmental/conservation groups, and recreational users.

- *Will the project benefit a larger initiative to address sustainability?*

Better flow management aligns with IWG Guiding Principles including improving domestic and agricultural water supply, enhancing fish habitat, and increasing LNFH sustainability by providing a consistent and healthy supply for maximized fish health. A decision support tool will help ensure sustainable water use for all users in the Icicle Subbasin.

- *Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?*

Several water management challenges and conflicts have led to the development of the IWG and subsequently the Icicle Strategy. 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. Conflicts in the subbasin include the following legal cases: City of Leavenworth v. Washington State Department of Ecology, Wild Fish Conservancy v. Salazar et al., Wild Fish Conservancy V. Irving et al, Wild Fish Conservancy v. Washington State Department of Ecology, and Center for Environmental Law and Policy v. USFWS.

A key principle endorsed in the IWG Operating Procedures is that all projects work to ensure that the shared vision of improved water management in Icicle Creek is achieved, as opposed to a fragmented and partial solution that could lead to further conflict. The proposed decision support tool will be informed by input from all IWG members and considering the interests of all IWG members.

E.1.3 Evaluation Criterion C. Planning and Preparedness

Plan Description and Objective:

- *When was the plan developed? How often is it updated?*

The proposed Decision Support Tool will direct future operations and is a key component of the Alpine Lakes Optimization, Modernization, and Automation project, which is one of the twelve recommended projects in the Icicle Creek Water Resource Management Strategy (Icicle Strategy). The Icicle Strategy was developed by the Icicle Work Group (IWG) and is the result of seven years of studying and negotiating an integrated water resource management strategy for the Icicle Creek Subbasin (Figure 3). The plan was developed between 2012 and 2019, with the finalized version published in 2019. A document titled "Streamflow Decision Support Tool, Icicle Strategy: Streamflow Improvement Action Plan – Update 2020" was completed as an update to the strategy in 2020. This update was focused on the Decision Support Tool as the vehicle to manage future automated releases from the Alpine Lakes (Aspect 2020).

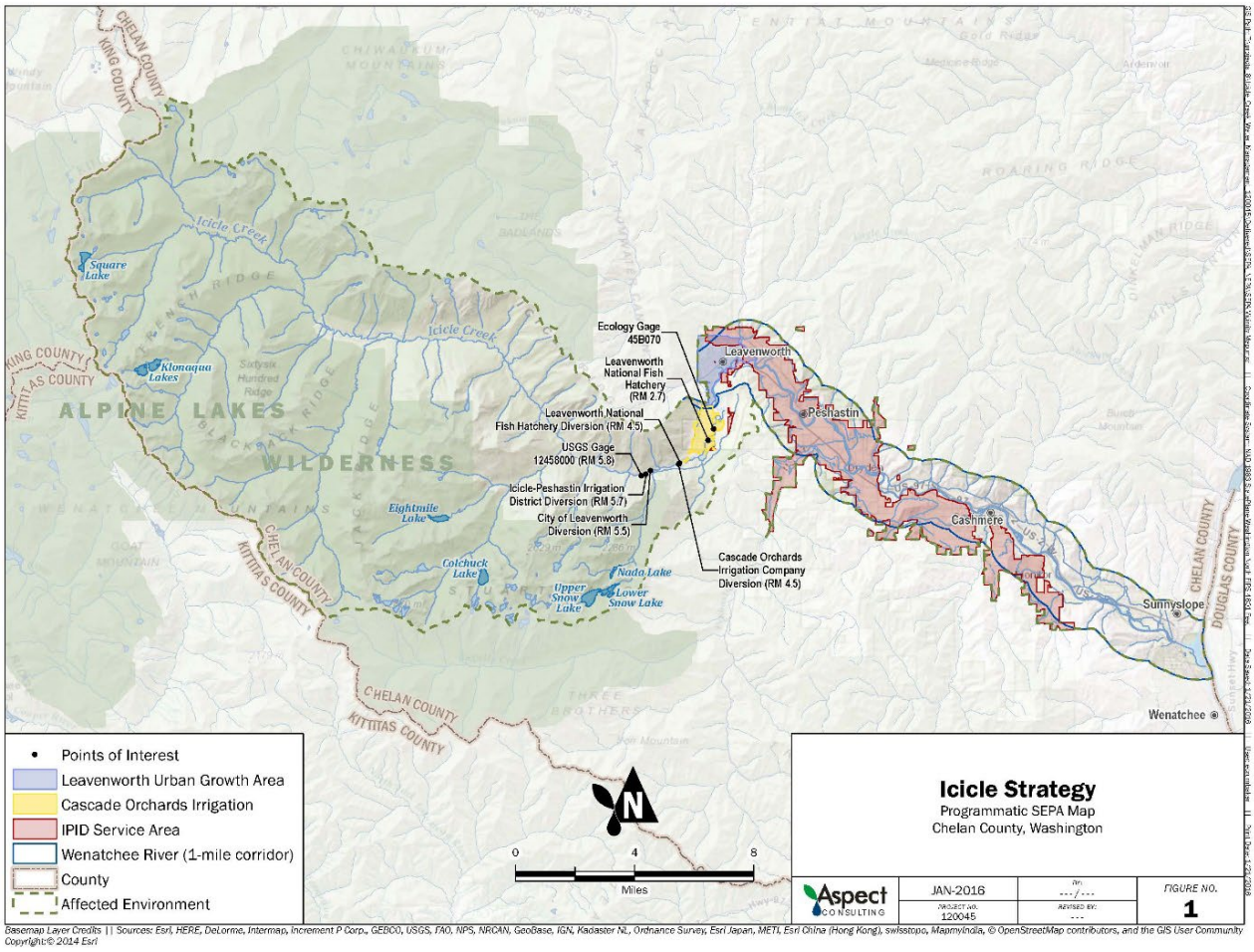

Figure 3. Geographic scope of the Icicle Strategy

- *What is the purpose and objective of the plan?*

The Icicle Strategy is a comprehensive water resource management plan designed to balance and meet out-of-stream and instream water demand and resolve habitat and fisheries issues in the Icicle Creek Subbasin. The need for the plan emerged from minimum instream flows not being met consistently, interruptions in irrigation water, litigation over water rights, issues with fish habitat and passage, as well as needs to protect tribal fishing rights and maintain sustainable operation of the LFNH. The Icicle Strategy operates under the Guiding Principles, which are a

set of objectives that all members of the IWG agreed were in their mutual interest to collaborate on and achieve. The Guiding Principles include the follwoing: 1) Improve Instream Flow in the Icicle Creek historic channel. The metric for this principle calls for 60 cfs in drought years, 100 cfs in non-drought years; 2) Improve sustainability of LNFH; 3) Protect Treaty/Non-treaty Harvest; 4) Improve Domestic Supply; 5) Improve Agricultural Reliability; 6) Enhance Icicle Creek Habitat; and 7) Comply with State and Federal Law, and Wilderness Acts.

- *What is the geographic scope of the plan?*

The geographic scope of the Icicle strategy is the entire Icicle Creek Sub-basin, including the headwaters in the alpine lakes, Icicle Creek tributaries, and Icicle Creek mainstem to the confluence with the Wenatchee River. It also includes the IPID service area and irrigation canals that divert from the Icicle and run east of the Icicle watershed, along the mainstem Wenatchee River from the town of Leavenworth to Monitor, WA (pink polygon in Figure 3).

- *Explain how the applicable plan addresses drought.*

The need for the Icicle Strategy emerged because current water management practices in the Icicle Creek Subbasin fail to consistently meet the demand for instream and out-of-stream water uses. This has been demonstrated by the minimum instream flows established in Chapter 173-545 WAC not being met, interruptible water users not receiving irrigation water, and litigation over water rights. These are issues that emerge in a drought year, with state droughts declared in Chelan County in eight (8) years since 2020 (Caroline Mellor, State Drought Lead personal communication). Without a comprehensive strategy to replace the current water management practices, climate change is projected to only worsen conditions, with an estimated 12 cfs drop in base flows and a 30% increase in irrigation curtailments in the Wenatchee Basin (Hall et al 2022).

The Icicle Strategy consists of a comprehensive list of projects that address the guiding principles and include several drought mitigation projects. The proposed project will develop a Decision Support Tool, which is conceptually detailed in an update to the Icicle Strategy (Aspect 2020, see attached excerpts). The Decision Support Tool will inform operation of the Alpine Lake Reservoirs Optimization, Modernization, and Automation project which is one of twelve projects recommended to meet Guiding Principles in the Icicle Strategy (IWG 2019, page 64, see attached excerpts). Other recommended projects to address drought include hatchery, irrigation, and domestic water use efficiency projects. The suite of projects are anticipated to provide 89 cfs and 31,958 acre-feet of total water benefit, of which 88 cfs are instream flow benefits (IWG 2019).

Plan Development Process:

- *Who was involved in developing the plan?*

The Washington Department of Ecology (Ecology) and Chelan County co-convened the IWG in 2012 to find collaborative solutions to chronic water supply problems in the watershed. The Icicle Work Group (IWG) is a diverse set of stakeholders representing local, state, and federal agencies, tribes, irrigation and agricultural interests, municipal/domestic water managers, and environmental organizations. The IWG includes members of the Confederated Tribes of the Yakama Nation, the Confederate Tribes of the Colville Reservation, U.S. Bureau of Reclamation, Icicle Creek Watershed Council, Trout Unlimited, Washington Water Trust, the

Icicle Peshastin Irrigation District, the Leavenworth Fish Hatchery, Washington Department of Fish and Wildlife, and Agricultural Representatives, among others.

- *Was the plan prepared with input from stakeholders with diverse interests?*

The plan was prepared by the Icicle Work Group in a truly collaborative process that occurred in quarterly meetings that have convened since 2012 and included the diverse interests of the members listed above (i.e. irrigation, fish hatchery, environmental groups, fish and wildlife, municipal). In order to provide structure for decision making among these diverse interests, the IWG developed a set of operating procedures that include a consensus decision framework. The framework provides a structure for all voices to be heard while also promoting successful decision making. Public comment periods for citizens outside the IWG were also opened several times throughout the plan development.

- *If the plan was prepared by an entity other than the applicant describe whether and how the applicant was involved in the development of the plan or why they were not part of the planning process.*

The County has and continues to play a pivotal role in the preparation and implementation of the Icicle Strategy. The County convened the Icicle Work Group with Ecology, and has attended and all IWG meetings as a core member. The County continues to play a crucial role towards the implementation of the identified projects and helps facilitate continued IWG member participation.

Plan Support for Project:

- *Does the plan identify the proposed project by name and location as a potential mitigation or water management action?*

The proposed project is a direct action that will support the Programmatic Environmental Impact Statement (PEIS) for Icicle Creek Water Resource Management. The PEIS evaluated 19 projects under 5 alternatives of combinations of projects and a no action alternative. The proposed project would directly tie into the benefits outlined by the Alpine Lakes Reservoir Optimization, Modernization, and Automation, and the general monitoring and data collection will indirectly support all of the projects outlined in the various alternatives.

- *Explain how the proposed project was prioritized in the plan over other potential projects/measures. If the proposed project is not specifically identified in the plan, does implementing the proposed project achieve a goal or need identified in the plan? Is the supported goal or need prioritized within the plan? If so, how is it prioritized?*

The proposed project will directly and indirectly provide positive benefits to the projects listed under Alternative 1, the preferred alternative. While the proposed project is not specifically identified in the PEIS, implementation will achieve a need that is critical to all projects in the PEIS which is the important need for decision support of the Alpine Lakes release and optimization and data monitoring and communication of the Icicle Creek streamflow.

In 2020, the IWG commissioned the development of a Streamflow Decision Support Tool Action Plan (2020 Action Plan). Its purpose was to:

1. Document the steps necessary to develop a Decision Support Tool that maximized the benefit of projects developed under the Icicle Strategy PEIS.
2. Summarize initial water management rules for integration into the tool.
3. Inventory initial and emerging data sources.
4. Summarize next steps on critical path items.

The effort proposed under this grant application is a continuation of the 2020 Action Plan.

E.1.4. Evaluation Criterion D. Readiness to Proceed and Project Implementation

- *Describe the implementation plan of the proposed project.*

Proposed schedule including tasks and milestones for this grant are demonstrated in Figure 4 below (expanded schedule with deliverables is included as an attachment in this application). The effort proposed under this grant is anticipated to begin in early 2025 to prepare the monitoring QAPP for approval by Ecology and begin permitting efforts with USFS to allow for deployment of monitoring equipment to begin in 2025 and at least capture the flow-critical window (August-October). Additional efforts proposed under this grant will occur within the 2-years following grant award

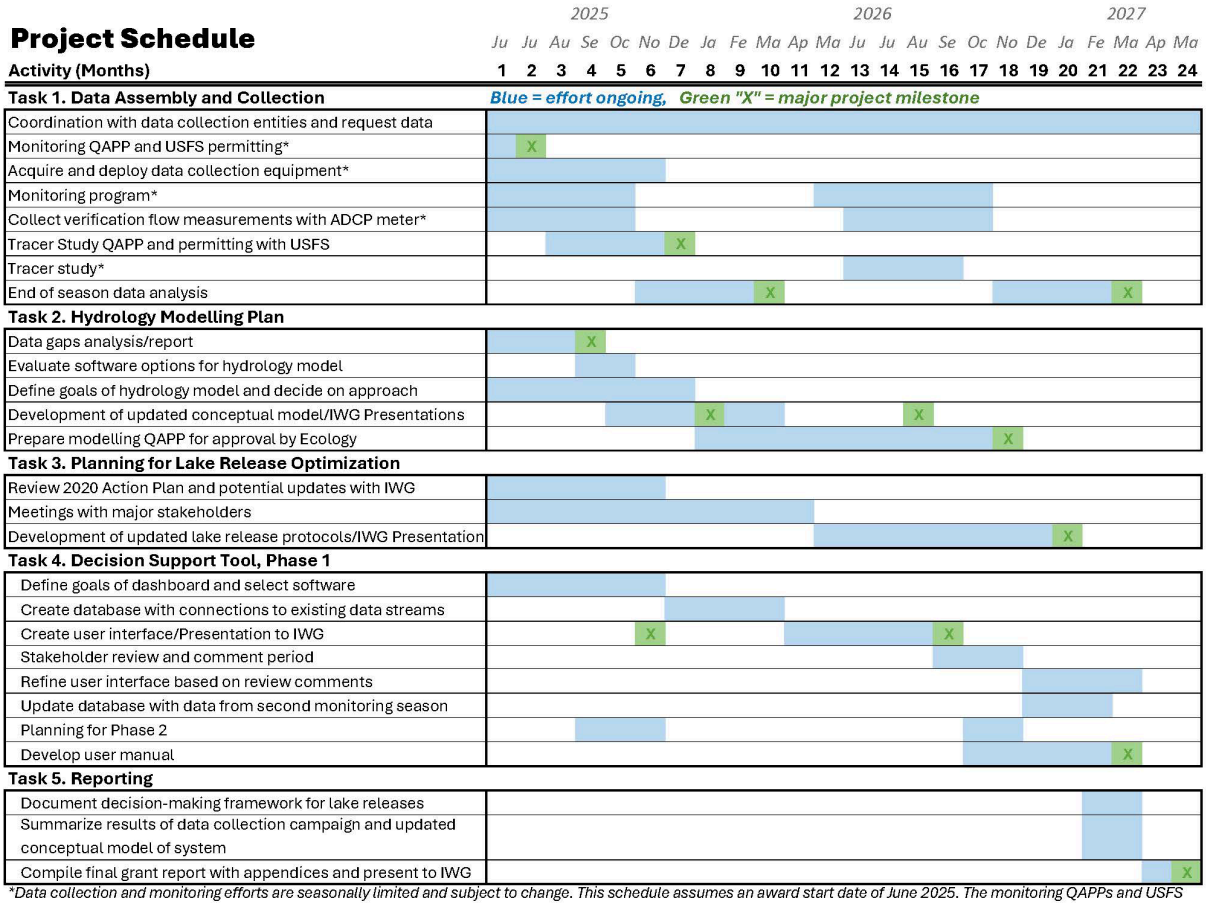

Figure 4: Anticipated Project Schedule

- *Describe any permits or approvals that will be required.*

US Forest Service permits will be required prior to initiating data collection at the proposed monitoring locations located within the Alpine Lakes Wilderness. It is anticipated that the process of applying for and receiving permits from the USFS may take up to six months, and so will begin in early 2025 under match funds to begin flow data collection in the 2025 season. If receiving permits for either the temporary monitoring stations or tracer study is deemed infeasible, alternative locations outside of the wilderness area have been identified that would remove the need for USFS permits.

- *If the project is completely or partially located on Federal land or at a Federal facility?*

Various components of the project are either located on federal land or will be used by federal agencies, including the US Forest Service, US Fish and Wildlife Service, US Bureau of Reclamation and NOAA-Fisheries. These federal agencies are members of the IWG and engaged and supportive of the project. Additional outreach and coordination with these federal agencies will be completed under the grant and their input will be incorporated into the

monitoring workplans. The County aims to lead this project in collaboration with federal agencies and other IWG members, as the project impacts all key stakeholders within the Icicle Basin. The County has traditionally been at the forefront of advancing and seeking funding for Icicle Strategy projects.

E.1.5. Evaluation Criterion E. Presidential and Department of the Interior Priorities

- *Please provide a map overlay displaying both the project area and CEJST tool.*

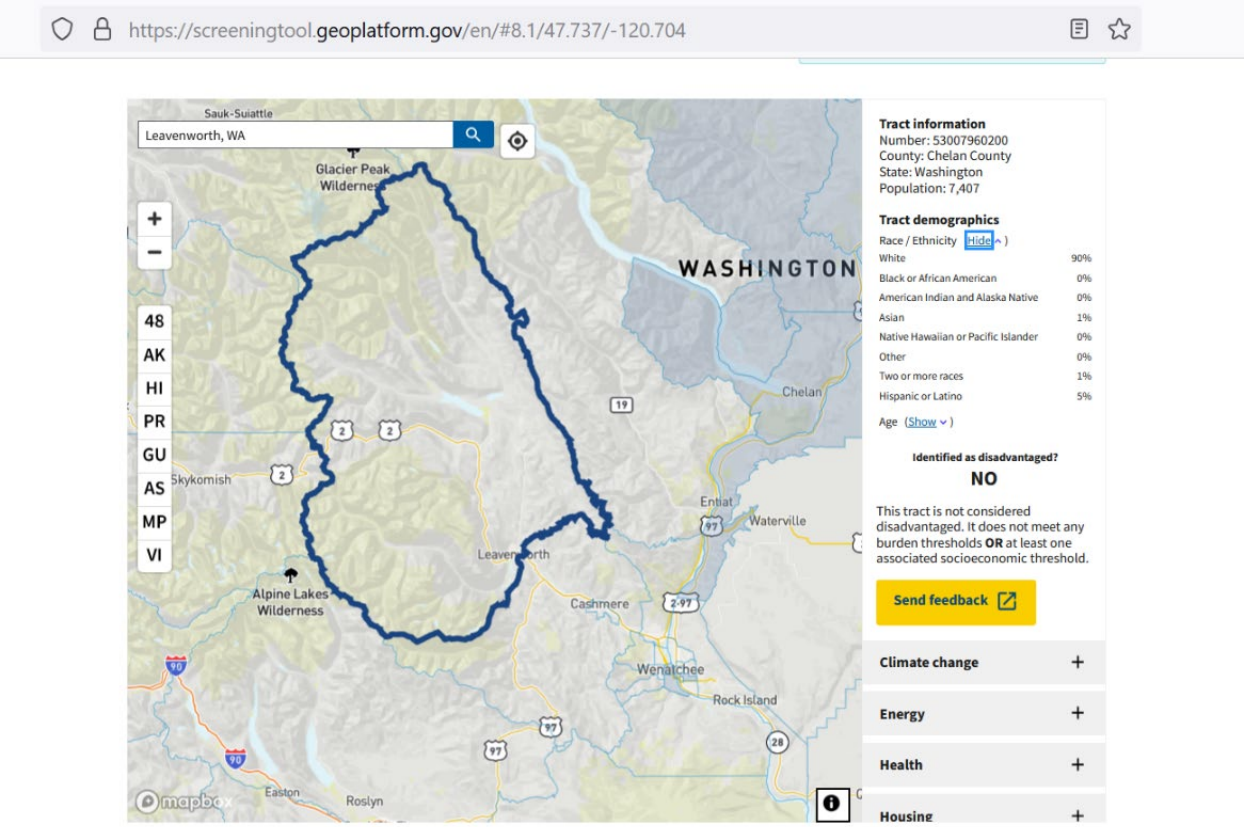

Figure 5. Census tract overlay of implementation area

- *If applicable, describe how the proposed project will directly serve and/or benefit a disadvantaged community?*

The project area, extending from the Alpine Lakes Wilderness to the town of Leavenworth, is not considered disadvantaged based on the Climate & Economic Justice Screening Tool available at geoplatform.gov (Figure 5). In addition to this tract, the tract directly to the southeast will be benefited by the proposed Decision Support tool through downstream improvements in water supply and water quality. IPID's service area extends through Cashmere to the unincorporated community of Monitor and thus includes this downstream tract. Although this tract is also not disadvantaged based on the CEJST tool, it is identified as disadvantaged using other, state-based tools such as Washington Department of Health Tracking Network map (https://fortress.wa.gov/doh/wtnibl/WTNIBL/). Benefits to this community include more reliable irrigation water, which will help protect agricultural jobs, and thus provide economic stability to migrant workers.

Tribal Benefits

- *Does the proposed project directly serve and/or benefit a Federally Recognized Tribe?*

Yes. The project benefits the Leavenworth National Fish Hatchery, which was constructed as mitigation for the tribal fishery adversely impacted by the construction of Grand Coulee Dam. The project area includes the ancestral lands of members of both the Confederated Tribes and Bands of the Yakama Nation and the Confederated Tribes of the Colville Reservation. The Yakama Nation is one of four Columbia River basin Treaty Tribes, and the Colville Tribes were established by Executive Order. Both Yakama and Colville fishers practice ceremonial and subsistence fishing from constructed fishing platforms and the banks of Icicle Creek at the fish hatchery. Both Yakama Nation and Colville Tribes are active members of the Icicle Strategy and support this project. Implementation of this Decision Support Tool will benefit Icicle Creek and other streams by improving the coordination and amount of flow released from the Alpine Lakes, therefore improving conditions for hatchery-produced spring Chinook salmon that support Tribal harvest rights on Icicle Creek.

- *Does the proposed project support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe?*

Yes. The improved management of lake releases through the Decision Support Tool will benefit fish propagation and the Tribal fishery, supporting Reclamation's tribal trust responsibility at the Leavenworth National Fish Hatchery.Summer steelhead and spring Chinook are culturally important fish to the Yakama Nation and Colville Wenatchi tribes. These tribes maintain non-exclusive fishing rights at the fish hatchery and the confluence of Icicle Creek and the Wenatchee River. Improved climate resilience by way of benefitting instream flow and expanded spawning and cold-water rearing opportunities for these species will benefit these important tribal fisheries. Tribal interests play an integral part in the Icicle Work Group which includes the development of collaborative strategies to support and optimize a wide range of in-stream and out-of-stream uses related to the Icicle subbasin, such as the Decision Support Tool.

E.1.6. Evaluation Criterion F. Nexus to Reclamation

- *Does the applicant have a water service, repayment, or operations and maintenance(O&M) contract with Reclamation?*

No. Chelan County does not have a water service, repayment, or O&M contract with Reclamation.

- *If the applicant is not a Reclamation contractor, does the applicant receive Reclamation water through a Reclamation contractor or by any other contractual means?*

No. Chelan County does not receive water through a Reclamation contractor.

- *Will the proposed work benefit a Reclamation Project area or activity?*

This project is a part of the Icicle Strategy, which is focused on resolving longstanding water resource issues in Icicle Creek. The Bureau of Reclamation is an active member of the IWG through its obligations and involvement at the Leavenworth National Fish Hatchery (LNFH) and partnership with US Fish and Wildlife Service. Reclamation has invested funds and implemented

projects at LNFH that are also a part of the Icicle Strategy including the Surface Water Intake, Fish Screens, and Fish Passage (SWISP) Project, pilot partial re-use aquaculture system (pRAS), and Snow Lake valve projects. Reclamation has also provided valuable support in the development of the Cascade Orchard Irrigation Company's (COIC) pump station and piping project scheduled for implementation in 2024-2025. The County is overseeing construction of the COIC project which will remove COIC from the shared diversion with LNFH, which is critical to the successful implementation of the LNFH's SWISP Project and LNFH's compliance under its2017 Biological Opinion.

The project also compliments other Icicle Creek and related projects recently funded by Reclamation's WaterSMART program, including the Cascade Orchard Irrigation Company Irrigation Efficiency and Pump Exchange Project, City of Leavenworth Advanced Metering Infrastructure Project, Yaksum Water Company Pipeline Replacement Project, and the Fromm (Icicle Creek) Streambank and Riparian Restoration Project.

- *Is the applicant a Tribe?*

No, Chelan County is not a Tribe or Tribal entity.

E.1.7. Evaluation Criterion G. Stakeholder Support for Proposed Project

- *Describe the level of stakeholder support for the proposed project. Are any stakeholders providing support for the project through cost-share contributions or through other types of contributions to the project?*

This project is part of the Icicle Strategy and supported by the Icicle Work Group (IWG), which is made up of 18 entities representing federal, state, and local governments, tribes, irrigation districts, and environmental organizations. Cost-share for this grant will come from the Washington Department of Ecology's Office of Columbia River, a co-convener of the IWG. The IWG has identified this as a high priority project to support better management of lake releases. IWG members that own and operate lake infrastructure (US Fish and Wildlife Service and Icicle Peshastin Irrigation District) are committed to developing and using this Decision Support Tool for their future operation of lake infrastructure.

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Bureau of Reclamation WaterSMART Grants No. R25AS00013

Drought Response Program:
Drought Resiliency Projects for Fiscal Year 2025

Chelan County Natural Resource Department, 10/7/2024

Icicle Creek Decision Support Tool

Budget Narrative, Statements, and Compliance

Contents

PERFORMANCE MEASURES

Key performance measures for this project are established in the Icicle Strategy Final Programmatic Environmental Impact Statement (PEIS) as the Icicle Strategy Guiding Principles. The Icicle Strategy Guiding Principles set two streamflow goals that the decision support tool will allow the Icicle Workgroup to meet: 100 cfs during non-drought years, with a long-term goal set at 250 cfs, and 60 cfs during drought years. The success of the decision support tool will be determined based primarily on its ability to improve and maintain instream flows in the Icicle Creek above those Guiding Principle levels, while still meeting the demands of major diverters on the Icicle Creek that also rely on the lake releases for agriculture (IPID) and fish propagation (LNFH).

Performance of monitoring data and equipment will be evaluated against the quality assurance guidelines proposed in the QAPPs to be prepared under Task 1, however this effort will not be funded under the proposed grant as it is considered normal operation and maintenance costs.

PROJECT BUDGET

Project Narrative

This project budget was developed based on previous CCNRD project experiences for staff time requirements, current pricing of necessary supplies and equipment, quotes from contractors, and contractual services based on the County's previous experience for time and cost.

The County's staff time (salaries, wages and fringe benefits) will be utilized for conducting project administration, financial administration, data collection and analysis, equipment installation, contractor coordination, and environmental and cultural compliance tasks. Indirect costs are based off of salaries/wages. Chelan County has a federally negotiated indirect rate. The indirect allocation includes costs for buildings, IT, facilities maintenance, treasurer costs, etc. It does not include our departments director or financial administration which is why we are accounting for them as direct costs. Travel expenses are expected for conducting site visits for monitoring and equipment installation. A detailed breakdown of department rates for staff time, indirect, and mileage can be found in Appendix C-F.

Budget Tables

Table 1. Non-federal and Federal Funding Requests

Funding Sources	Amount
Non-Federal Entities	
1. Department of Ecology	$248,166.00
Requested from Reclamation	$248,166.00
Total Project Cost	$496,332.00

Funding Sources	Amount
Non-Federal Entities	
1. Chelan County	$77,405.50
Requested from Reclamation	$77,405.50
Total Project Cost	**$154,811.00**

Table 2. Budget Proposal

Budget Item Description	Computation		Total Cost
	Quantity	$/Unit	
Salaries and Wages			
Sr. Natural Resource Specialist	70	$50	**$3,503**
Chief Accountant	60	$41	**$2,470**
Director	20	$67	**$1,343**
Natural Resource Specialist 1	60	$33	**$2,007**
Field Technician	40	$26	**$1,040**
Subtotal Salaries and Wages			**$10,364**
Fringe Benefits			
Sr. Natural Resource Specialist	70	$16	**$1,116**
Chief Accountant	60	$14	**$811**
Director	20	$18	**$368**
Natural Resource Specialist 1	60	$12	**$724**
Field Technician	40	$2	**$80**
Subtotal Fringe Benefits			***$3,099***
Equipment			
Sontek-IQ Plus	2	$10,700	**$21,400**
Sontek RS5 ADCP Meter	1	$30,000	**$30,000**
Onset U30 Weather Station	1	$6,000	**$6,000**
Subtotal Equipment			**$57,400**
Supplies			
Pressure Transducers/Temperature Dataloggers	8	$700	**$5,600**
Subtotal Supplies			***$5,600***
Contractual			
Geosyntec Consultants (dba Aspect Consulting)		$399,500.00	$399,500.00
Central Valley Helicopters	1	$16,000.00	$16,000.00
Subtotal Contractual			***$415,500***
Indirect			
See indirect cost rate agreement	$21,211	20.60%	**$4,369**
Total			**$496,332**

ENVIRONMENTAL AND CULTURAL RESOURCE COMPLIANCE

- *Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts, as well as any other past, present, or reasonably foreseeable future developments that you are aware of that will affect these same resources in the surrounding area.*

This project will not include any earth-disturbing work. The Decision Support Tool will be used to manage lake releases in a way that more closely mimics the natural hydrology of the streams within the Icicle Basin and to benefit water quantity and quality conditions.

- *Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?*

U.S. Fish and Wildlife Service (USFWS), Via IPaC, indicates that Canada Lynx (Lynx canadensis), Gray wolf (Canis lupus), Wolverine (Gulo gulo), Northern Spotted Owl (Strix occidentalis caurina), Yellow-billed Cuckoo (Coccyzus americanus), and Bull Trout (Salvelinus confluentus) as threatened or endangered species that may occur within the project area. Critical habitats listed include Bull Trout and Northern Spotted Owl. Activities associated with this project are not anticipated to have any lasting or negative impacts on the species or habitats previously mentioned.

- *Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States"? If so, please describe and estimate any impacts the proposed project may have.*

There are mapped wetlands that potentially fall under CWA jurisdiction within the project area. Project actions will not be conducted in existing wetlands; therefore, existing wetlands will not experience any impacts from implementation of this project. Major surface waters that exist within the project boundaries are the Wenatchee River, Icicle Creek, Chumstick Creek and their tributaries. These waters have been declared non-navigable and not under federal jurisdiction. Additionally, actions associated with this project are not expected to result in negative impacts to surface waters. Conversely, successful implementation of this project should yield long term results of increased stream flow within adjacent surface waters.

- *When was the water delivery system constructed?*

Icicle Irrigation District (IID) and Peshastin Irrigation District (PID) respectively began water delivery in 1917. IID and PID are each under the direction of the same board of directors and have been jointly managed for the entirety of their operation. The districts are currently undergoing the processing of merging into one irrigation district, IPID, and will be referred to as such.

- *Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.*

No.

- *Are any buildings, structures, or features in the project area listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.*

Buildings, structures, infrastructure or any features of the local irrigation districts will not be affected by this project.

- *Are there any known archeological sites in the proposed project area?*

There are known archeological sites within the mapped project area, however, this project will not have any impact on those known sites.

- *Will the proposed project have an adverse and disproportionate effect on communities with environmental justice concerns (as discussed in E.O. 14096)?*

This will not pose any disproportionately high or adverse effects on low income or minority populations. The implementation of this project aims to better advise IPIDs decisions in its lake releases, therefore making all communities more resilient to drought conditions.

- *Will the proposed project limit access to, and ceremonial use of, Indian sacred sites or result in other impacts on tribal lands?*

No.

- *Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?*

No.

REQUIRED PERMITS OR APPROVALS

Any permits or approvals will be identified if they become necessary and the County will ensure that they are acquired prior to work beginning.

OVERLAP/DUPLICATION OF EFFORT STATEMENT

This project does not overlap or duplicate similar efforts taking place in Chelan County.

CONFLICT OF INTEREST STATEMENT

This project does not pose any conflict of interest for Chelan County.

Bureau of Reclamation WaterSMART Grants No. R25AS00013

Drought Response Program:
Drought Resiliency Projects for Fiscal Year 2025

Chelan County Natural Resource Department, 10/7/2024

Icicle Creek Decision Support Tool

Application Appendices

Contents

APPENDICES

Appendix A: Icicle Work Group Letter of Support

October 3, 2024

Sheri Looper
Bureau of Reclamation
Drought Response Program
P.O. Box 25007
Denver, CO 80225-0007

RE: Icicle Creek Decision Support Tool

Dear Ms. Looper,

On behalf of the members of the Icicle Work Group, we are pleased to submit this letter of support for Chelan County's application to the Bureau of Reclamation for the *WaterSMART Drought Resiliency Projects* grant for the development of an Icicle Creek Decision Support Tool.

The Icicle Work Group was formed in December 2012 to "find collaborative solutions for water management within the Icicle Creek drainage" while meeting various needs and interests within the basin. The Icicle Work Group has made great progress over ten years and has developed a strategy that will result in lasting solutions in the basin. The Icicle Work Group is driven by a set of guiding principles that outline objectives to accomplish their mission. The Icicle Work Group is made up of a diverse set of stakeholders within Icicle Creek, including federal, state and local agencies, Tribes, environmental organizations and the four major water right holders within Icicle Creek.

The goal of this project is to create a data collection and coordination platform between the Icicle-Peshastin Irrigation District, US Fish and Wildlife Service and other agencies (USGS, WDFW, NOAA) to improve data collection in the basin, manage lake releases that balance instream and out-of-stream needs, and adapt decision-making over time through a Decision Support Tool. The proposed project for the BOR WaterSMART grant has the potential for more effective and coordinated management of water in the basin. This project will support the coordination efforts between the irrigation district and US Fish and Wildlife Service in their management of releases of stored water in high alpine lakes, benefit data collection agencies, as well as help accomplish the IWG's guiding principles.

We hope that the Bureau of Reclamation will support this project and the efforts of the Icicle Work Group. Please let us know if we can provide any additional information. Thank you for your consideration.

Sincerely,

Melissa Downes
Department of Ecology- Office of Columbia River
Co-convener, Icicle Work Group

Mike Kaputa, Director
Chelan County Natural Resource Dept.
Co-convener, Icicle Work Group

Appendix B: Chelan County Board of Commissioners Official Resolution

ORIGINAL

Resolution No. 2024-85

RE: Resolution Supporting Chelan County application to the US Bureau of Reclamation WaterSMART Drought Resiliency Projects (No. R25AS00013) on behalf of the Icicle Creek Decision Support Tool

WHEREAS, Icicle Creek in Chelan County, Washington is a priority watershed and contains critical needs for water management; and

WHEREAS, the Icicle Work Group was formed in 2012 to develop and implement an integrated water resource management strategy for Icicle Creek and is comprised of a broad and diverse group of stakeholders, including federal, state and local agencies, tribes, and environmental groups; and

WHEREAS, the Icicle Work Group desires to develop a decision support tool to coordinate and optimize water managers and reservoir releases in Icicle Creek in support of the Icicle Work Group instream flow and water supply objectives; and

WHEREAS, Chelan County is a co-convener of the Icicle Work Group and has the technical and administrative capacity to develop and implement the project with the Icicle Work Group;

NOW, THEREFORE BE IT RESOLVED that:

1. The Chelan County Natural Resource Director (Mike Kaputa) is authorized to make formal application to the US Bureau of Reclamation for grant assistance;
2. The Chair of the Chelan County Commissioners shall be authorized to enter into the agreement upon majority approval by the Chelan County Commissioners;
3. The Natural Resource Director has reviewed the grant application on behalf of the Chelan County Commissioners;
4. Chelan County certifies that the matching funds indicated in the grant application shall be provided if the grant application is successful;
5. The Natural Resource Director and staff will work with the US Bureau of Reclamation to meet established deadlines for entering into a financial assistance agreement;
6. This resolution becomes part of the grant application;

Dated this 30th day of September, 2024

CHELAN COUNTY Commissioners SEAL STATE OF WASHINGTON

BOARD OF CHELAN COUNTY COMMISSIONERS

KEVIN OVERBAY, CHAIRMAN

TIFFANY GERING, COMMISSIONER

SHON SMITH, COMMISSIONER

ATTEST: ANABEL TORRES
Clerk of the Board

CHELAN COUNTY BOARD OF COMMISSIONERS

Appendix C: Equipment Quotes

CLINE AIR SERVICES, LLC
Central Valley Helicopters
ELLENSBURG, WA 989267671 US
(509) 968-9300
patti@centralvalleyheli.com
www.centralvalleyheli.com

Invoice

BILL TO	SHIP TO
Chelan County Natural Resource Department 411 Washington St, Suite 201 Wenatchee, WA 98801	Chelan County Natural Resource Department 411 Washington St, Suite 201 Wenatchee, WA 98801

INVOICE #	DATE	TOTAL DUE	DUE DATE	TERMS	ENCLOSED
2264967	07/31/2024	$3,360.83	08/30/2024	Net 30	

DATE	ACTIVITY	DESCRIPTION	QTY	RATE	AMOUNT
07/29/2024	**R44 Charter/Survey**	Cost Per Hour (Time in Air)	2.90	910.00	2,639.00T
07/29/2024	**Standby Icicle**		6	75.00	450.00T

SUBTOTAL	3,089.00
TAX	271.83
TOTAL	3,360.83
BALANCE DUE	**$3,360.83**

Quote #: B246722
Expires: 2024 Sep 30

Proposal Summary

#	Part Number	Description	List Price USD	Qty	Ext. Price USD
1	31-0015	Battery hook-up cable, 5ft (1.5m)	$30.00	1	$30.00
2	SON-IQP	SonTek-IQ Plus. Low profile, five beam up-looking real-time acoustic Doppler current meter/flowmeter (3.0-MHz). The SonTek-IQ Plus includes an extended operating range (5-m), advanced data processing including the SmartPulseHD feature, and current profiling. Features dynamic measurement cell, vertical acoustic beam and pressure sensor for water level measurement, internal flow calculations for both instantaneous discharge as well as total volume, temperature sensor, tilt sensor, RS232, SDI-12, Modbus interface and 4 GB recorder in a low-profile (2.9cm) urethane pressure case (30m max. depth). System includes mounting brackets, USB-RS232 serial adaptor, tool kit, dummy plug kit, power supply and memory drive with SonTek-IQ software and technical documentation.	$9,985.00	1	$9,985.00
3	24-0208	Custom 1-inch (2.54-cm) tall stainless steel riser mount, completely compatible with existing hole patterns on the SonTek-IQ and the standard SonTek-IQ mounting brackets.	$180.00	1	$180.00
4	36-0040-020	20-m power and RS232/SDI-12/Modbus communications cable, compatible with the SonTek-IQ Flow Display, 5-pin male dry-pluggable to terminal block	$495.00	1	$495.00
5	Shipping	Fixed Shipping	$25.00	1	$25.00
				Subtotal	$10,715.00

Grand Total (in USD)	$10,715.00
Terms	Net 30
FOB	Origin

This order is subject to the Standard Terms and Conditions of Sale - Xylem Americas effective on the date the order is accepted which terms are available at https://www.xylem.com/en-us/support/xylem-americas-standard-terms-and-conditions/ and incorporated herin by reference and made a part of the agreement between parties.

Appendix D: Chelan County Natural Resources FY24 Comp Rates

CCNRD 2025

	SR Program Manager Robinson	Finance Manager Bjorklund	Director Kaputa	Natural Res. Spec Hendrickson	Field technician
Hourly Rate:					
Labor Rate/Hour	39.78	45.10	69.59	36.15	26.00
Soc Sec	2.47	2.80	4.31	2.24	1.61
Medicare	0.58	0.65	1.01	0.52	0.38
L&I	0.02	0.02	0.03	0.02	0.01
State Unemp	0.06	0.07	0.10	0.05	0.04
Retirement	4.08	4.62	7.13	3.71	0.00
WA family leave	0.08	0.10	0.15	0.08	0.00
VEBA	1.01	1.01	1.01	1.01	0.00
Med/Ins	6.35	6.35	6.35	6.35	0.00
Benefit Rate/Hour	14.64	15.61	20.10	13.97	2.04
Total	54.42	60.71	89.69	50.12	28.04

Appendix E: Chelan County FY24 Motor Pool Rates

2024 MOTOR POOL RATES
FINAL SUMMARY
As of 5/31/2023

MILEAGE VEHICLES FOR GENERAL USE
J109, J110, J111, J112, J115, J116, J117

Vehicle Count	Annual Depreciation	Annual Replacement	3-Year Average O&M + Insurance	3-Year Average Mileage	Depr per Mile	Repl per Mile	O&M + Ins per Mile			2024 Rate	2023 Rate	% Change
7	12,877.47	23,176.89	41,705.37	26,412	0.49	0.88	1.58			2.94	1.69	74%

2024 rate (excluding replacement cost) $2.06/mile

Appendix F: Contractor Quotes

Icicle Strategy Decision Support Tool
Proposed Scope of Work and Budget, Aspect Consulting

Task	Description	Budget
1A	**Data Assembly and Collection – Coordination with Data Collecting Entities** • Data requests, coordination and meetings with USGS, Ecology, LNFH, City of Leavenworth, IPID and COIC. • Interviews with stream gage managers at USGS, Ecology and LNFH	$7,500
1B	**Data Assembly and Collection – Monitoring Plans** • Prepare Data Monitoring QAPP in coordination with the IWG • Prepare Tracer Study QAPP in coordination with the IWG and major diverters on Icicle Creek, consistent with applicable USGS and Ecology guidance and standard operating procedures. • Address comments from Ecology and USFS <u>Deliverables:</u> • Monitoring QAPP • Tracer Study QAPP	$38,800

1C	**Data Assembly and Collection – Data Monitoring Program**
	• Coordination with USFS for permitting.
	• Deploy monitoring equipment for data collection during 2025 and 2026 seasons. Monitoring equipment includes:
	  ○ Sontek-IQs (to be purchased by the County) lake releases (helicopter costs to be covered by the County).
	  ○ Temporary monitoring stations including dataloggers and staff gages at four locations (dataloggers to be purchased by the County).
	  ○ One weather station (to be purchased by the County).
	• Collect flow measurements using ADCP flow meter (to be purchased by County) and corresponding staff gage readings for developing rating curves at the temporary monitoring locations.
	• Collect up to five instances of streamflow verification measurements using ADCP flow meter throughout the 2025/2026 season at the three permanent gaging stations.
	• Execute two tracer studies in 2026 corresponding with lake releases, one in early season (June-July) and one in late season (August-September) (Aspect to provide equipment.
	• Annual compiling and analysis of data collected including annual reports.
	<u>Deliverables:</u>
	• 2025 and 2026 Monitoring Summary Report
		$146,600

2	**Hydrology Modelling Plan** • Review existing data and studies and perform data gaps analysis. • Refine Icicle basin conceptual model. • Define modeling goals and select modelling software. • Establish geographical and temporal domains for the hydrology model. • Develop a plan/targets for model development and calibration with feedback from IWG. • Prepare hydrology modelling QAPP. • Incorporate feedback/edits from Ecology and IWG into QAPP. <u>Deliverables:</u> • Hydrology modelling QAPP, which will include a data gaps report, conceptual model, and modeling plan	$25,200

3	**Planning for Lake Release Optimization** • Review 2020 Action Plan with IWG and facilitate discussion. • Meetings with major stakeholders to refine priorities and protocols. • Develop recommended protocols for feedback from IWG. • Incorporate final feedback from IWG for inclusion in final grant report. <u>Deliverables:</u> • Final PowerPoint presentation to IWG	$43,800
4	**Decision Support Tool, Phase 1** • Define specific needs for tool to inform software and data storage solutions and prepare initial approach. • Present proposed approach to IWG for feedback. • Create database for storing hydrology data. • Create user interface/dashboard for displaying data. • Present draft to IWG for feedback. • Revisions to database and interface based on feedback. • Develop user manual. • Planning for Phase 2 of dashboard – to be documented in final grant report. <u>Deliverables:</u> • PowerPoint presentation to IWG • Decision support tool user manual	$75,200
5	**Reporting** • Summarize efforts completed under grant award. • Document decision-making framework from Task 3 – update to 2020 Action Plan. • Document next steps including Phase 2 of decision support tool, model development and incorporation, automation, etc. • Appendices are expected to include data monitoring report for 2025 and 2026, modelling QAPP, user manual for decision support tool. • Provide draft report for feedback from County. • Prepare final grant deliverable report incorporating feedback from County. Deliverables: • Final grant report with appendices	$62,400
	Total	**$399,500**

Appendix G: Indirect Cost Contract

USDA United States Department of Agriculture | Forest Service | Albuquerque Service Center | 4000 Masthead St, NE Albuquerque, NM 87109

File Code: 1440/1580
Date: September 6, 2024

STATE AND LOCAL DEPARTMENT UNIT
INDIRECT COST NEGOTIATION AGREEMENT

Skip Moore
Chelan County Auditor
Chelan County Auditor's Office
350 Orondo Ave, Suite 306
Wenatchee, WA 98801

The indirect cost rate contained herein is for use on contracts, grants, and cooperative agreements with the Federal Government to which Title 2 Code of Federal Regulations (CFR) Part 200 applies, subject to the limitations contained in Section II (A) of this agreement. The rate was prepared by Chelan County and the U.S. Department of Agriculture, Forest Service, in accordance with the authority contained in Appendix VII of the Regulations.

SECTION I: Rate

Rate Type	From	To	Rate	Applicable to
Predetermined Rate	1/1/2023	12/31/2023	20.46%	All Programs
Predetermined Rate	1/1/2024	12/31/2024	20.46%	All Programs

Allocation Base

Total Direct Salaries and Wages

Expenditures Excluded: The allocation base cited above only includes direct salaries and wages. By definition, capital expenditures and sub-wards are excluded from the base.

Treatment of Fringe Benefits and Paid Absences: Vacation, holiday and sick leave are included in salaries and wages. These paid absences are claimed on grants, contracts, and other agreements as part of the normal cost of salaries and wages. Separate claims for the costs of these paid absences are not made.

File Code: 1440/1580
Date: September 6, 2024

SECTION II: General

A. LIMITATIONS: Use of the rate contained in this agreement is subject to any statutory or administrative limitations and is applicable to a given grant or contract only to the extent that funds are available. Acceptance of the rate(s) agreed to herein is predicated upon the following conditions:

1) That the indirect costs included in the indirect cost pool are incurred, finally accepted legal obligations of the organization and are allowable under the governing cost principles;
2) That the same costs treated as indirect costs have not been claimed as direct costs;
3) That similar indirect costs have been accorded consistent treatment, and;
4) That the information provided by the organization which was used as a basis for acceptance of the rate agreed to herein is not subsequently found to be materially incomplete or inaccurate by the Federal Government.

In such situations as described above, the rate would be subject to renegotiation at the discretion of the Federal Government.

B. AUDIT: Adjustments to amounts resulting from an audit upon which the negotiation of the agreement was based will be compensated for in subsequent negotiation.

C. CHANGES: The rate(s) contained in this agreement is based on the organization structure and accounting system in effect at the time the proposal was submitted. Changes in the organizational structure or changes in the method of accounting for costs which affect the reimbursement resulting from use of the rate in this agreement require the prior approval of the authorized representative of the responsible negotiation agency. Failure to obtain such approval may result in subsequent audit disallowances.

D. PREDETERMINED RATE: The predetermined rate contained in this agreement is based on an estimate of costs which will be incurred during the period for which the rates are applied and are not subject to adjustment.

E. NOTIFICATION OF FEDERAL AGENCIES: Copies of this document may be provided to other Federal offices as a means of notifying them of the agreement contained herein.

USDA United States Department of Agriculture | Forest Service | Albuquerque Service Center | 4000 Masthead St, NE Albuquerque, NM 87109

File Code: 1440/1580
Date: September 6, 2024

F. SPECIAL REMARKS: Indirect costs charged to Federal grants/contracts by mean other than the rate(s) cited in this agreement should be adjusted to the applicable rate cited herein and applied to the appropriate base to identify the proper amount of indirect costs allocable to the program. However, awards providing for indirect cost rate ceilings will be subject to the ceilings stipulated in the award, or the rates in this agreement, whichever are lower.

By the Local Agency	By the Responsible Federal Agency
Chelan County	USDA-Forest Service
Signature	JOHN HERNANDEZ Digitally signed by JOHN HERNANDEZ Date: 2024.09.06 15:40:04 -06'00' Signature
Skip Moore Printed Name	John Hernandez Printed Name
Chelan County Auditor Title	Branch Chief, Resource Audit Branch Title
Date September 9, 2024	Date

Negotiated by:
Irene Saenz, Auditor
Albuquerque Service Center
Resource Audit Branch
Phone: 581-2910
Fax: 1-866-436-5939
Email: Irene.saenz@usda.gov

2.3.2 Alternative 1 (Preferred Alternative) Narrative Description

Alternative 1, also referred to as the Base Package, meets all the objectives defined in the IWG's Guiding Principles. These projects have been agreed to and moved forward by the IWG for review in this PEIS. While IWG members have reserved a final recommendation on Alternative 1 until resolution of the PEIS and consultation with the co-leads in 2018, this alternative represented the best recommendation available after 4 years of study by IWG members.

Alternative 1 includes the following projects[6]:

- **Alpine Lakes Reservoirs Optimization, Modernization, and Automation** modernizes and automates the outlet works and gate infrastructure at seven lakes. The intent is to improve management and releases of stored water at seven lakes in the Icicle Creek Subbasin based on changing conditions to meet the Subbasin's needs. It increases streamflow for fish and improves reliability and operation of stored water for agricultural use and the LNFH. (GP1; GP5)[7]
- **IPID Irrigation Efficiencies** explores options to improve irrigation delivery and on-farm efficiencies. Projects may include canal piping or lining and on-farm efficiency upgrades, which would improve drought resiliency and reliability to district users. Additionally, the IWG would work with IPID to voluntarily move water from users that do not use or need as much water to users that need additional water. This project also benefits fish by increasing streamflow. (GP1; GP5)
- **COIC Irrigation Efficiencies and Pump Exchange** proposes to change COIC's point of diversion from its existing location at RM 4.5 on Icicle Creek to a location on the right bank of the Wenatchee River near its confluence with Icicle Creek or on the left bank of Icicle Creek near its confluence with the Wenatchee River and implement other water saving measures, such as piping the delivery system. The augmented streamflow has the potential to improve reliability of water supply for agriculture, benefit fish passage and habitat, and maintain treaty and non-treaty harvests. (GP1; GP5)
- **Domestic Conservation Efficiencies** focuses on conservation projects in the City of Leavenworth and Chelan County and implements municipal and rural water efficiency projects such as a lawn buyback program that could incentivize reducing the amount of lawn homeowners irrigate, leak detection and repair, meter installation, and water use conservation to improve domestic supply. (GP4)
- **Eightmile Lake Storage Restoration** rebuilds the Eightmile Lake dam to restore usable storage to the historical and permitted high water storage elevation. This

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

[7] GP = Guiding Principal. See explanation in Table 2-2.

would increase streamflow for fish and meet the domestic water needs of the City of Leavenworth and surrounding rural areas in Chelan County and improves the reliability and drought resiliency for agricultural users (GP1; GP4; GP5). Additional water for the City of Leavenworth would be preferentially pursued on the Wenatchee River to reduce impacts to Icicle Creek, although in emergencies water could be supplied from Icicle Creek instead to meet the City's service obligations.

- **Tribal and Non-Tribal Fisheries** ensures that projects and actions taken do not have negative effects on tribal fishery activity in the Icicle Creek Subbasin. It monitors fishery effectiveness and implements actions for improvement, while protecting Tribal Treaty and federally protected harvest rights and non-tribal harvest at all times. (GP2)
- **Habitat Protection and Enhancement** identifies and implements stream restoration and protection projects such as riparian plantings, engineered log jams, and conservation easements to improve stream habitat and ecosystem health. (GP6)
- **Instream Flow Rule Amendment** modifies the instream flow rule's interim domestic reservation of 0.1 cfs to a final level of 0.5 cfs. This helps meet domestic water needs through 2050. As described in Chapter 173-545 WAC, the rule amendment requires instream flow and habitat restoration. This will improve domestic supply in the Icicle Creek subbasin. (GP4)
- **LNFH Conservation and Water Quality Improvements** focuses on projects to reduce surface water use and improve access to groundwater. These projects may include onsite reuse, an effluent pump back, and wellfield enhancements for year-round benefits. It would also increase streamflow for fish and improve access to reliable water for the hatchery's operations. These projects also improve water quality in Icicle Creek. (GP1; GP2)
- **Fish Passage** improves passage by assessing and removing barriers, so fish have better access to healthy habitats. This could include improved operation at Structure 2 and modification of channel morphology at the Boulder Field. Improved passage will increase the amount of habitat fish can access within the subbasin. (GP6)
- **Fish Screening** upgrades fish screens on diversions to meet current standards. This will bring the major diverters on Icicle Creek into compliance with Washington State and NMFS screening requirements and bring LNFH into compliance with the screening requirements set in the Biological Opinion (NMFS, 2015). These projects reduce fish mortality, which ultimately improves fish passage. (GP6; GP7)
- **Water Markets** creates an Icicle Water Market and seeds it with an initial 1,000 acre-feet of water for agriculture use in the Icicle Creek Subbasin and Wenatchee River Basins during shortages. (GP4)

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

Table 2-2 shows how the projects included in Alternative 1 addresses the IWG's Guiding Principles. This suite of projects is expected to cost $82 million, provides 89 cfs and 31,958 acre-feet of total water benefit (88 cfs and 28,458 acre-feet of instream benefit).

Table 2-2
How Alternative 1 (Preferred Alternative) Meets Guiding Principles

Guiding Principle Number	Guiding Principles	How the Alternative 1 Meets the Guiding Principles
GP1	Improve Instream Flow	Meets goals of 100 cfs in average years and 60 cfs in drought years. Anticipated flow improvement is 88 cfs, in addition to base flows.
GP2	Improve Sustainability of LNFH	Meets goal of source redundancy and improved fish rearing and capacity, allowing LNFH to meet fish production goals. Also, improves water quality, and passage in Icicle Creek.
GP3	Protect Tribal and Non-Tribal Harvest	Meets goal of instream flow improvement balanced with preservation of fishery with adaptive management strategy in place, and potential amenity and access increases.
GP4	Improve Domestic Supply	Meets peak 2050 domestic demand
GP5	Improve Agricultural Reliability	Meets goal of 1,000 acre-feet for agricultural interruptible water rights.
GP6	Enhance Icicle Creek Habitat (includes fish passage and fish screens)	Meets goal of additional habitat improvement.
GP7	Comply with State and Federal Laws and Wilderness Acts	Meets goal by requiring project checks on all permits and an environmental review.

Because Icicle Creek experiences low flows most acutely in the late summer/early fall (see Section 3.3), it is insufficient to consider the instream flow Guiding Principle met if the annual quantities meet "average" drought or non-drought year conditions. Rather, it is appropriate to consider performance of the Alternatives on a weekly time-step and to consider both actual flows in an indicator drought and non-drought year, as well as how average conditions fair.

A representative year approach and weekly average flows were used to determine performance of the alternatives in meeting the instream flow goal. 2015 was selected as a representative drought year and 2014 as a representative non-drought year. Weekly average flows in all non-drought years (50 percent exceedance) and drought years (80

2 Background

2.1 Icicle Workgroup

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) in December 2012 to find solutions for water management within the Icicle Subbasin. 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).

The IWG meets quarterly to make decisions on implementing and monitoring progress made on the Icicle Creek Water Resource Management Strategy (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 related to the development of a Streamflow Decision Support Tool as described in this report is the IWG Instream Flow Subcommittee (IFSC). The IFSC, which comprises local, state, federal, and tribal fish biologists, 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.

4 Water Management Rules

Following the completion of pilot releases from the Alpine Lakes in 2016 and 2017, the IFSC developed objectives for water management rules to help maximize streamflow benefits in Icicle Creek and its tributaries. The water management rules will form the backbone of a future Streamflow Decision Support Tool. These rules are likely to be modified over time as the IWG and a Streamflow Decision Support Tool will likely have an Adaptive Management Plan component. Some rules are likely static, while others are conditional (water-year dependent). This section attempts to describe some of the initial discussions on this issue.

1. Variable stored-water releases should balance shortfalls in streamflow around projects that provide static benefits.
2. Goals to release water to meet mainstem instream flow targets should optimize releases, while reducing impacts in tributary streams and meeting tributary flow targets in Leland Creek and French Creek.
3. Ramping rates for stored-water releases is unique to each tributary. Preliminary ramping rates were considered as not to exceed 5 to 10 cfs per week in late summer and early fall. However, the release rates from each lake should consider the following in development of water management rules:
    a. The release rate should consider the downstream objective as the primary requirement (e.g. fish propagation at LNFH, irrigation at IPID).
    b. The release rate should blend into the natural hydrograph to reduce potential for fish stranding, especially during late September and October.
    c. Minimize potential amphibian stranding.
    d. Minimize introduction of a flashy hydrograph.
4. Develop criteria that govern the volume of water stored for priority late-season releases at the risk of not meeting early-season instream flow targets.
5. Avoid stored-water releases or protection of water supplies that increase streamflow in the Icicle Creek historical channel during the tribal harvest window (April to July) that conflicts with tribal harvest.
6. Goal is to release stored water within a year. Snowpack predictions and improved SNOTEL site data will inform carryover opportunities.
7. Consideration of a hierarchy of stored-water releases:
    a. IPID irrigation and LNFH hatchery rearing needs.
    b. IPID and LNFH lake maintenance requirements.
    c. Respect for the subordination agreement between IPID and LNFH for Snow Lakes.
    d. The balance of stored-water releases with fish life stages in the tributaries.

e. Wilderness priorities for recreational and aesthetic opportunities.

8. Releases should consider Bull Trout life stage goals in Icicle Creek tributaries, these are:

   a. Bull trout rearing temperature of <15˚C
   b. Bull trout spawning temperature of <9˚C from July to December
   c. Dissolved oxygen in creeks of > 11 mg/L
   d. pH in creeks between 6.0 and 8.5

Opportunities for direct measurement, or correlations, are necessary for other priority reaches in Icicle Creek. The future Streamflow Decision Support Tool should have water management rules that optimize benefits across reaches.

5 Water Budget Data Streams

Development of a Streamflow Decision Support Tool that enables real-time management of releases from the Alpine Lakes storage and management of other water supplies will require a robust network of streamflow, water quality, and weather monitoring stations. The purpose of these monitoring stations is to enable the IWG to make streamflow management decisions that satisfy water management rules established for the Icicle Creek subbasin and enable monitoring of contributions from implementation of Preferred Alternative projects. An initial inventory of data sources is provided in this section.

5.1 Existing Real-Time Data Sources

Streamflow is currently gaged at two telemetry-enabled locations as shown on Figure 1:

- USGS 12458000, Icicle Creek above Snow Creek near Leavenworth
- Ecology 45B070, Icicle Creek near Leavenworth

The three nearest weather stations are located at:

- Stevens Pass
- Fish Lake
- Blewett Pass

An emergency weather station (45W002) was installed at Eightmile Lake in 2018.

Update 2020: Three telemetry-enable hydrologic stations were installed by Ecology bringing the total number of streamflow gaging stations to three, plus one lake-stage station at Eightmile Lake and five weather stations. The co-convenors sent a letter to the Leavenworth Fisheries Complex manager requesting they consider adding telemetry to the existing real-time gaging station at Structure 2. The letter is included in Appendix B.

- Ecology 45W002 Eightmile Lake
- Ecology 45W003 Eightmile Creek Below Dam
- Ecology 45W004 Icicle Ridge

5.1.1 Eightmile Lake Stage and Creek Hydrograph

Two emergency hydrologic stations were installed by Ecology in 2018 at Eightmile Lake.

Ecology gaging station 45W002 Eightmile Lake is located adjacent to the dam impounding Eightmile Lake. This station was installed in 2018 and records lake stage, precipitation, air temperature, and water temperature.

Ecology gaging station 45W003 Eightmile Creek Below Dam is located below the Eightmile Lake dam on Eightmile Creek. This station was installed in 2018 and records stream stage, discharge, and air temperature at 15-minute intervals. Note that a rating curve has not been developed for this station; therefore, the discharge results are uncertain. The station has telemetry providing real-time data.