



Icicle Creek Water Resource Management Strategy

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Aspect Consulting

Background

- **Co-Conveners:** Ecology OCR and Chelan County DNR
- **Process:** Assembled Icicle Workgroup Stakeholders
- **Timeline:** Substantial progress on reaching consensus goals and initiating project evaluations since December 2012
- **Goals:** Meet instream and out-of-stream objectives in Icicle Creek Basin, provide an alternate pathway for conflict resolution other than litigation

IWG Members

- Office of Columbia River
- Chelan Co Board of Commissioners
- Conf Tribes of the Yakama Indian Nation
- WA State Dept of Fish & Wildlife
- Conf Tribes of the Colville Reservation
- WA State Dept of Ecology
- US Bureau of Reclamation
- Icicle & Peshastin Irrigation District
- USFWS – Leavenworth Fish Hatchery
- City of Leavenworth
- NOAA Fisheries
- Chelan County
- Cascade Orchard Irrigation Co
- Wild Fish Conservancy
- Icicle Creek Watershed Council
- Center for Environmental Law & Policy
- WA Water Trust
- US Forest Service
- Trout Unlimited
- Agricultural Representative Mel Weythman
- Agricultural Representative Daryl Harnden
- City of Cashmere



Vision

The Icicle Creek Work Group seeks to find collaborative solutions for water management within the Icicle Creek drainage to provide a suite of balanced benefits for existing and new domestic and agricultural uses, non-consumptive uses, fish, wildlife, and habitat while protecting treaty and non-treaty fishing interests.

Purpose

The purpose of the Icicle Creek Work Group (“Work Group”) is to develop a comprehensive Icicle Creek Water Resource Management Strategy through a collaborative process that will achieve diverse benefits defined by all of the Guiding Principles below. The Work Group will use best available science to identify and support water management solutions that lead to implementation of high-priority water resource projects within the Icicle Creek drainage.

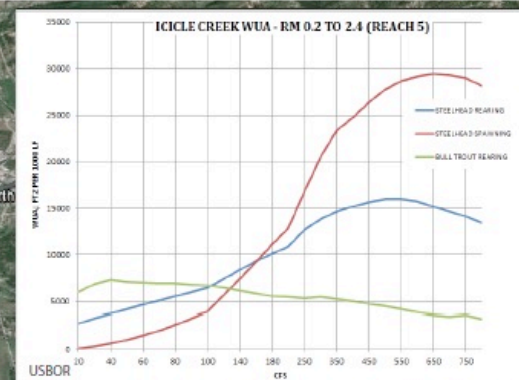
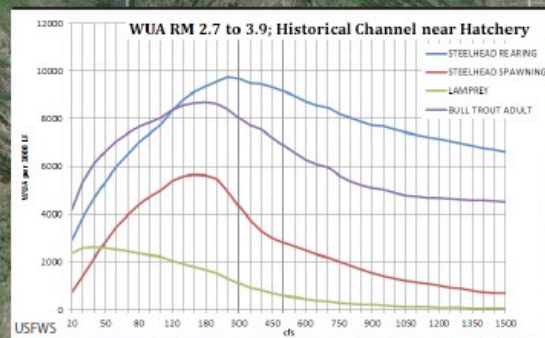
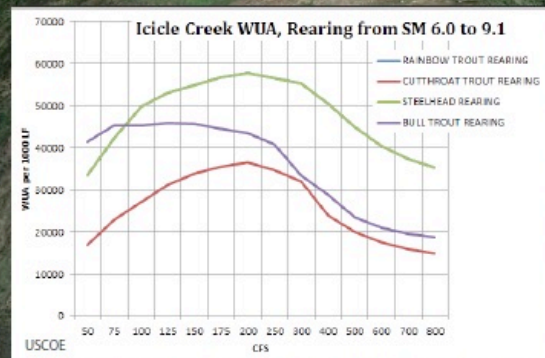
Guiding Principles

- **Adequate Streamflow** (Dry Year Goal = 60 cfs, Average Year Goal = 100 to 250 cfs)
- **Sustainably Leavenworth National Fish Hatchery** (52 cfs diverse reliable sources)
- **Meet Treat / Non-Treaty Harvest Rights**
- **Municipal/Domestic Demand Met** (~5,000 acre-feet, 5-7 cfs)
- **Improve Agricultural Reliability** (2-4 cfs, pending IWG)
- **Enhance Aquatic / Terrestrial Habitat**
- **Comply With State & Federal Law**
- **Comply with Wilderness Acts**

Total =
50 to 60 cfs short-term,
and 200 cfs long-term

Instream Flow Metric Approach

- **Instream Flow Committee Formed**
 - USFWS; Yakama Nation; Confederated Tribes of Colville Reservation; NOAA Fisheries; CELP; WDFW; Icicle-Peshastin Irrigation Dist; USBOR; Wild Fish Conservancy; Trout Unlimited
- **Icicle Creek Reaches Defined from Previous Studies**
- **Hydrographs and Weighted Usable Areas Evaluated**
- **Historic Channel (Reach 4) A Priority for Flow/Habitat Improvement**



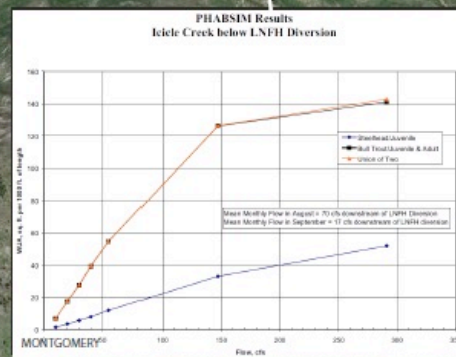
REACH 1
- 200 cfs in September
- RB rearing = focal life stage

REACH 2
- 200 cfs in Aug, September
- RB rearing = focal life stage

REACH 4
- 250 cfs in Aug, Sept, Oct
- SH rearing = focal life stage

REACH 3
- 291 cfs in Aug, Sept, Oct
- RB/SH rearing = focal life stage

REACH 5
- 550 cfs in Aug, Sept, Oct
- 650 cfs in April
- SH rearing & SH spawning



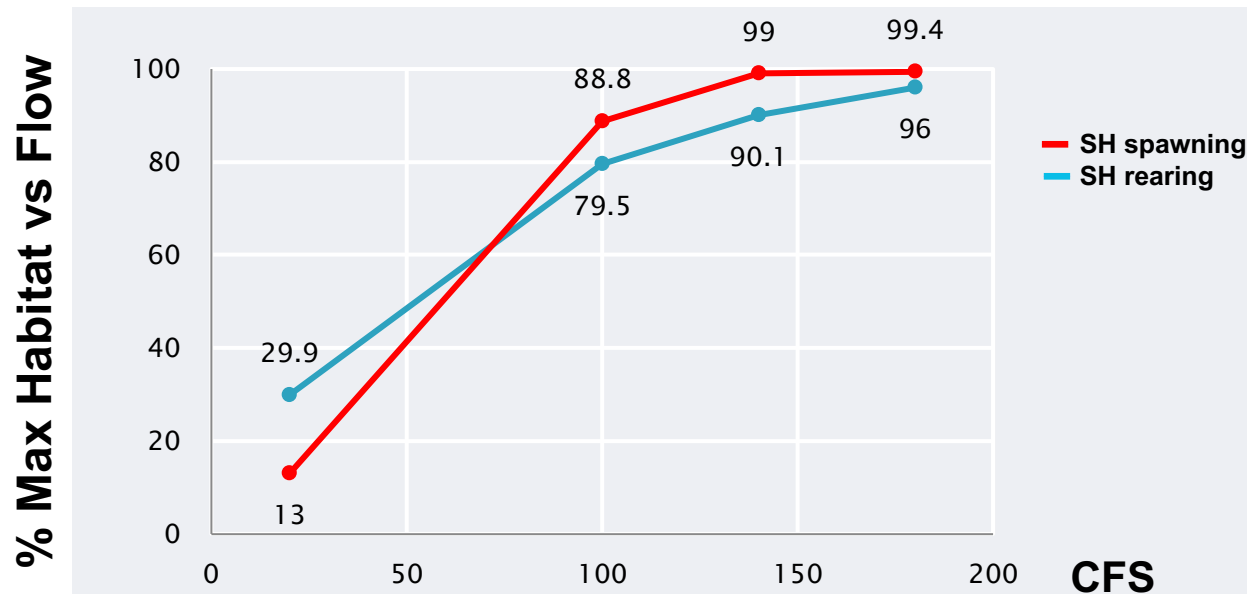
Icicle Creek Flow-Habitat Curves

Icicle Workgroup Instream Flow Committee
Leavenworth, Washington

	April 2014	by WV	FIGURE NO. 1
	PROJECT NO. 120045-007	DRAWN BY DRH	

IFC Recommendations

- **Drought Years (90% Exceedance Flows):** Under no conditions would there be less than 60 cfs in the historic channel (Reach 4) during low flow periods (summer/fall).
- **Non-Drought Years:** Under no conditions would there be less than 100 cfs in the historic channel (Reach 4). 250 cfs long-term goal for maximum habitat utilization.



Overview of Potential Projects

- **Conservation**
- **Groundwater Augmentation**
- **Reuse**
- **Pump Exchange**
- **Modification of Existing Storage**
- **New Storage**
- **Water Markets**
- **Fish Passage and Screening**
- **Habitat Improvement**
- **Tribal Fishery Enhancement**

Reliability Level of Icicle Water Supply Projects

Water supply made available by proposed projects are grouped according to the following:

- ***Guaranteed*** - water rights are permanently placed in the State Trust Program under RCW 90.42.080
- ***Firm*** - water rights that are described as “non-permanent conveyances” under RCW 90.42.040
- ***Interruptible*** - water rights that are subject to interruption during drought years

Graph Explanatory Note

The following graphs show how an integrated project list can be created.

The projects identified are generally ones currently under appraisal evaluation or proposed for funding.

Projects can be added or removed so long as Guiding Principles are all met.

PERCENT HABITAT INCREASE AND CAPITAL COST

STEELHEAD SPAWNING HABITAT IN ICICLE CREEK CHANNEL WUA, % OF MAXIMUM HABITAT

INCREMENTAL PROJECT COST INCLUDING 25% CONTINGENCY (MILLIONS)

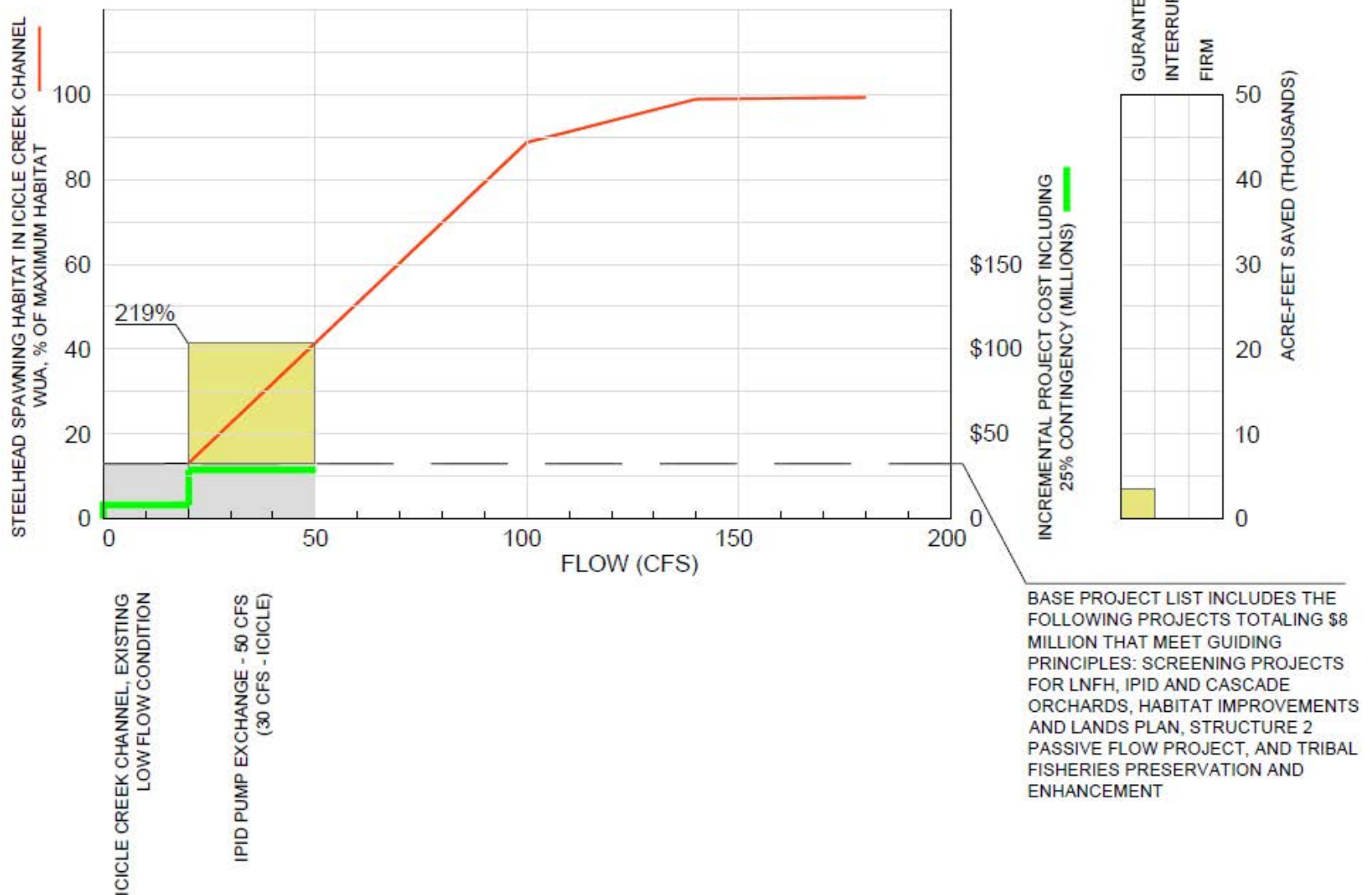
FLOW (CFS)

ICICLE CREEK CHANNEL, EXISTING LOW FLOW CONDITION

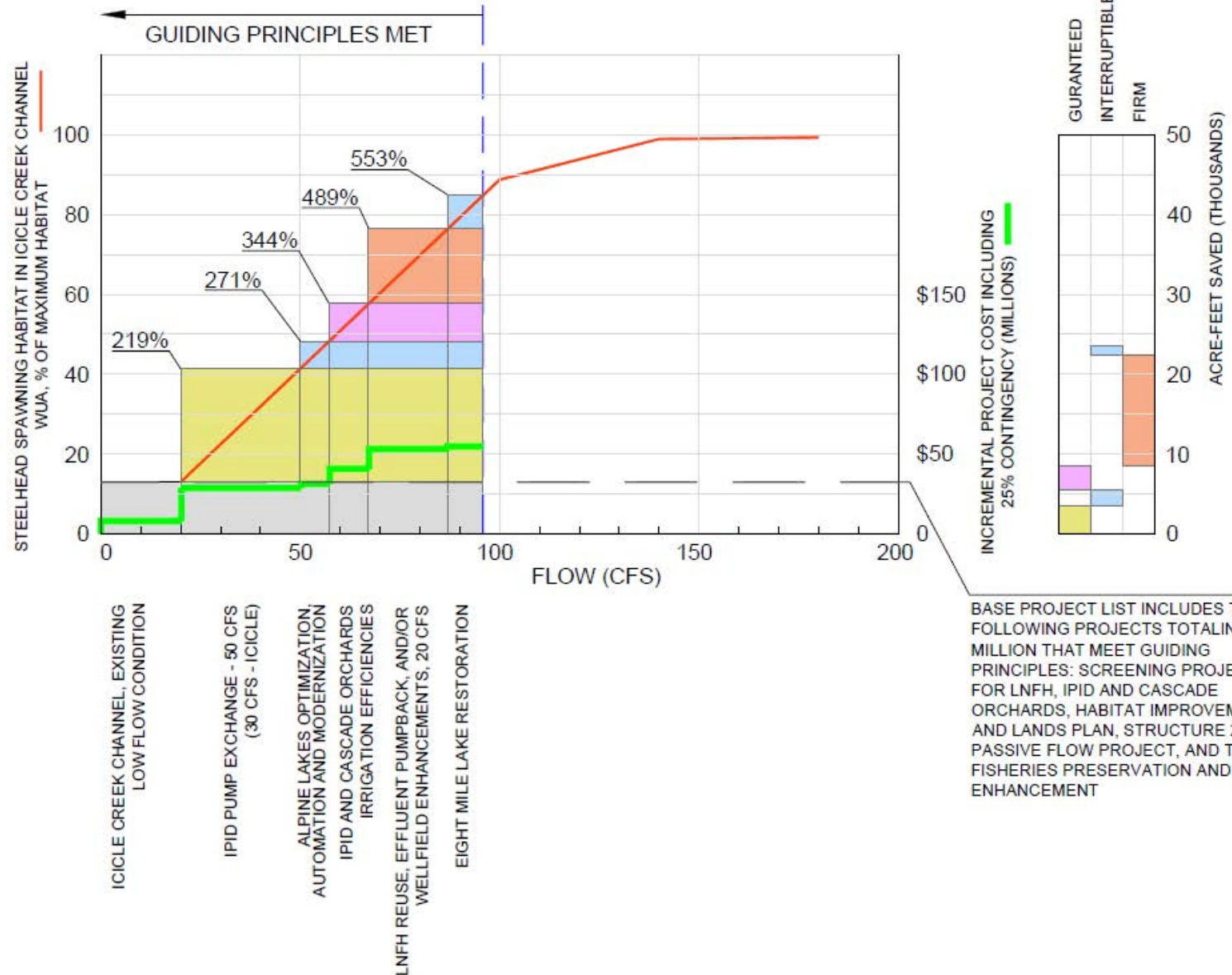
BASE PROJECT LIST INCLUDES THE FOLLOWING PROJECTS TOTALING \$8 MILLION THAT MEET GUIDING PRINCIPLES: SCREENING PROJECTS FOR LNFH, IPID AND CASCADE ORCHARDS, HABITAT IMPROVEMENTS AND LANDS PLAN, STRUCTURE 2 PASSIVE FLOW PROJECT, AND TRIBAL FISHERIES PRESERVATION AND ENHANCEMENT

Flow (CFS)	Habitat Increase (%)	Incremental Cost (\$M)
0	~12	~5
50	~40	~10
100	~88	~120
150	100	~150
200	100	~150

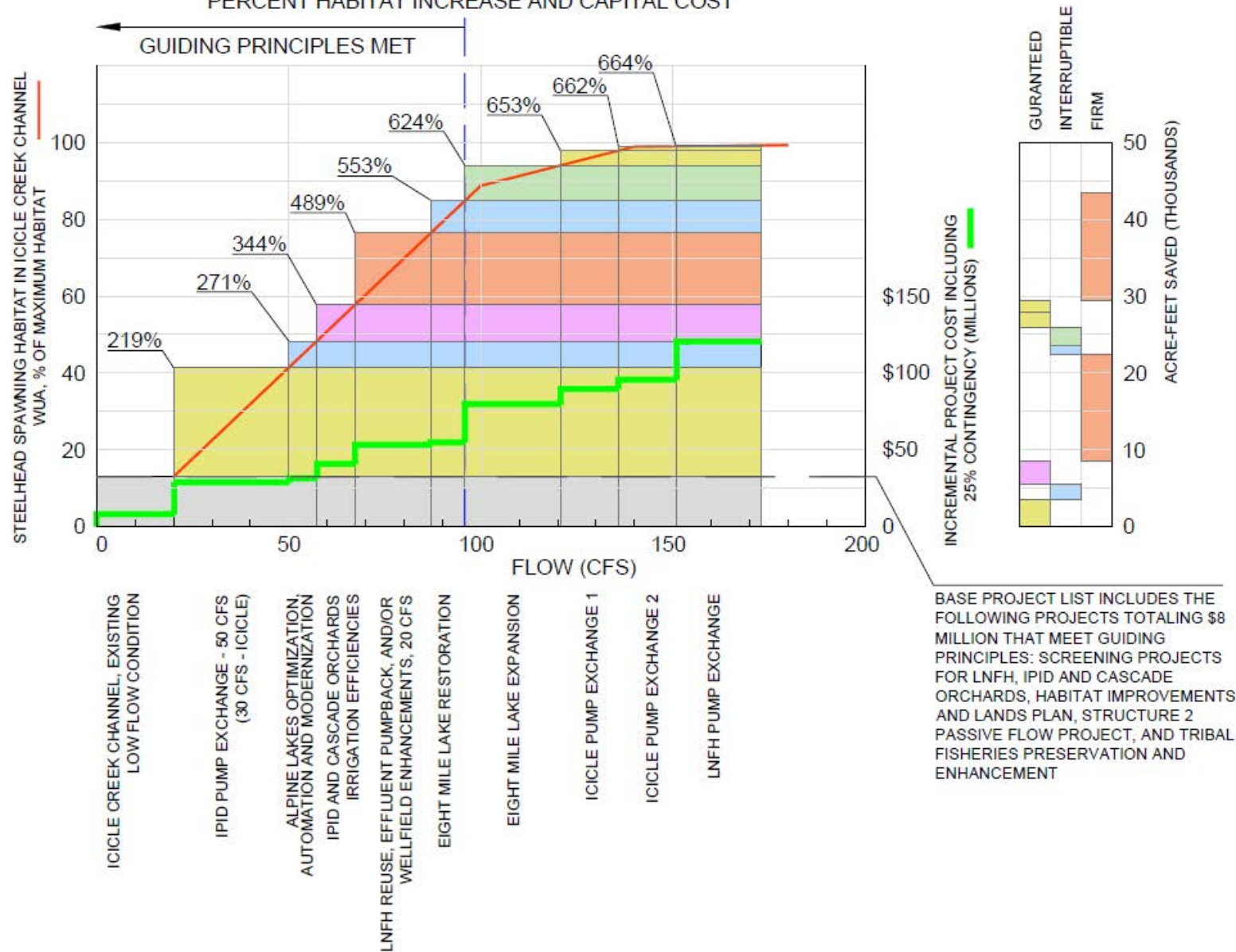
WENATCHEE 2050 INTEGRATED PROJECT LIST PERCENT HABITAT INCREASE AND CAPITAL COST



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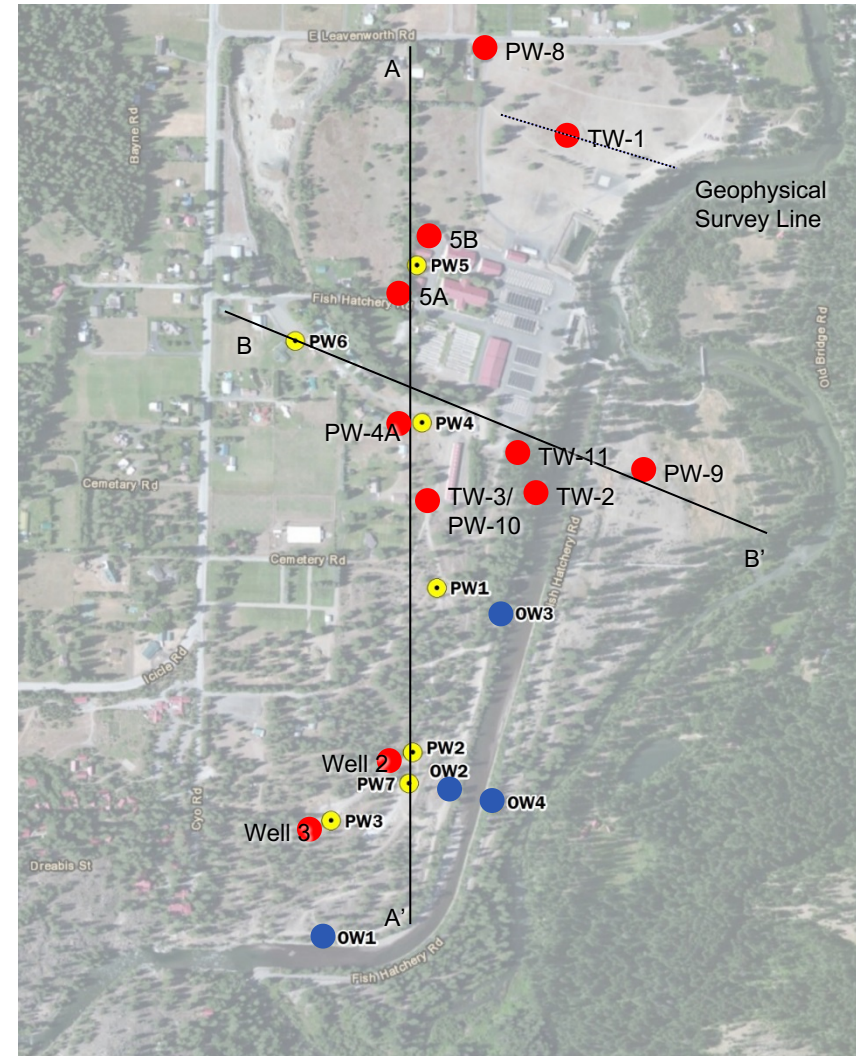
Conservation

- **Conservation Survey of IPID, COIC, and Leavenworth**
- **COIC likely best conservation opportunity for pipeline upgrades** (e.g. 5 cfs, \$1K to \$2K / ac-ft)
- **IPID pipe upgrades limited and costly** (e.g. 10 cfs, \$3K to \$6K / ac-ft)
- **Leavenworth use generally has declined per capita**
- **On-farm savings generally limited, highly efficient**
- **Guaranteed** (non-consumptive)



Groundwater Augmentation

- Expand groundwater supplies at LNFH.
- 7+ cfs
- Firm
- Geophysical testing completed 12/2014
- Proposed test well Spring 2015
- Production wells sized and installed 2015-?
- \$2-\$5M ?



Reuse

- Pilot evaluation of reuse at LNFH
- 20 cfs?
- Firm
- Reuse has been successful at other area hatcheries.
- Cost TBD



Pump Exchanges

■ IPID

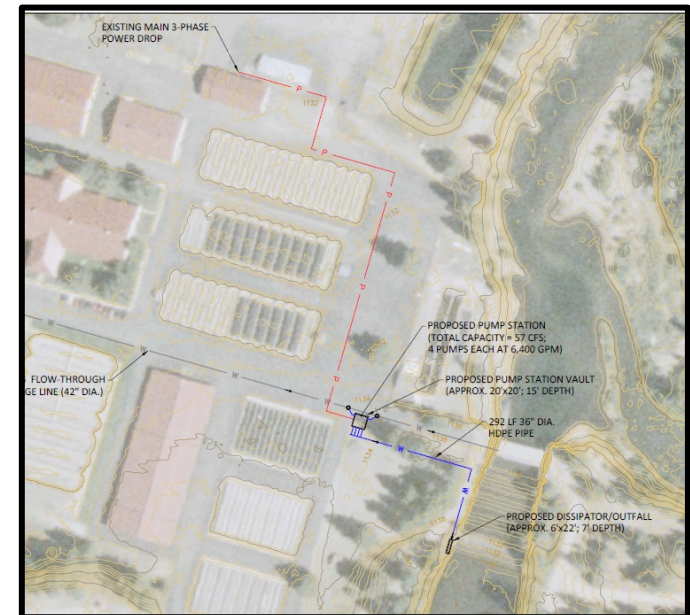
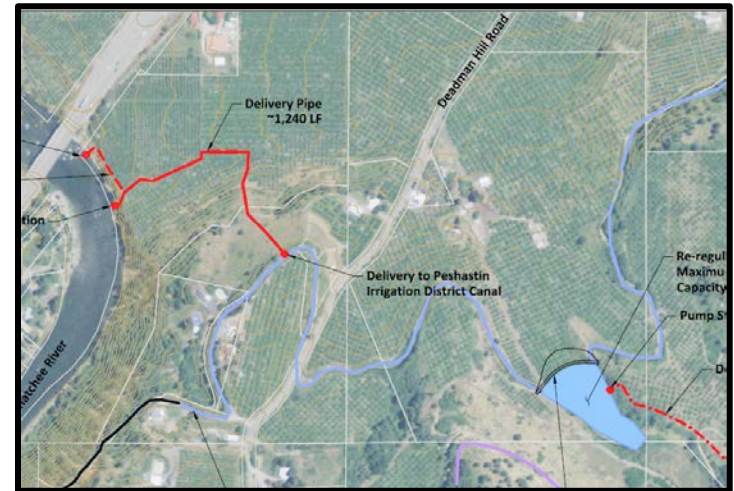
- 40 to 62 cfs, 117 cfs
- Guaranteed
- Appraisal studies complete, O&M funding required

■ LNFH

- 28-57 cfs
- Firm
- Conceptual study complete, \$700K-\$1.1M

■ COIC

- 5 cfs
- Guaranteed
- Appraisal study funding needed



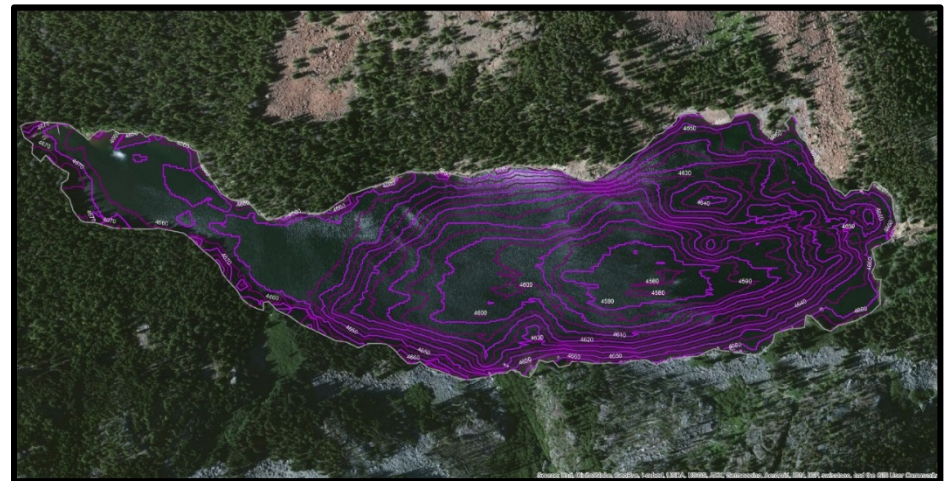
Modification of Existing Storage

■ Alpine Lakes Optimization

- Automate and re-operate Lakes
- 30-42 cfs Interruptible
- \$86K - \$3.5M
- \$16 - \$450 /ac-ft

■ Eight-Mile Lake Restoration

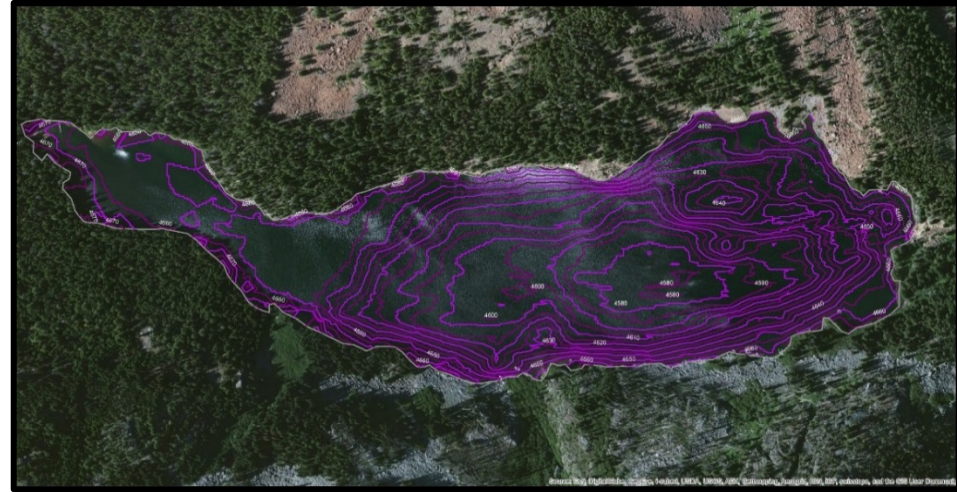
- Restore up to 1125 ac-ft (2500 ac-ft total)
- 5-10 cfs Guaranteed
- Dam repair and/or siphon
- \$1.5 - \$1.7M
- \$1400 - \$2400 / ac-ft



New Storage

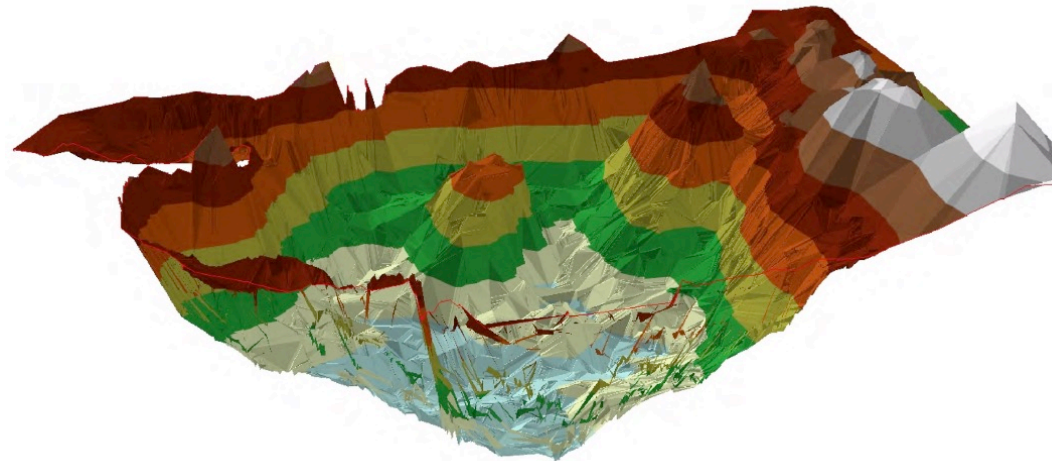
■ Eight-Mile

- 1 ft pool raise and/or siphon
- 1,000 ac-ft expansion
- \$3.7M
- \$1700 / ac-ft
- 11.6 cfs



■ Klonaquia

- Construct outlet tunnel
- 10-50 ft drawdown
- 600-2500 ac-ft
- 5-20 cfs



Water Markets

- Facilitate transactions between sellers and buyers
- Likely shift agricultural use to municipal or instream flow
- Season of use challenges exist
- 500 ac-ft produces about 3 cfs for 90 days
- Valuations in the range of \$1,000 - \$2,000
- Purchase cost on the order of \$500K to \$1M
- Additional transaction and formation costs

Supply

Sellers: Water right holders

Projects:
Retime
available water



Banking Functions

- Certifies validity of water rights
- Business rules for bank
- Establishes pricing
- Marketing
- Regulatory interaction



Demand

Buyers:

- Mitigation for new uses
- Reliability for existing uses

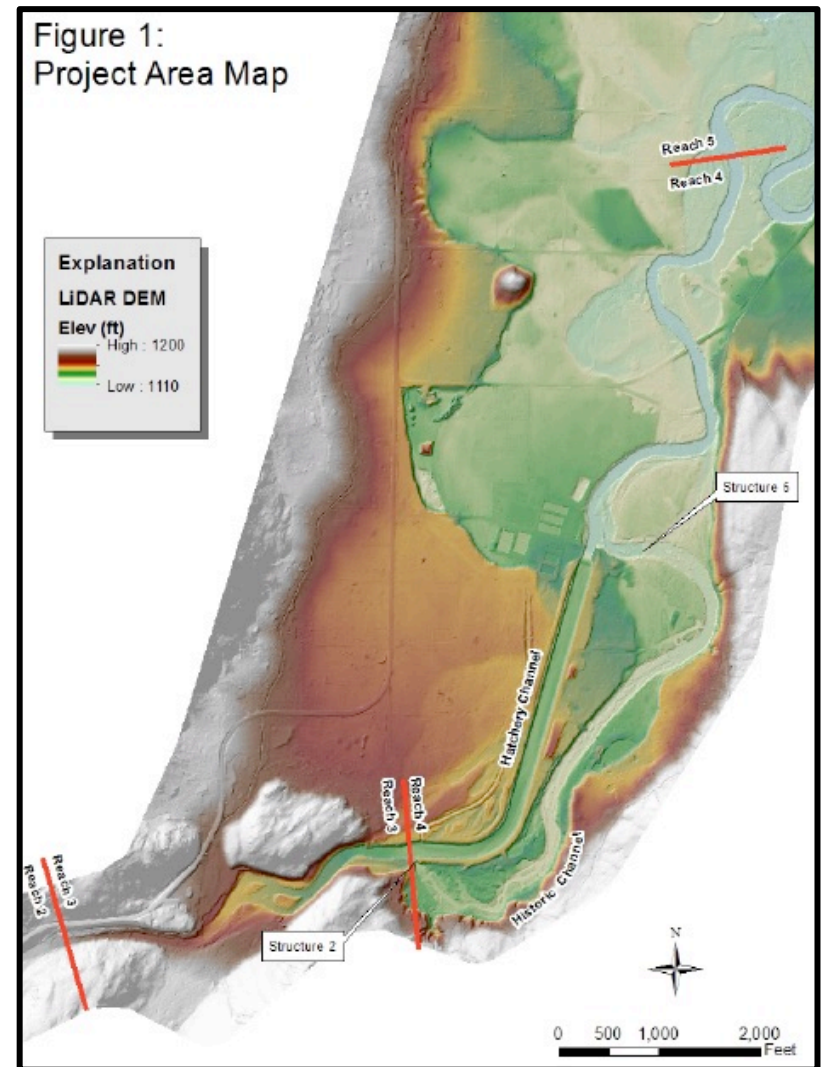
Fish Passage & Screening

- LNFH Structure 2 modifications
- LNFH Structure 5 modifications
- LNFH / COIC Intake and Fish Screen
- IPID Fish Screen
- WDFW Fish Screen and Diversion Inventory



Habitat Improvement

- **IWG Recommendation: no additional high flow through historic channel**
- **Additional high flow habitat improvements in other reaches**
- **Targeted habitat improvements in Icicle Creek pending IFC input and project development**



Tribal Fishery Enhancement

- **Tribal Impacts and Enhancement Study**
 - **Protection measures for existing historic location**
 - **Additional locations or access acquired?**
 - **Different fishing methods permitted?**
 - **Location amenities enhanced?**
 - **Adaptive management and monitoring as projects implemented?**



Related Projects

- **Mission Creek flow restoration**
- **Wenatchee Community Lands Plan**
- **Voluntary Stewardship Program**

Next Steps

- **Initiate SEPA/NEPA Scoping to Increase Transparency**
- **Begin feasibility studies on consensus early action items (e.g. LNFH Groundwater Augmentation)**
- **Establish metrics for remaining Guiding Principles**
- **Identify Data Gaps and Begin Studies**
- **Establish final Integrated Project List that Accomplishes Guiding Principles**