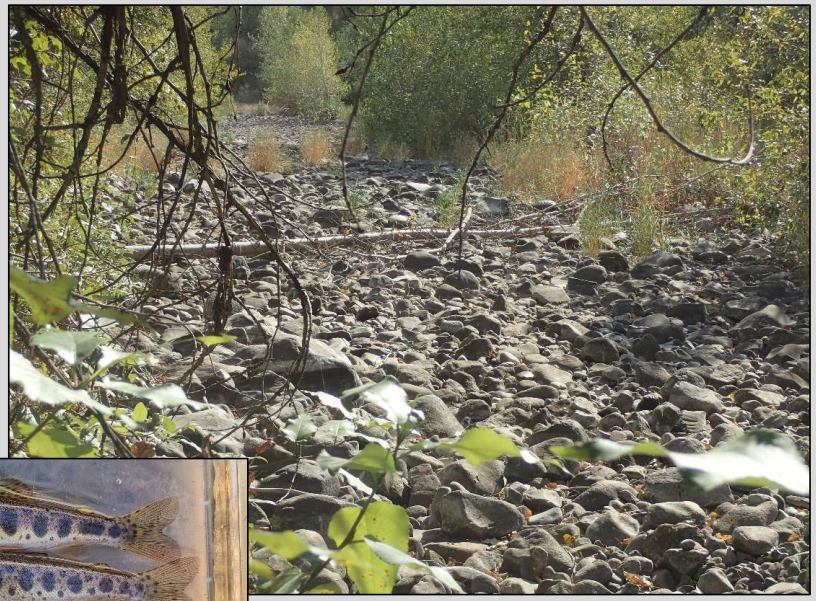
Innovative Approach to Addressing Low Summer Base Flows to Improve Juvenile Steelhead Habitat in the Potlatch River, ID



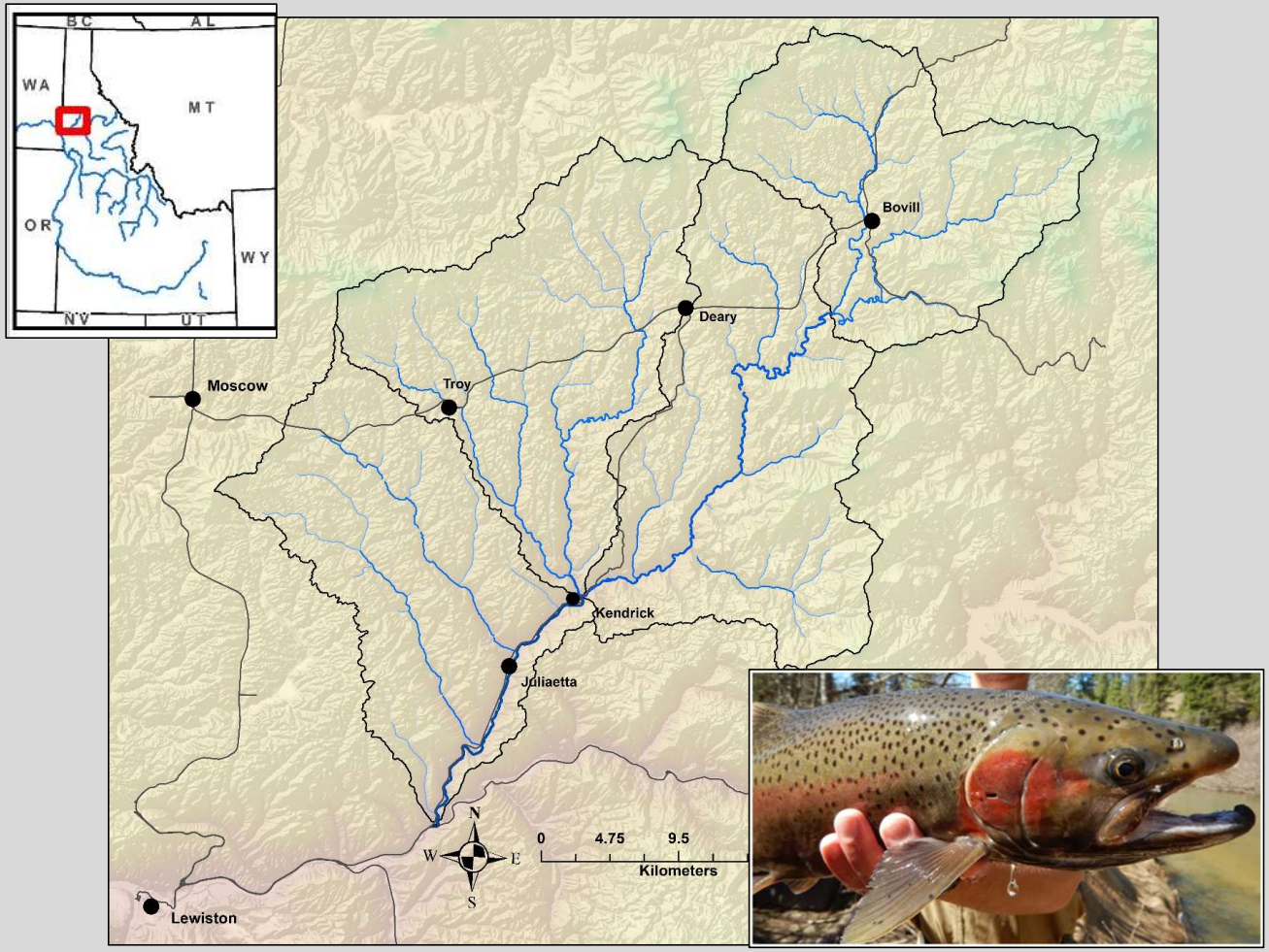
2025 Pacific Coast Steelhead Management Meeting

December 9th

Brian Knoth and Robert Hand

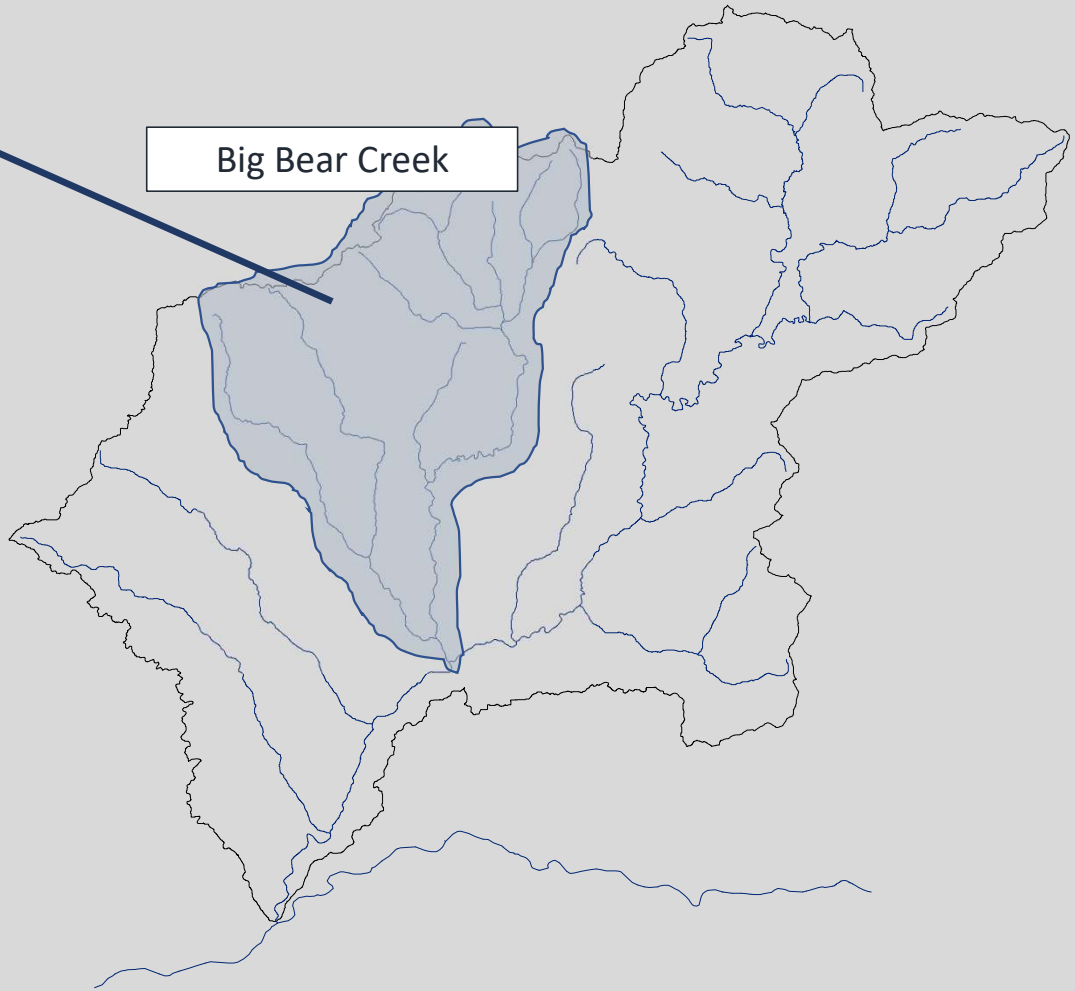
IDAHO FISH & GAME

Potlatch River, North-Central Idaho



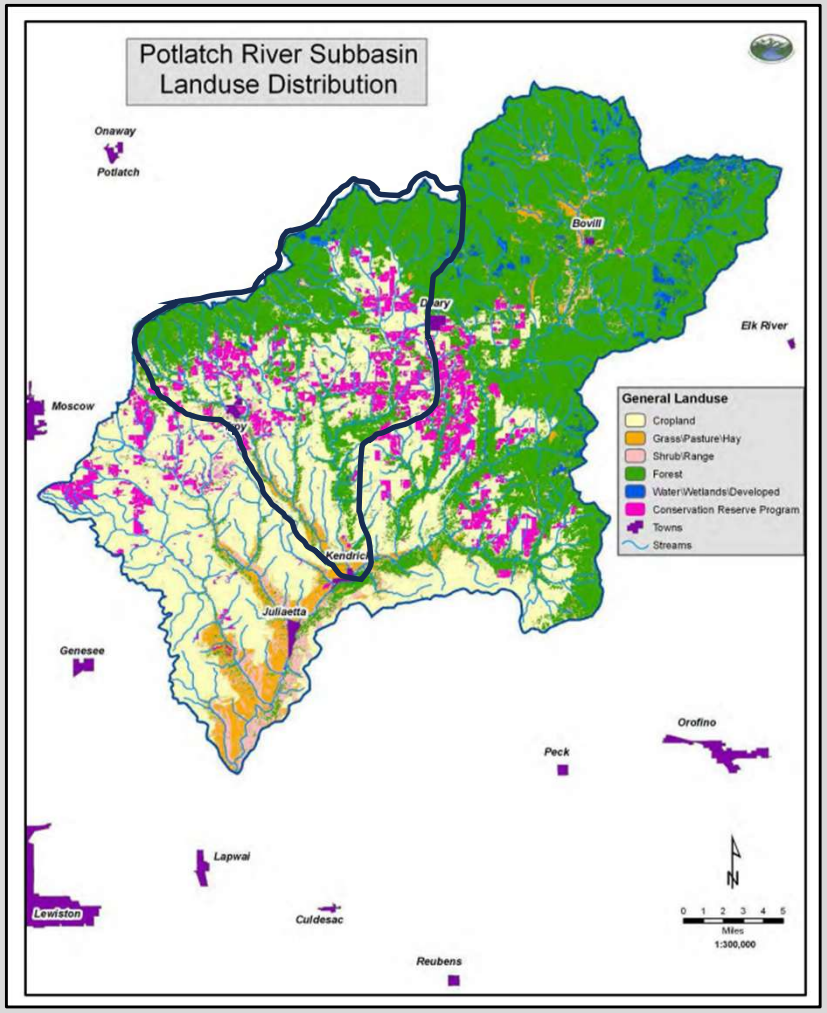
- Largest spawning area for wild steelhead in the lower Clearwater River
- Managed as a wild steelhead refuge area
- Long-term habitat restoration and steelhead monitoring program
- Critical to recovery efforts of ESA listed Clearwater River steelhead

Index Watershed- Big Bear Creek



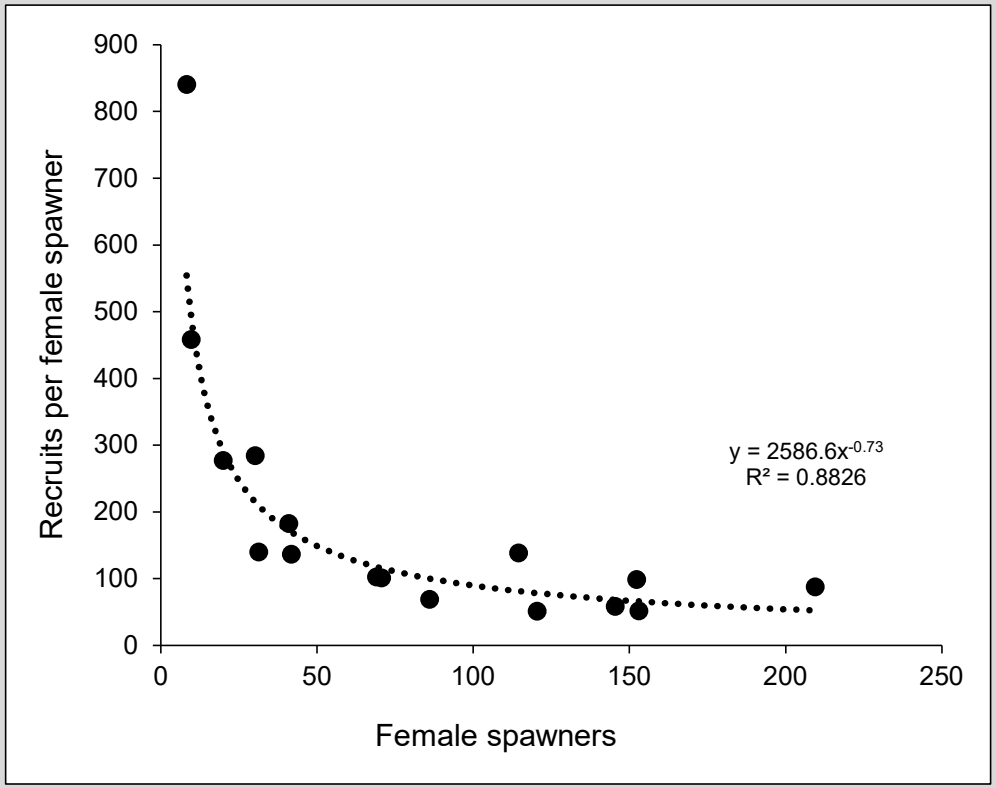
- Largest sub-watershed of Potlatch River
- Characterized by steep basaltic canyons rimmed by rolling cropland
- Supports highest densities of juvenile steelhead in Potlatch River

Big Bear Creek- Land-use Practices



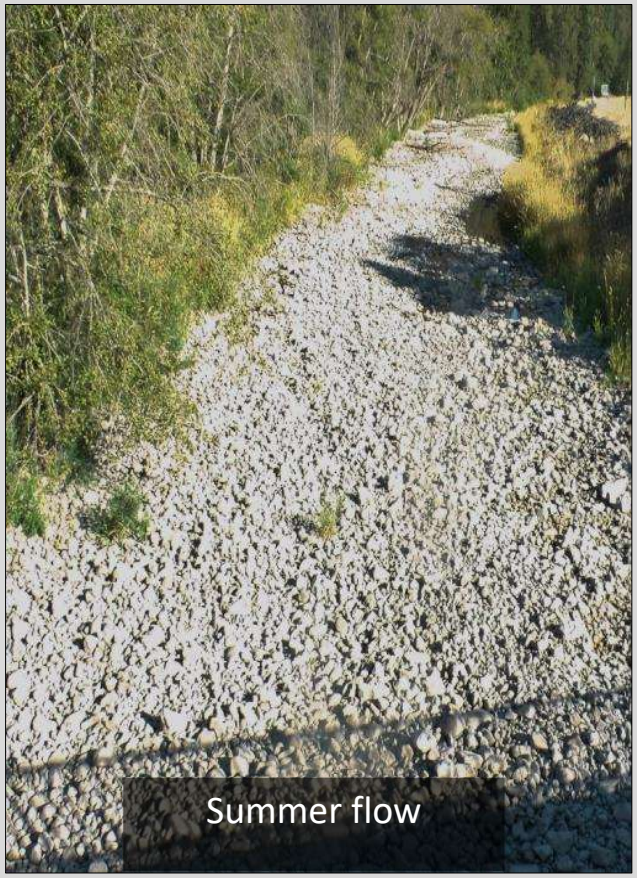
- 85% of watershed privately owned
- Predominantly large-scale commercial agriculture
  - Dry land farming
  - Drain tiles prevalent

Big Bear Creek- Steelhead



- Productivity is strongly density dependent
- Habitat capacity is limited
- Restoration strategies focused on expanding amount of juvenile rearing habitat

Altered Flow Regime



- Land-use practices have altered hydrograph
- Extremely flashy
- Peak spring flows becoming more powerful
- Summer base flows problematic

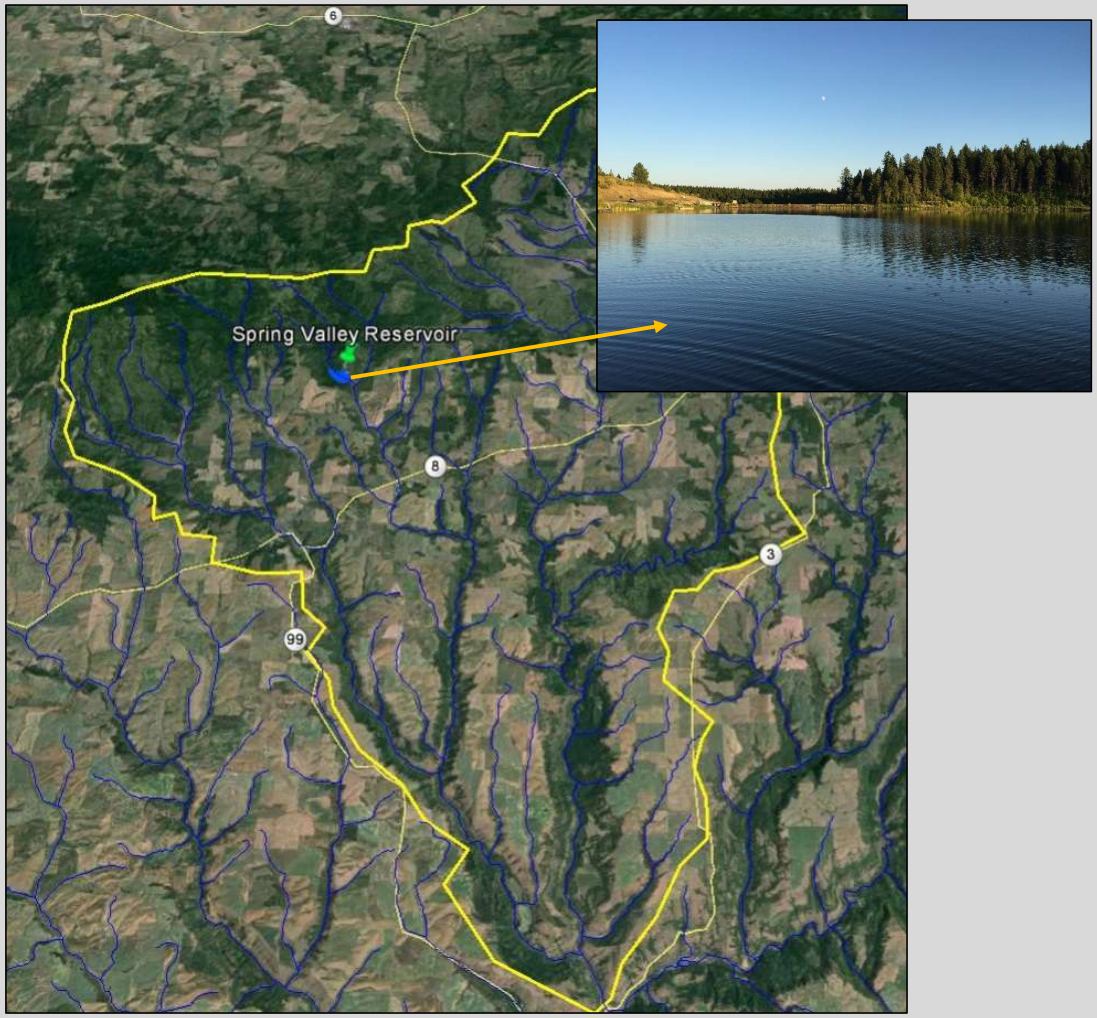
Low Summer Base Flows

- Miles of stream go dry or intermittent
- Fish stranded in isolated pools
  - Increased competition
  - Fish kills common
- Primary factor restricting juvenile steelhead rearing habitat

Flow Supplementation

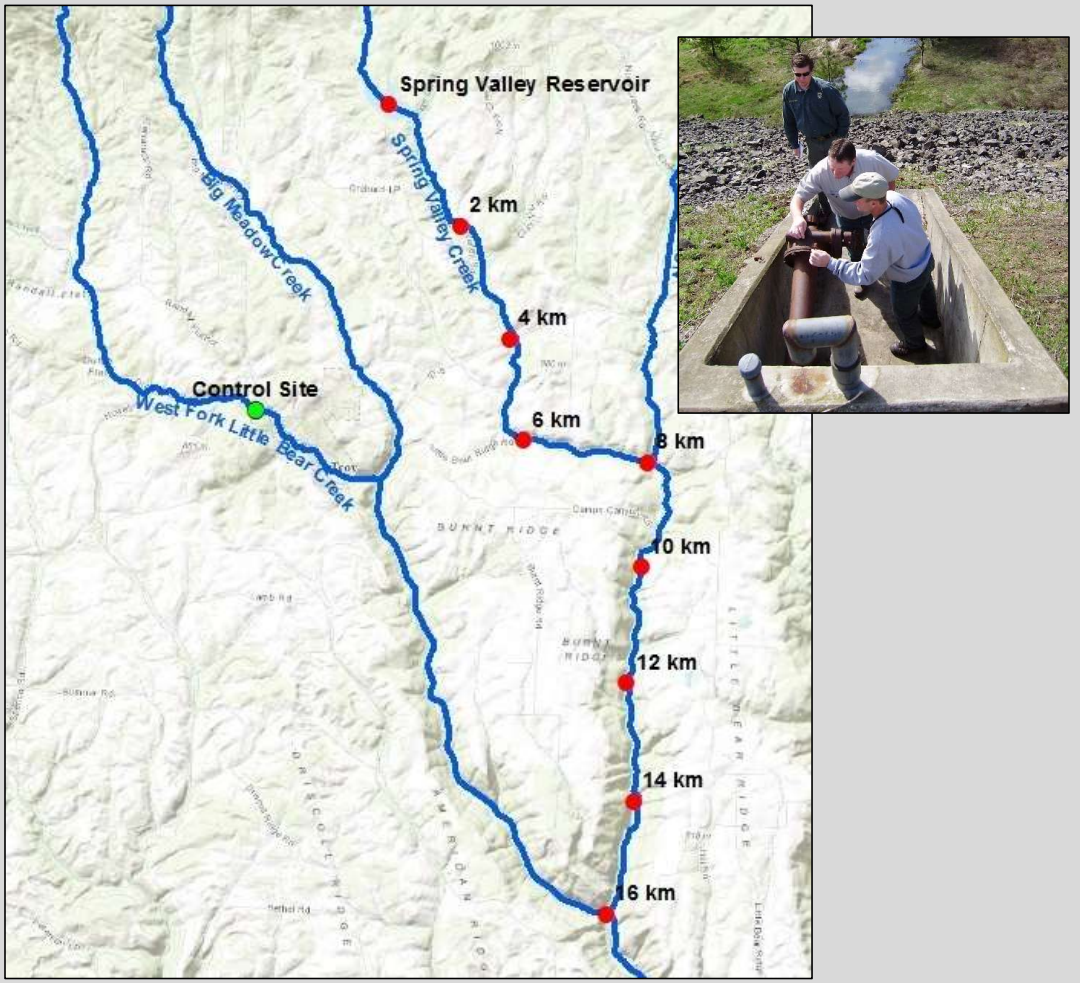
- Restoration Strategy:
  - Supplement summer stream flow through water releases from a headwater reservoir

- Expected Response:
  - Increase the quantity and improve the quality of juvenile rearing habitat
  - Increase juvenile steelhead growth and survival (initial); improve juvenile steelhead production (long-term)



Pilot Studies- 2015 & 2016

- Conducted pilot studies to examine feasibility of approach at SVR
- Different water release strategies in each year
- Examine impacts to both the reservoir and downstream habitat
- Monitored streamflow, wetted habitat, pool density, water temperature, and dissolved oxygen



Release Strategies

2015

- Releases occurred from August 3 – October 21 (79 days)
- Mean water release rate: 0.64 cfs
- Estimated 108 acre feet of water released from reservoir
- Reduced volume of cold water in reservoir by approximately 82%*

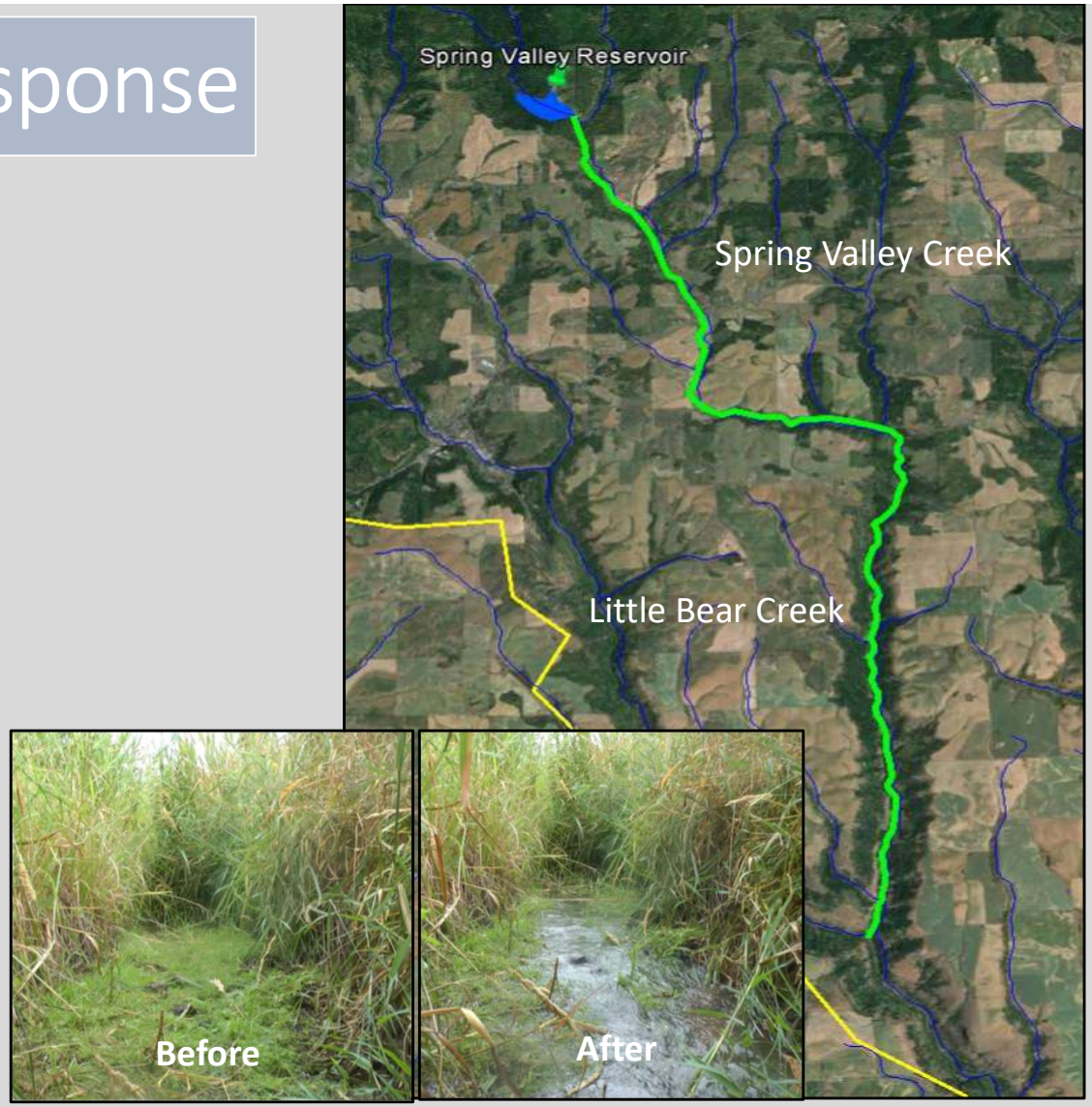
2016

- Releases occurred from June 6 – October 10 (126 days)
- Mean water release rate: 0.42 cfs
- Estimated 112 acre feet of water released from reservoir
- Reduced volume of cold water in reservoir by approximately 85%*

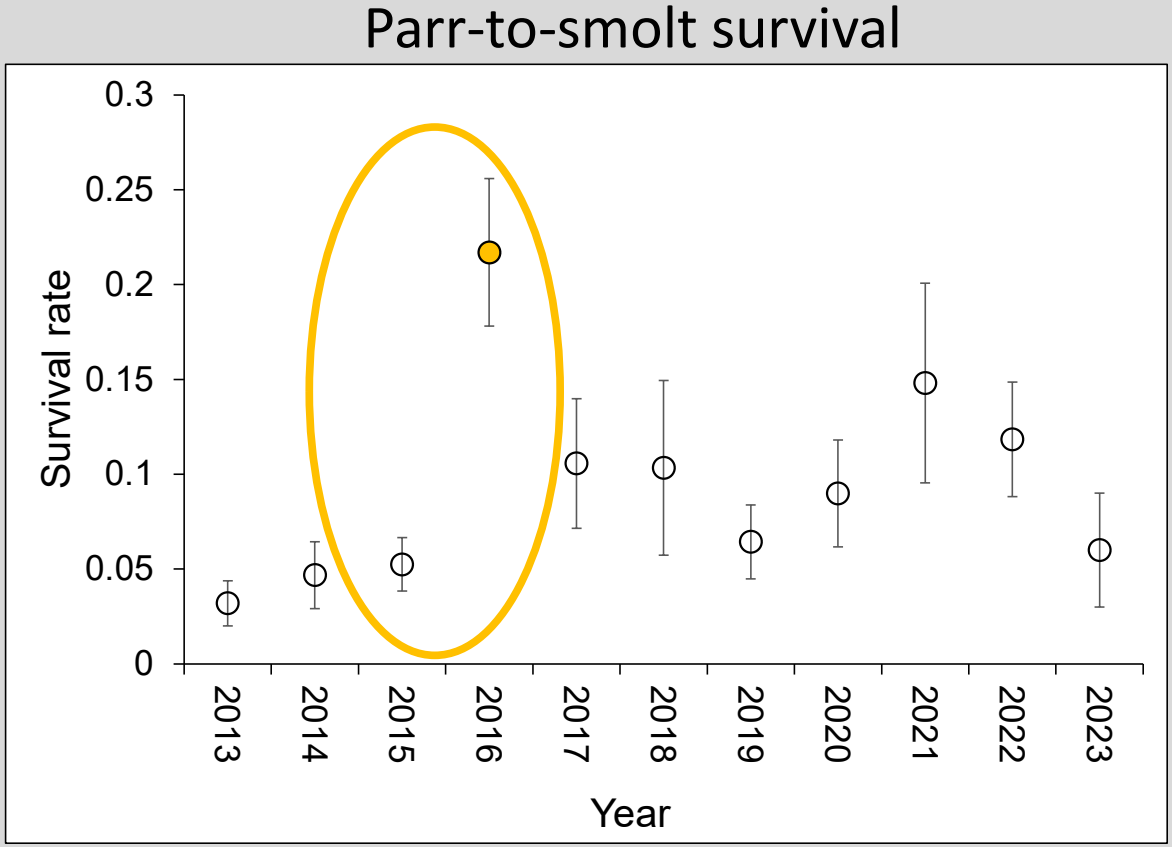



Downstream Habitat Response

- Re-watered an additional 8-10 km of habitat (2015)
- Maintained perennial flow in > 18 km
- Increased pool density relative to control sites
- Reduced downstream water temperatures
  - ~ 5°C cooler in treatment reach (2016)
- Increased downstream dissolved oxygen levels
  - DO levels ≥ 6.0 mg/L in treatment reach (2016)



Steelhead Response



10 Years Later…. What have we been doing?

- Problem: The capacity of Spring Valley Reservoir is limited
  - There is a risk of removing the entire volume of cold-water during dry/drought years

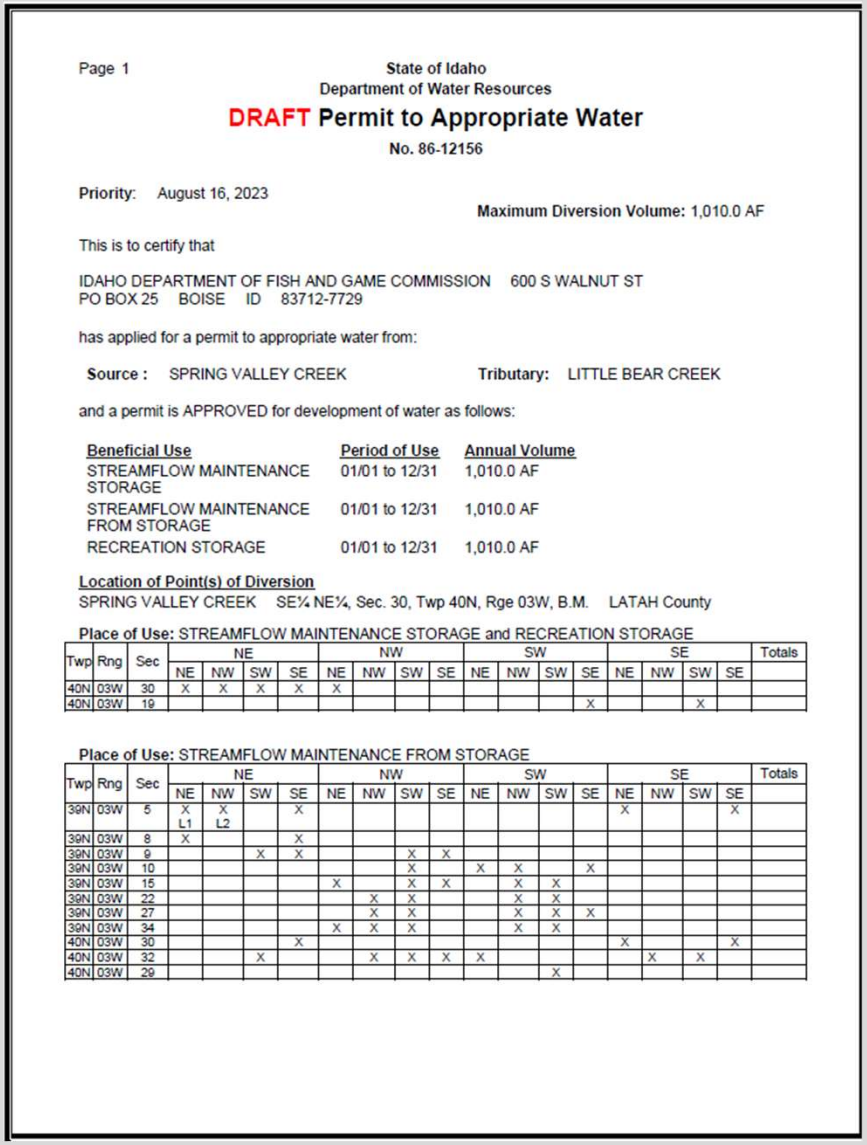
- Solution: Increase capacity of the reservoir by raising dam height
  - Maintain recreational use of the reservoir while ensuring adequate cold-water volume to conduct water releases

Project Design

- In 2022, IDFG received funding for 100% design plans
- 40” increase in dam height
- Increase cold-water volume to ~132-200 acre-ft
  - Utilize only cold hypolimnetic water for releases

How to Protect the Water?

- Funders wanted certainty about protecting water from withdrawal
- In 2024, IDFG secured a new water right for Spring Valley Reservoir
  - Additional storage capacity
  - Streamflow maintenance permit that protects water releases from withdrawal for over 18 km downstream



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State of Idaho
Department of Water Resources

DRAFT Permit to Appropriate Water

No. 86-12156

Priority: August 16, 2023

Maximum Diversion Volume: 1,010.0 AF

This is to certify that

IDAHO DEPARTMENT OF FISH AND GAME COMMISSION 600 S WALNUT ST
PO BOX 25 BOISE ID 83712-7729

has applied for a permit to appropriate water from:

Source : SPRING VALLEY CREEK **Tributary:** LITTLE BEAR CREEK

and a permit is APPROVED for development of water as follows:

Beneficial Use	Period of Use	Annual Volume
STREAMFLOW MAINTENANCE STORAGE	01/01 to 12/31	1,010.0 AF
STREAMFLOW MAINTENANCE FROM STORAGE	01/01 to 12/31	1,010.0 AF
RECREATION STORAGE	01/01 to 12/31	1,010.0 AF

Location of Point(s) of Diversion

SPRING VALLEY CREEK SE¼ NE¼, Sec. 30, Twp 40N, Rge 03W, B.M. LATAH County

Place of Use: STREAMFLOW MAINTENANCE STORAGE and RECREATION STORAGE

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
40N	03W	30	X	X	X	X	X												
40N	03W	19												X			X		

Place of Use: STREAMFLOW MAINTENANCE FROM STORAGE

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
39N	03W	5	X L1	X L2		X									X			X	
39N	03W	8	X			X													
39N	03W	9			X	X			X	X									
39N	03W	10							X		X	X		X					
39N	03W	15					X		X	X		X	X						
39N	03W	22						X	X			X	X						
39N	03W	27						X	X			X	X	X					
39N	03W	34					X	X	X			X	X						
40N	03W	30				X									X			X	
40N	03W	32			X			X	X	X	X					X	X		
40N	03W	29											X						

Conclusions and Next Steps

- Low summer base flows are the major factor limiting steelhead production in the Potlatch River
- Flow supplementation pilot studies demonstrated feasibility of this approach
  - Water releases provided immediate benefits to juvenile steelhead habitat
- Reservoir modifications are needed to make this a permanent solution
- Challenges to implement such a project
  - Perception issues, water protection, and funding
- Estimated cost range: $4-5 million
  - Cost/km: ($212,000 - $277,000)
  - Comparable to instream habitat treatment projects
- Anticipate presenting 100% designs to funding partners in 2026

Questions?

Private Landowners

Decreasing Summer Flows