

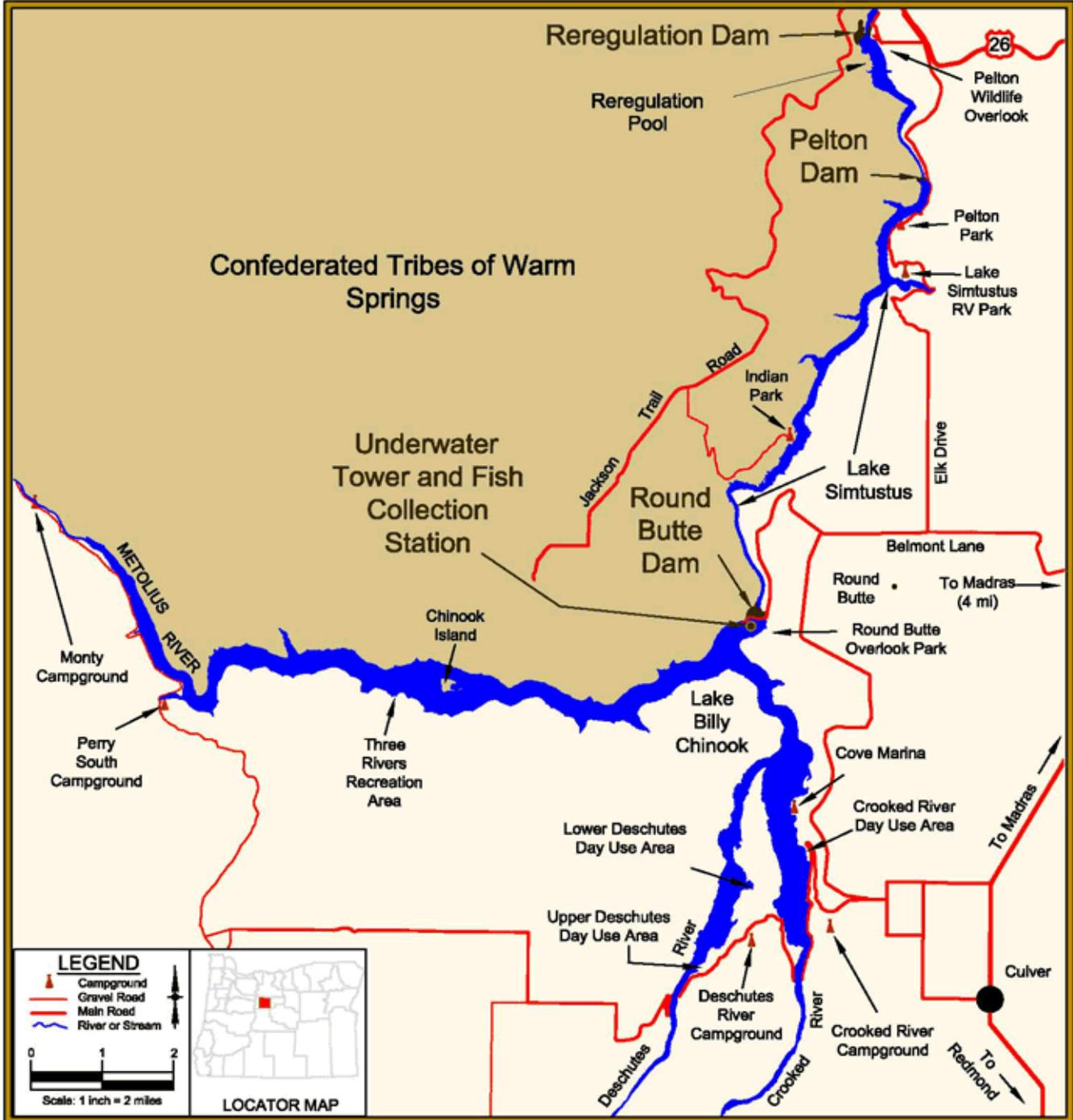
Utilizing Round Butte Hatchery in the Reintroduction of Anadromous Fish in the Deschutes River

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LEGEND

- Campground
- Gravel Road
- Main Road
- River or Stream

Scale: 1 inch = 2 miles

LOCATOR MAP

PELTON ROUND BUTTE

Project Facilities

- ✦ FERC Project 2030
- ✦ Modified Run of the River
 - ✦ 2 Dams Peaking, 1 Reregulating
- ✦ 3500- 4500 cfs Average Flow
- ✦ Dam Heights: 440, 204, 88 feet
- ✦ 427 Megawatts Capacity

Round Butte



Pelton



Re-regulating



Brief History

- 1957-1964 - Pelton Round Butte Complex constructed
 - Upstream and Downstream facilities were part of original construction
 - Including the Pelton Adult Fish Trap
- 1968 - Passage terminated
- 1973 - Round Butte Hatchery constructed
- 1997 - Relicensing process started
- 2004 - Settlement Agreement completed
 - with full complement of Protection, Mitigation, and Enhancement Measures
- 2005 - FERC license issued on June, 21
- 2007 - Reintroduction program began with steelhead fry releases followed by Chinook fry releases in 2008
- 2009 - Selective Water Withdrawal operational December
- 2011 - First adults returned from fry/smolt releases
- 2012 – First Adults Passed Above Project

Lake Billy Chinook



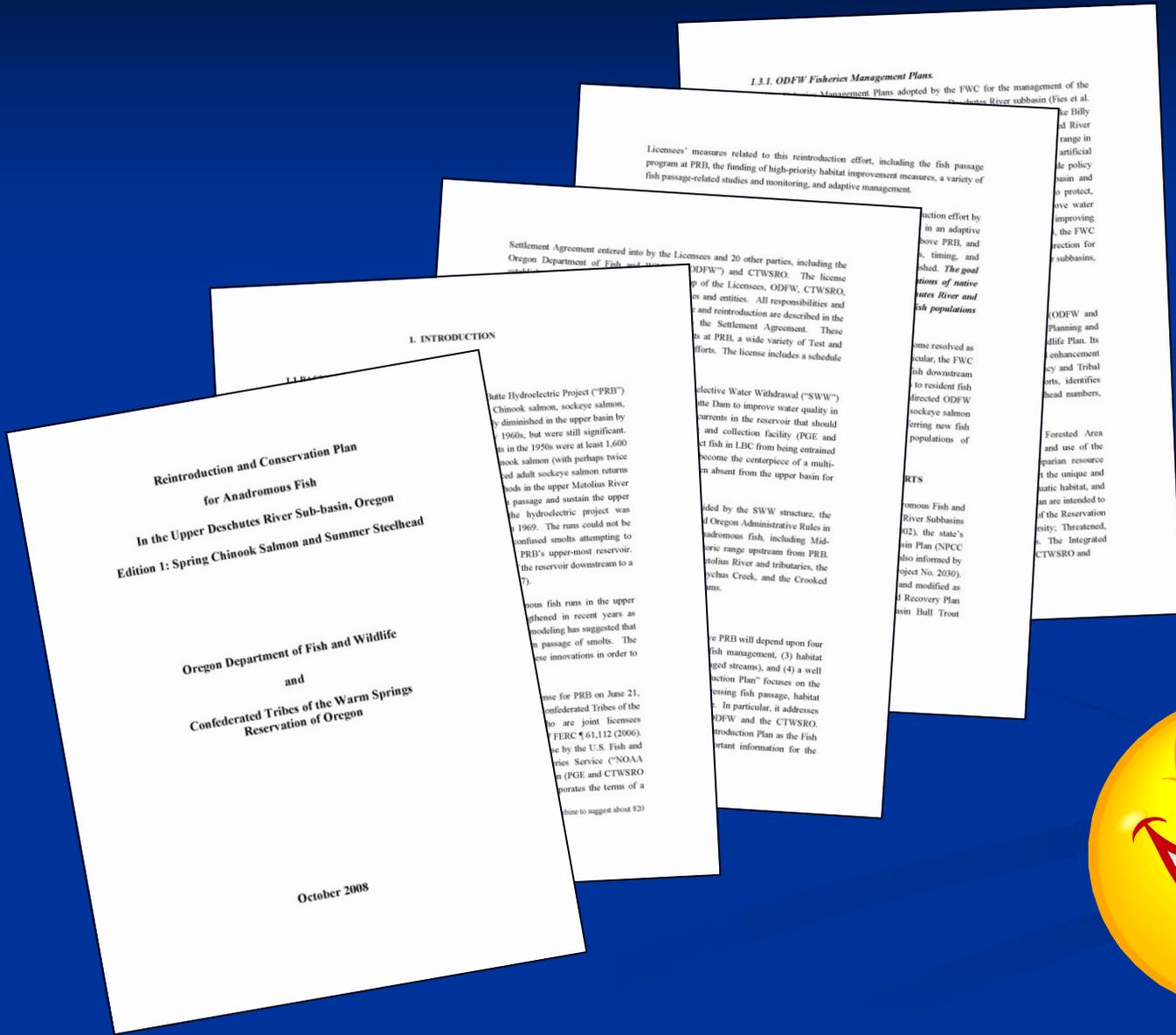
Selective Water Withdrawal / Fish Collection Facility Google earth

Imagery Date: 6/17/2011

44°38'08.25" N 121°16'49.71" W elev 1951 ft

Eye alt 2473 ft

Reintroduction Plan



Reintroduction and Conservation Plan for Anadromous Fish in the Upper Deschutes River Sub-basin, Oregon Edition 1: Spring Chinook Salmon and Summer Steelhead

Oregon Department of Fish and Wildlife
and
Confederated Tribes of the Warm Springs
Reservation of Oregon

October 2008

I. INTRODUCTION

Battle Hydroelectric Project ("PRB") Chinook salmon, sockeye salmon, diminished in the upper basin by 1960s, but were still significant. In the 1950s were at least 1,600 brook salmon (with perhaps twice as many sockeye salmon returns) in the upper Matolius River to passage and sustain the upper hydroelectric project was in 1969. The runs could not be sustained smolts attempting to PRB's upper-most reservoir, the reservoir downstream to a 7).

ous fish runs in the upper thinned in recent years as modeling has suggested that in passage of smolts. The these innovations in order to

use for PRB on June 21, Confederated Tribes of the so are joint licenses FERC # 6,112 (2006). by the U.S. Fish and Service ("NOAA in (PGE and CTWSRO orates the terms of a hine to suggest about \$20

Licensees' measures related to this reintroduction effort, including the fish passage program at PRB, the funding of high-priority habitat improvement measures, a variety of fish passage-related studies and monitoring, and adaptive management.

Settlement Agreement entered into by the Licensees and 20 other parties, including the Oregon Department of Fish and Wildlife ("ODFW") and CTWSRO. The license of the Licensees, ODFW, CTWSRO, and entities. All responsibilities and and reintroduction are described in the Settlement Agreement. These is at PRB, a wide variety of Test and Efforts. The license includes a schedule

selective Water Withdrawal ("SWW") Gate Dam to improve water quality in currents in the reservoir that should and collection facility (PGE) and at fish in LBC from being entrained become the centerpiece of a multi- in absent from the upper basin for

ided by the SWW structure, the Oregon Administrative Rules in anadromous fish, including Migratory range upstream from PRB, Matolius River and tributaries, the velus Creek, and the Crooked ems.

PRB will depend upon four fish management, (3) habitat aged streams), and (4) a well function Plan" focuses on the existing fish passage, habitat In particular, it addresses ODFW and the CTWSRO, Reintroduction Plan as the Fish stant information for the

1.1.1. ODFW Fisheries Management Plans.

Management Plans adopted by the FWC for the management of the Deschutes River subbasin (Fies et al.

action effort by in an adaptive above PRB, and s, timing, and shed. The goal tions of native es River and sh populations

oms resolved as ular, the FWC fish downstream to resident fish directed ODFW sockeye salmon ffering new fish populations of

RTS

omous Fish and River Subbasins 02), the state's ain Plan (NPCC also informed by rject No. 2030). and modified as Recovery Plan ain Bull Trout

the Billy Ad River range in artificial la policy basin and o protest, ve water improving the FWC rection for subbasins,

ODFW and Planning and life Plan. Its enhancement ey and Tribal orts, identifies head numbers.

Forested Area and use of the sparian resource t the unique and atic habitat, and an are intended to of the Reservation sity, Threatened, s. The Integrated CTWSRO and



Fish Passage Plan / Reintroduction Plan

Goals and Objectives

- Establish self sustaining, harvestable populations of steelhead, spring chinook, and sockeye in the Deschutes River Basin to fully utilize the available habitat and production capability
- Provide access to habitat to support a self sustaining fishery
- Support the contribution of salmon, steelhead, and other native species to a healthy ecosystem
- Provide access to and through Project waters for Pacific lamprey, summer/fall chinook, rainbow trout, bull trout and other native fish species
- To contribute to recovery efforts for Middle Columbia steelhead

Fisheries Management Direction

- The upper Deschutes River subbasin will be managed for naturally produced spring chinook salmon, summer steelhead, and sockeye salmon.
- Hatchery fish will be released until spawner escapement goals are met. It is desirable to eliminate supplementation as early as possible.
- Preliminary escapement goals are to achieve 500 adults in three consecutive years for summer steelhead and spring chinook salmon.
- Preliminary escapement goals are to achieve 1000 adults in three consecutive years for sockeye salmon.



Stock Selection

Spring Chinook

-  Warm Springs wild (if available)
-  Warm Springs hatchery (if available)
-  F-1 Generation with parental origins identified above
-  **RBH crosses with fish having one of the parental origins given above**
-  Round Butte Hatchery (This is where we are starting)



Summer Steelhead

-  Wild steelhead from the East and West Side Tributaries
-  F-1 Generation hatchery summer steelhead with wild parental origin
-  **RBH crosses with parental origins identified above**
-  Round Butte Hatchery (This is where we are starting)



The Adults

Initial estimates of the potential broodstock needs for the reintroduction of summer steelhead

Subbasin	Potential need for broodstock (number of females)	
	Phase 1	Phase 2
---	20-25 wild ¹	20 - 50 wild ¹
Upper Deschutes	78	26 - 162
Metolius	---	---
Crooked	37	56 - 384
Totals	<i>119</i>	<i>86 - 550</i>



Initial estimates of the potential broodstock needs for the reintroduction of spring Chinook salmon

Subbasin	Potential need for broodstock (number of females)	
	Phase 1	Phase 2
Upper Deschutes	22	17 - 49
Metolius	126	78 - 233
Crooked	1-47	0 - 49
Totals	<i>149-195</i>	<i>95 - 331</i>





Spring Chinook

Phase of reintroduction	Stream area	Fry		Smolts	
		Brood	Number	Brood	Number
Phase 1	Metolius R. system	H	277,000 ^a	H	5,000
	Deschutes R.	H	500 ^b	H	0
	Whychus Cr.	H	47,000 ^a	H	5,000
	Crooked R.	H	500-105,000 ^b	H	7,500
	<i>All</i>	<i>H</i>	<i>325,000-430,000</i>	<i>H</i>	<i>17,500</i>
Phase 2	Metolius R. system	H, M, W	173,000-519,000 ^c	---	0
	Deschutes R.	H, W	0 ^d	---	0
	Whychus Cr.	H, M, W	37,000-110,000 ^c	---	0
	Crooked R.	H	0-109,000 ^d	---	0
	<i>All</i>	<i>H, M, W</i>	<i>210,000-738,000</i>	---	<i>0</i>



Summer Steelhead

Phase of reintroduction	Stream area	Fry		Smolts	
		Brood	Number	Brood	Number
Phase 1	Deschutes R.	---	0 ^a	---	0 ^a
	Whychus Cr.	H	286,000 ^b	H	5,000 ^b
	Crooked R. system	H	288,000 – 708,000	H	7,500 ^c
	All	<i>H</i>	<i>574,000 – 994,000</i>	<i>H</i>	<i>12,500</i>
Phase 2	Deschutes R.	---	0 ^a	---	0 ^a
	Whychus Cr.	W, M, H	100,000-596,000 ^d	W	7,700 ^d (one generation)
	Crooked R. system	W, M, H	222,000-1,417,000 ^d	W	13,000 ^d (one generation)
	All	<i>W, M, H</i>	<i>322,000 - 2,013,000</i>	<i>W</i>	<i>20,700</i>



Sockeye (*Oncorhynchus nerka*)



Lake Billy Chinook kokanee used to:

Convert proportion to anadromous form

Maintain kokanee populations

Support harvest

Forage base

- Passage and reintroduction strategy for sockeye are to collect, mark, and release kokanee that exhibit migratory behavior.
- Returning adults of with known upriver origin will be passed to spawn naturally or moved to RBH / Wizard Falls for propagation and subsequent juvenile release.

Pathogen Concerns

- Limit the introduction of pathogens above
- Amplification of pathogens
- Initially eyed eggs or fry will be released
- Goal is to get to volitional adult passage



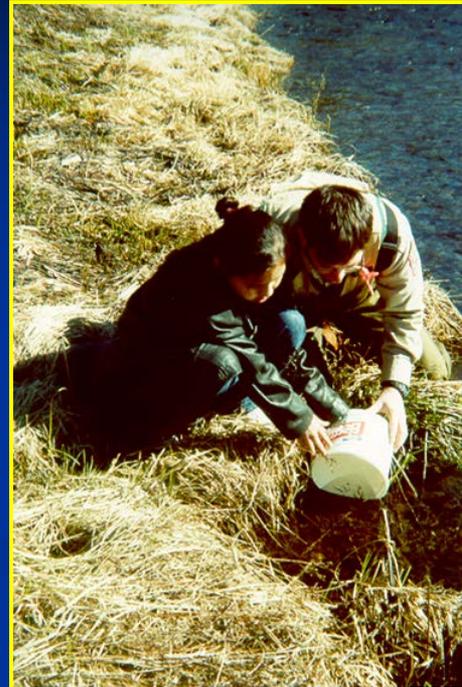
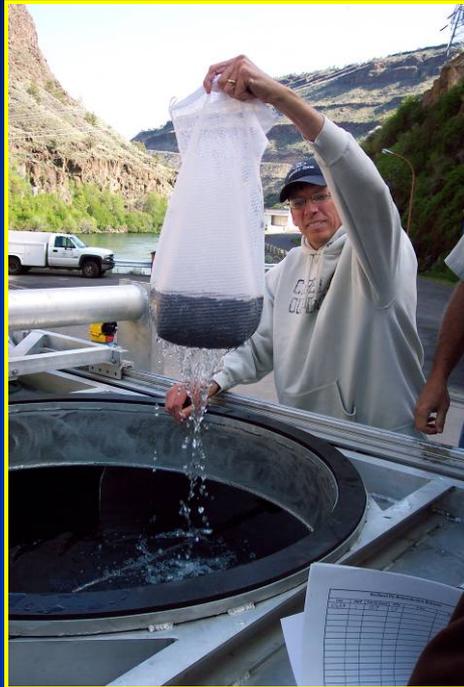
Round Butte Fish Hatchery



Active Reintroduction



Fry Outplanting Program



Fry Transport

Trucked from Round Butte Hatchery

- Mesh bags in oxygenated aerated water

Meet teams at rendezvous locations

- Some placed in bags filled with O₂
- Transported in coolers/packs to release locations



Fry Releases

- Occur across historic anadromous range
- Fish are acclimated to water temperature
- Released into slow water habitat



Total Fry Released to Date

2007	Steelhead	275,000
2008	Chinook	140,000
	Steelhead	525,000
2009	Chinook	602,244
	Steelhead	832,288
2010	Chinook	527,631
	Steelhead	611,787
2011	Chinook	548,170
	Steelhead	705,866
2012	Chinook	489,846
	Steelhead	609,253

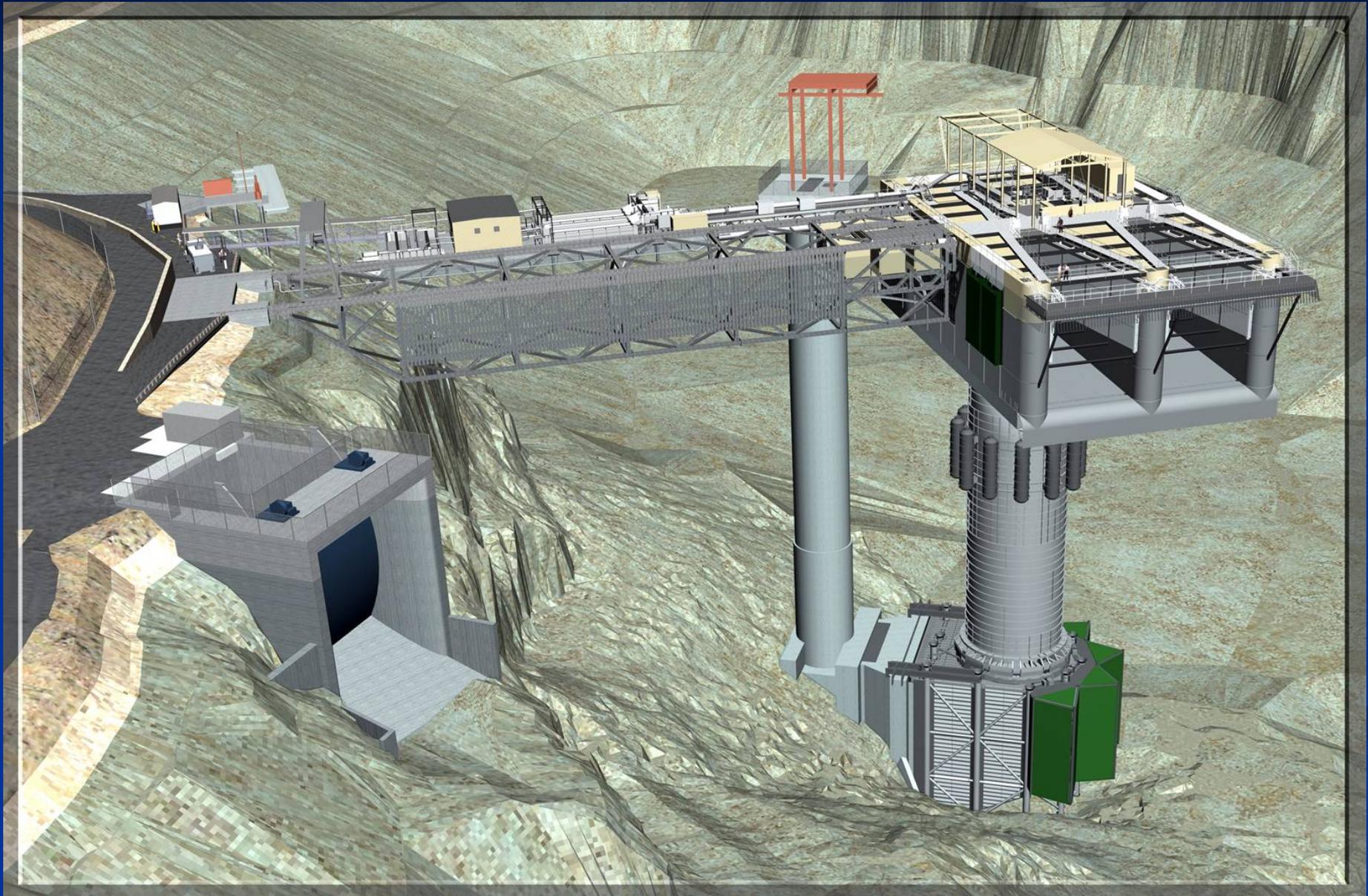
Smolts Released Above Project



	Chinook	Steelhead	Sockeye
2010	17,500	13,500	-
2011	23,914	13,723	-
2012	20,241	11,869	3,870

All fish marked with **Right or Left Max Clip** only!

Selective Water Withdrawal (SWW)



Fish Captured at SWW

Species	2010	2011	2012*
<u>Ch. Salmon</u>	<u>43,810</u>	<u>30,351</u>	<u>23,471</u>
<u>Sockeye</u>	<u>49,734</u>	<u>225,763</u>	<u>5,125</u>
<u>Summer Steelhead</u>	<u>7,732</u>	<u>10,604</u>	<u>7,866</u>
<i>Kokanee</i>	18,122	176,775	33,279
<i>Rainbow Trout</i>	178	328	69
<i>Bull Trout</i>	356	768	408
<i>Brown Trout</i>	361	407	211
<i>Black Crappie</i>	2	1	0
<i>Blue Gill</i>	153	83	121
<i>Brown Bullhead</i>	49	37	48
<i>Stickleback</i>	81	780	105
<i>Chisel mouth</i>	8	220	1
<i>Smallmouth Bass</i>	561	274	127
<i>Mountain Whitefish</i>	20	22	10
TOTAL	121,167	446,413	70,841



Adult Returns



2011 First Adult Chinook Return



Maxillary Clip Only

- 7 Known Origin Spring Chinook Returned
- 5 adult RM (4 ♂ 1 ♀) and 2 RM jacks
- RM Spawned at RBH to support the Reintroduction Program
- 164 LM fish (54 ♂ 98♀) and 12 LM jack none were used for broodstock

2011 First Sockeye Return



- 19 RM clipped sockeye returned in 2011 all 1 salts
- Very low fat reserves – 9 pre-spawning mortality
- Skewed sex ratio at spawning 2 males 8 females

2011 First Summer Steelhead Return



— 62 known origin summer steelhead returned

— RM – 43 (27 ♂ 16 ♀)

— LM - 19 (9 ♂ 10 ♀)

— Spawned at Round Butte to support Reintroduction Program

2012 Adult Passage

- February 23rd Finalized 2012 Adult Passage Strategy
- Still understanding the new system in LBC
 - ✓ Reservoir Currents
 - ✓ Collection efficiency
 - ✓ Biological Response (radio tagged fish)
 - ✓ SAR, fecundity, sex ratios, run timing, fish health not fully understood
- Approximately 50% of the known origin fish will be passed and 50% will be utilized for broodstock for Reintroduction Program
- Begin adult migration T&V studies
- Anticipate program will provide a demographic boost
- Spreads the risk
- One year strategy, further discussions and longer term decision based on additional information



2012 Known Origin Adult Returns

49 Spring Chinook Returned

- RM 26 (7 M 15 F 4 jacks)
- LM 23 (10M 12 F 1 jack)
- 24 passed above the dam (14 RM and 10 LM)
- 25 used for brood (12 RM and 13 LM)



84 Sockeye Returned

- All RM (33 M 50 F)
- All passed above dam



77 summer steelhead returned as of December 11th

- RM 57 (17M 40F)
- LM 20 (9M 11F)
- 35 passed above the dam (30 RM and 5 LM)
- 42 used for brood (27 RM and 15 LM)



Test and Verification / Monitoring

🐟 Adult Migration

- 🐟 Fixed and mobile telemetry
- 🐟 Spawning surveys

🐟 Screw Trapping

- 🐟 PIT tagging
- 🐟 Migration timing

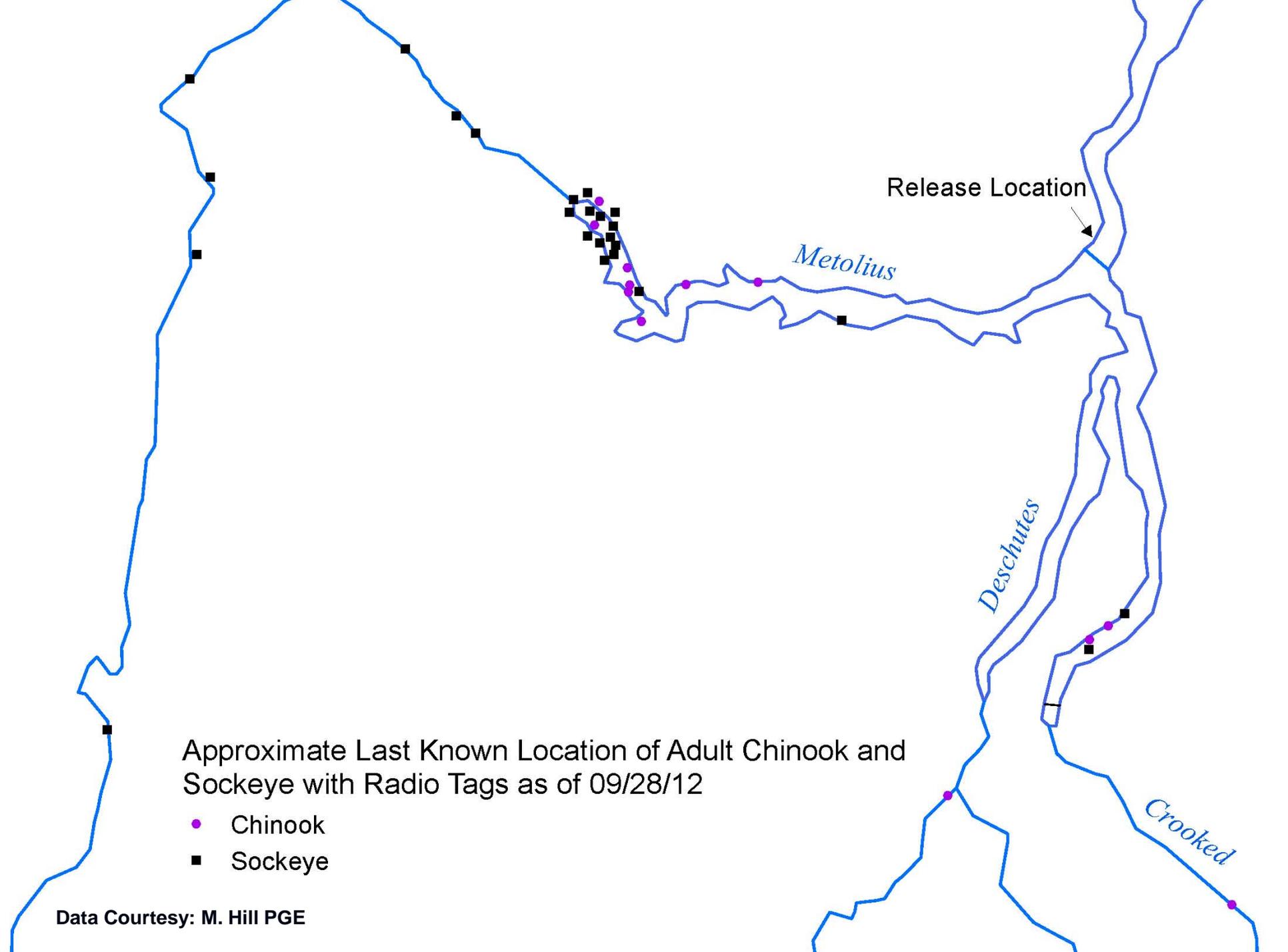
🐟 Electrofishing and Snorkeling Surveys

- 🐟 Growth
- 🐟 Densities
- 🐟 Distribution

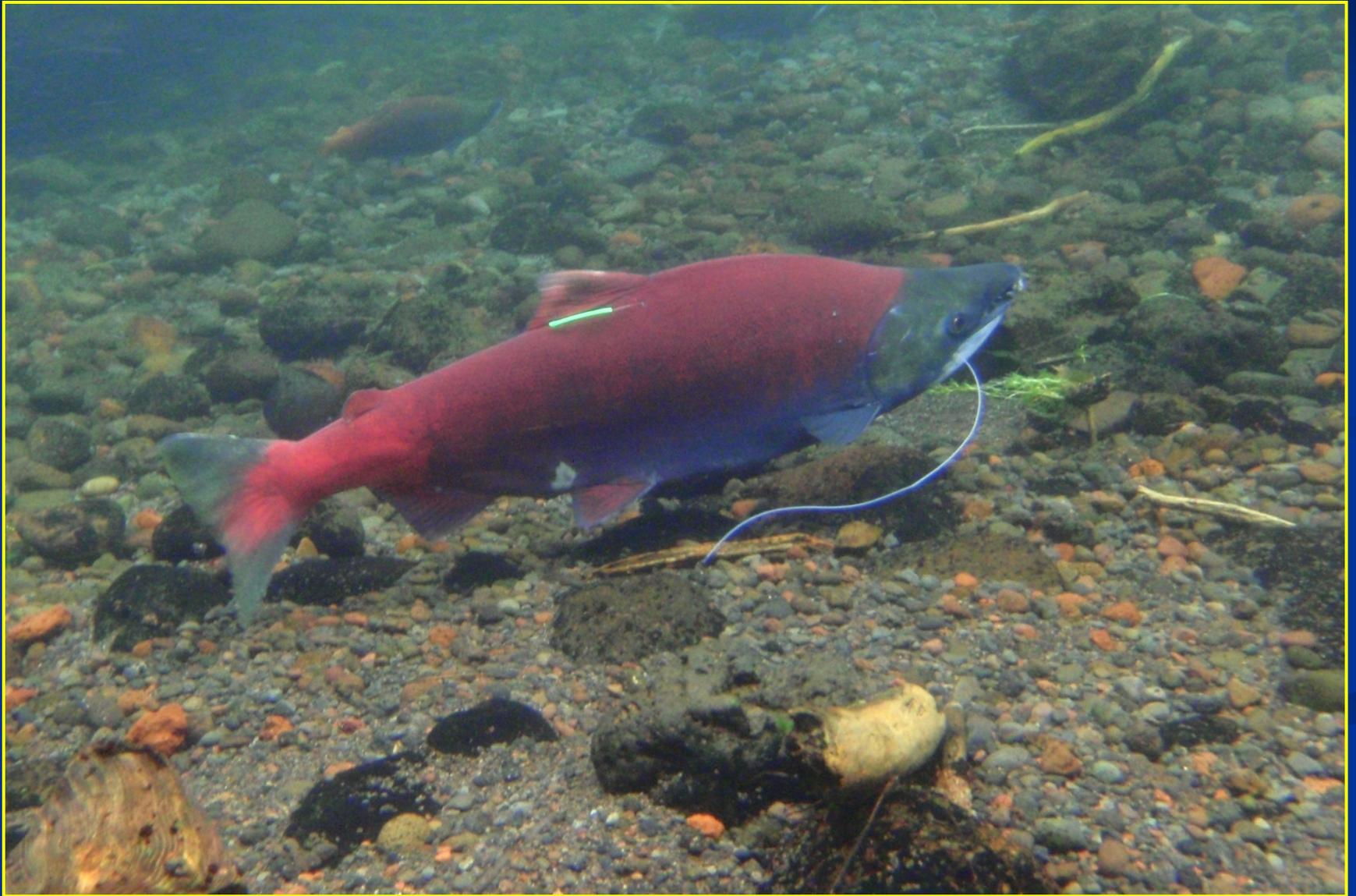
🐟 SWW/FTF Collection

- 🐟 PIT tag detections/collection efficiency
- 🐟 Injury and Mortality
- 🐟 Upstream / downstream transport
- 🐟 Outmigration





First Evidence of Spawning in the Metolius River in 45 Years



Future and Ongoing Challenges

- Incubation and Rearing Space
 - Specifically for sockeye
- Complete sockeye reintroduction plan
- Better understand fish interactions
- Continue to study new system in LBC
- Long term adult passage strategy



Questions?

