



# Use of Seasonal Instream PIT Tag Detection Systems in the Lower Clearwater and Salmon River Tributaries



by:

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Funded by:



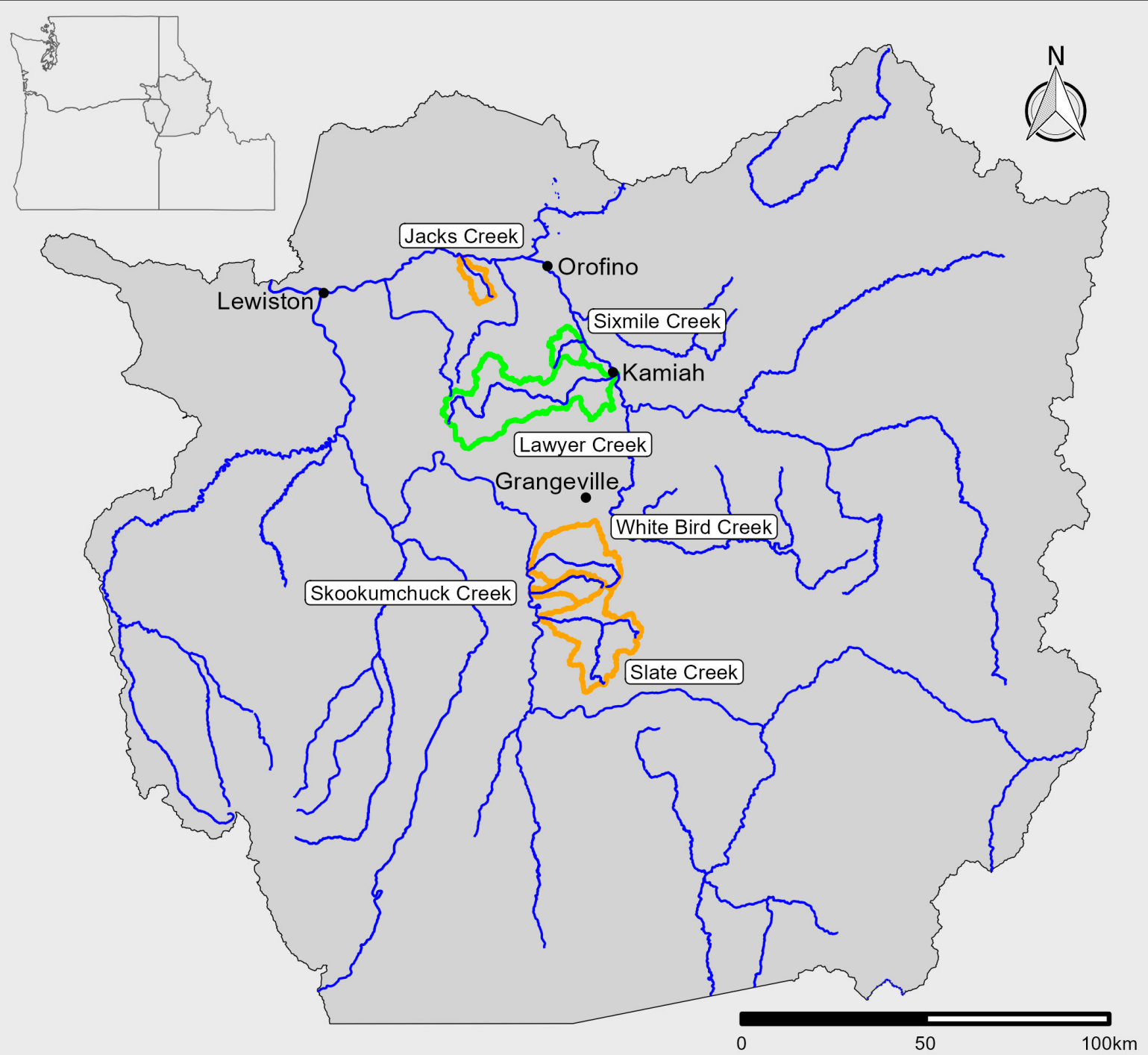


# Example of a Seasonal Instream PIT Tag Detection System (IPTDS)

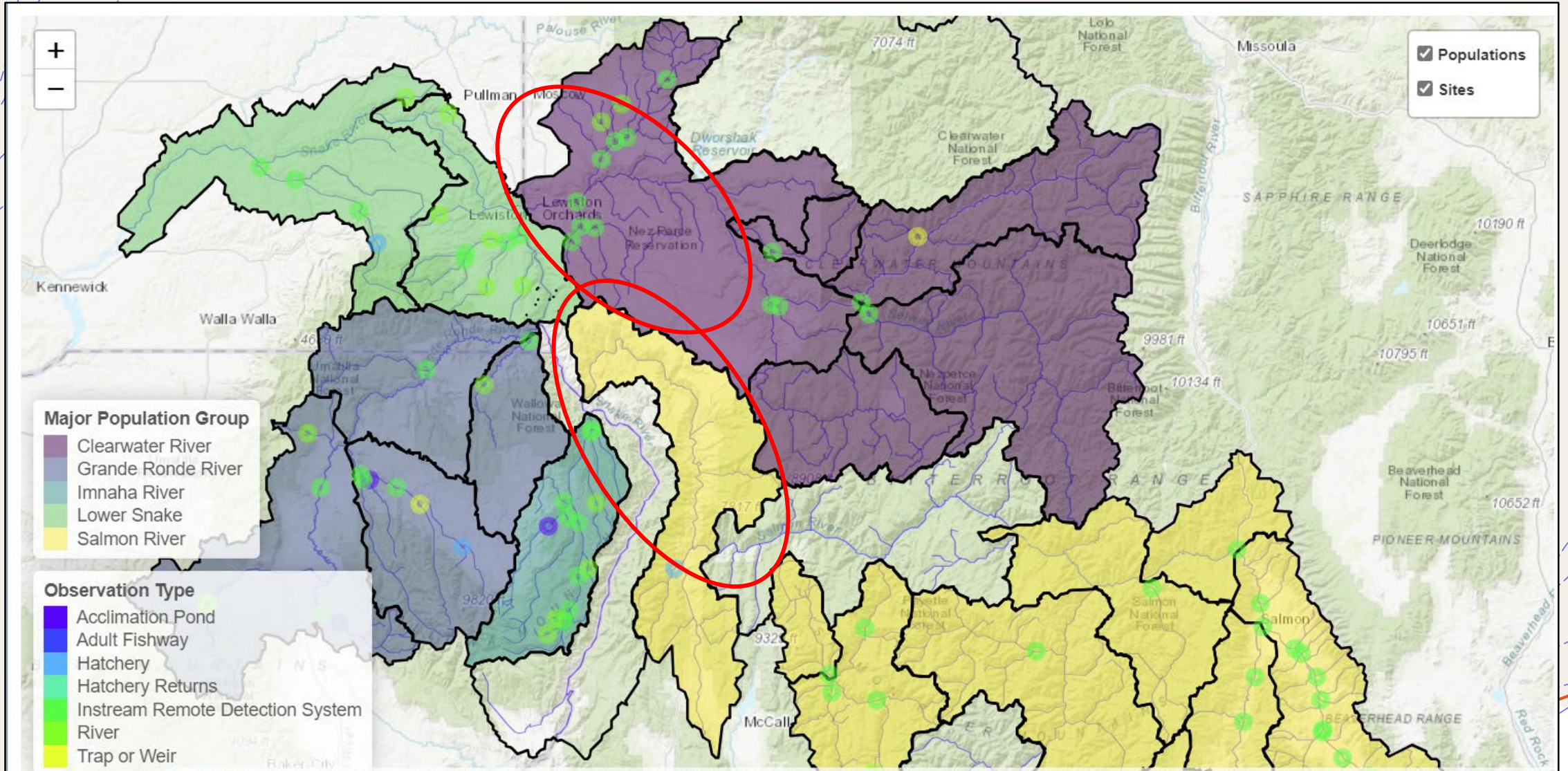




# Study Area



# Major Population Groups



# Tributaries Sampled

## Lower Clearwater River

- Big Canyon Cr.\*
- Lawyer Cr.\* ✓
- Cottonwood Cr.
- Jim Ford Cr.
- Orofino Cr.
- Bedrock Cr.
- Jacks Cr. ✓
- Sixmile Cr. ✓

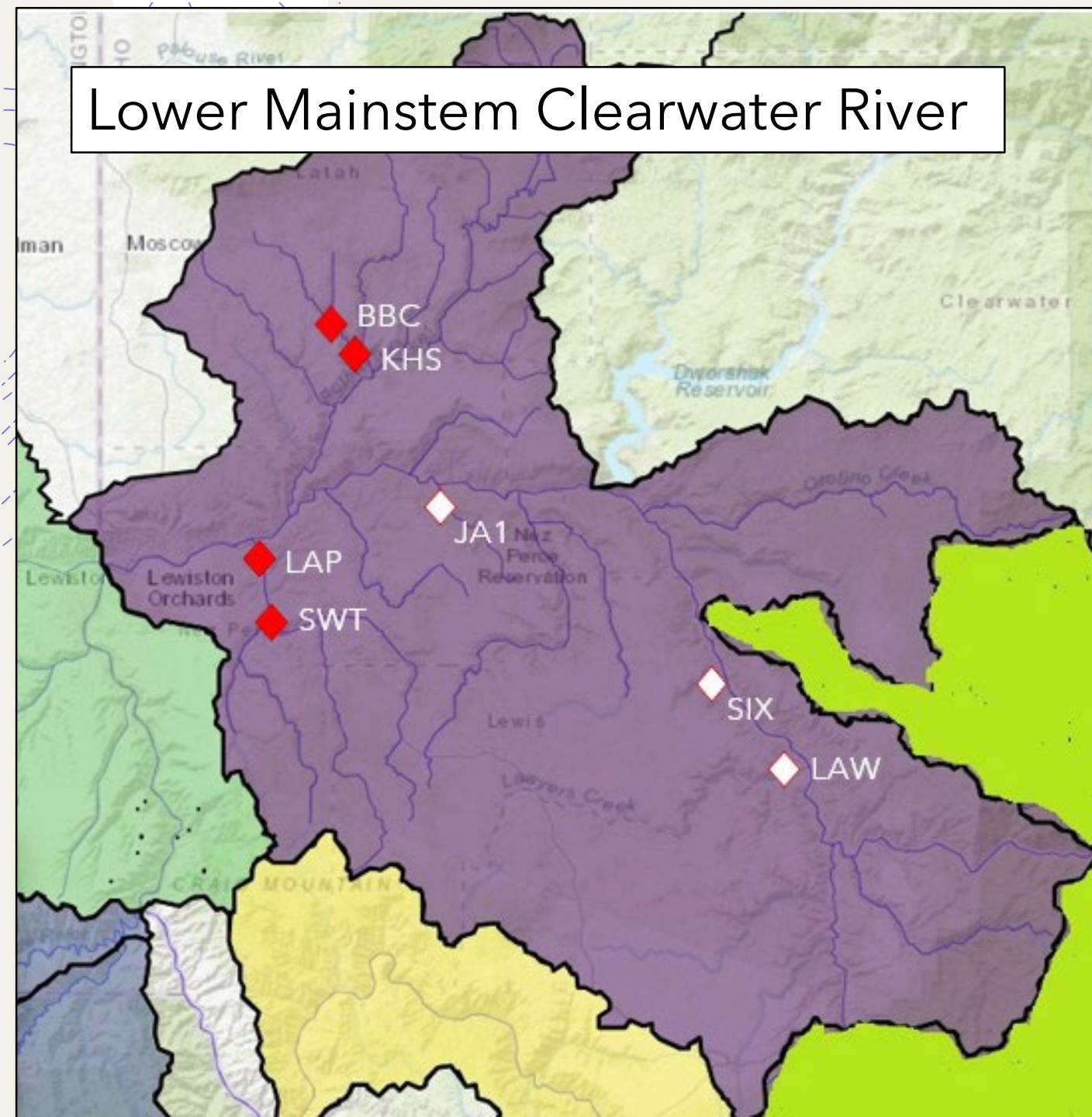
## Lower Salmon River

- White Bird Cr. ✓
- Slate Cr. ✓
- Skookumchuck Cr. ✓

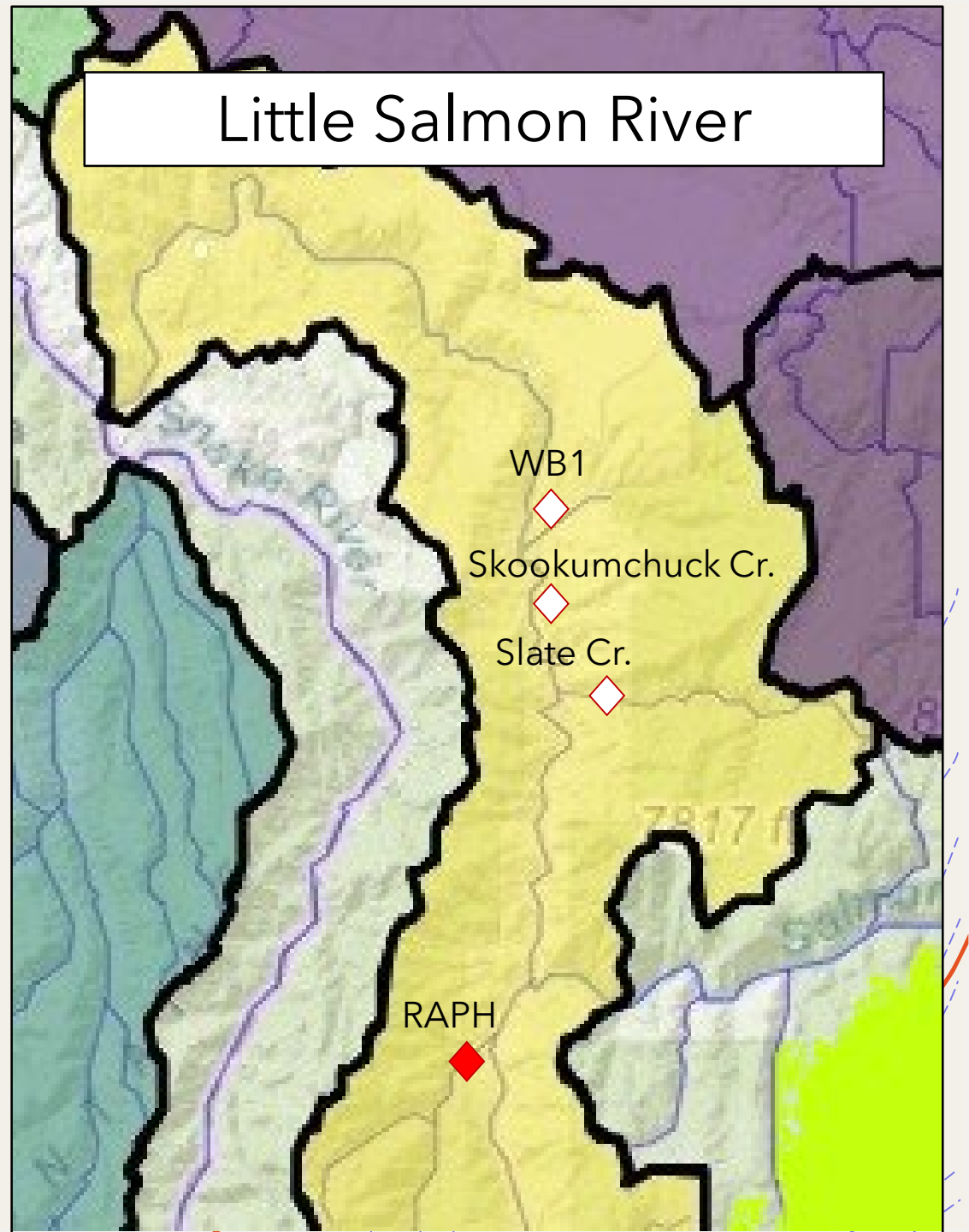
\*Major spawning areas



# Lower Mainstem Clearwater River



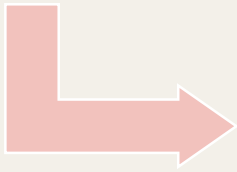
# Little Salmon River



# Concept

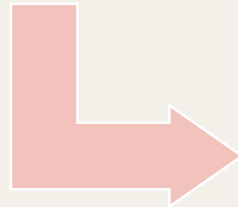
Lower  
Granite  
Dam

- Estimate Natural Origin Abundance (STADUM)
- NOAA and IDFG Systematically PIT Tag Natural Origin Adults (2,000 - 3,000)



Upstream  
Tracking

- Track Movement to final upstream tributary



Place in  
Tributary

- Estimate Abundance in Tributary (DABOM)



## Lower Clearwater River Upstream of Lewiston, ID



(photo by Morgan Sublette)

## Lower Salmon River Near the Confluence





# Objectives

- Instream PIT Tag Detection System (IPTDS) Objectives
  - Estimate adult abundance at individual tributaries for 1- 2 years
  - Compare IPTDS abundance estimate to weir M-R method at selected sites
- Weir Objectives
  - Describe life history traits
  - Document presence of adult hatchery steelhead



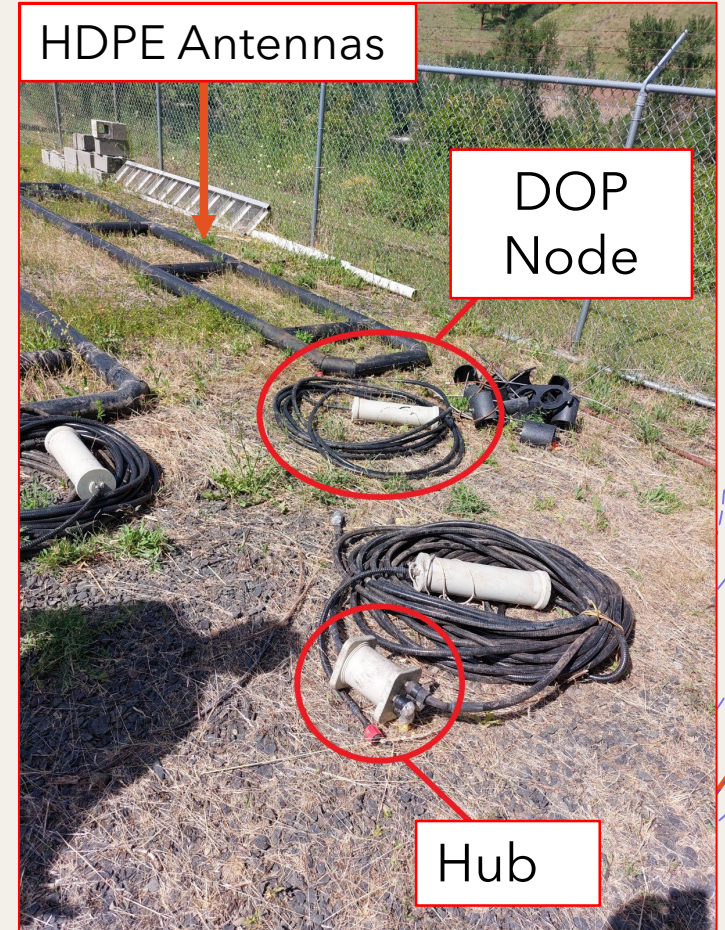
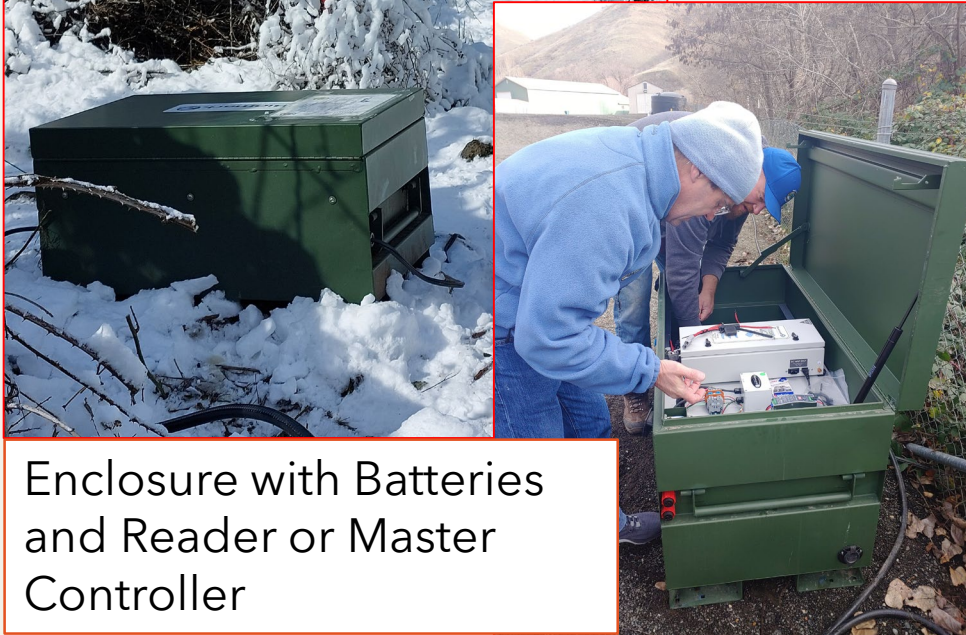
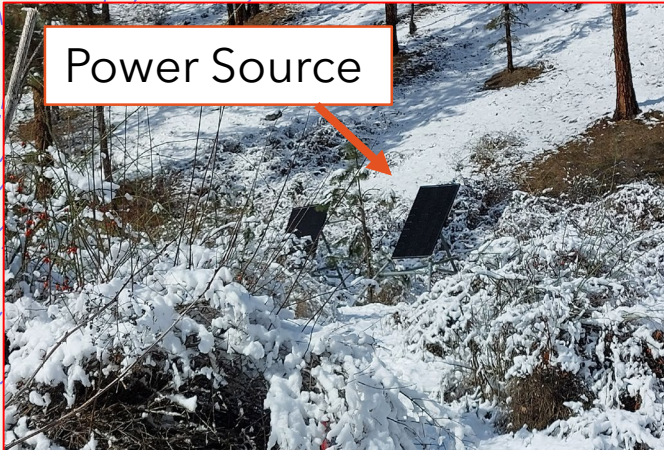
Lawyer Creek 2023

# A Quick Review of Past Studies

Study Authors	Study Years	Lower Clearwater Creeks	Types of Results
Kucera, P.A. and D.B. Johnson 1986	1983-1984	Bedrock, Cottonwood, Big Canyon, Jacks, Mission	juvenile densities by age, adult observations
Johnson R.E. and J.A. Hesse 2002	1994-1996	Bedrock, Cottonwood, Big Canyon, Jacks, Mission	juvenile densities by age
Chandler C. and Parot R. 2003	2003	Lapwai, Mission, Sweetwater, Big Canyon	Juvenile densities, habitat surveys
Chandler C. 2011	2007-2013	Catholic, Cottonwood, Pine, Bedrock, Jacks, Orofino, Whiskey, Cedar, Jim Ford, Big, Sixmile, Lawyer, Maggie	Juvenile densities, habitat surveys
Bowersox, B.J., J.S. Hargrove, T. Copeland, and M. R. Campbell. 2023	2019-2020	Lapwai, Potlatch R. tributaries, Cottonwood, Bedrock, Big Canyon, Orofino, Jim Ford, Lawyer	Genetic population structure, effective population size



# Equipment



# Lower Salmon River Dates of Operation

Tributary	Year	Method	Dates of Operation	Median First Observation Dates
Skookumchuck Cr.	2019	IPTDS	3/20 - 6/23	4/2
	2020	IPTDS	3/12 - 6/23	3/30
Slate Creek	2020	IPTDS	2/13 - 6/23	4/17
White Bird Creek	2021	IPTDS	1/15 - 6/22	3/21
	2022	IPTDS	1/21 - 5/20	3/26

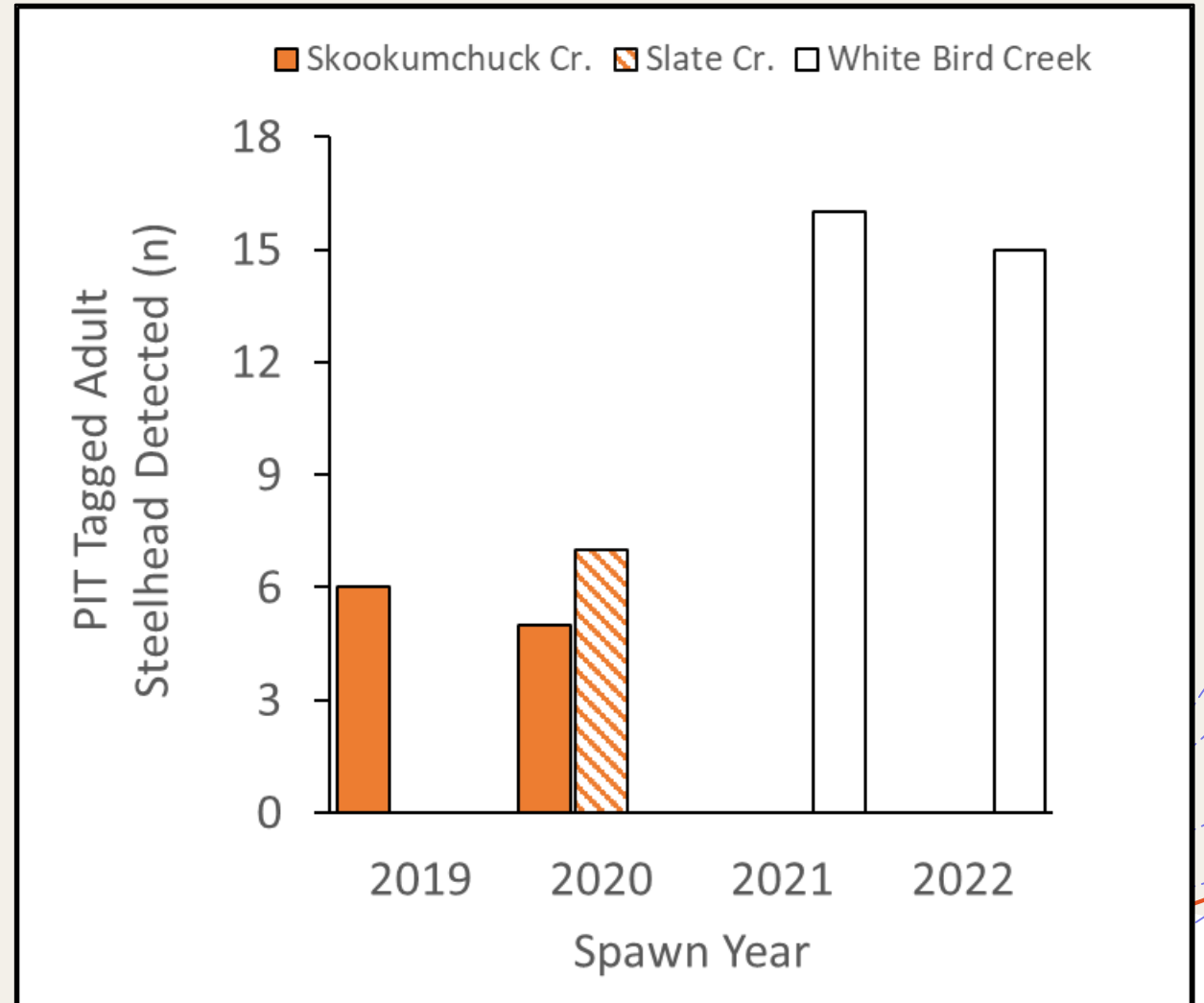


# Results

## Lower Salmon River PIT Tag Detections



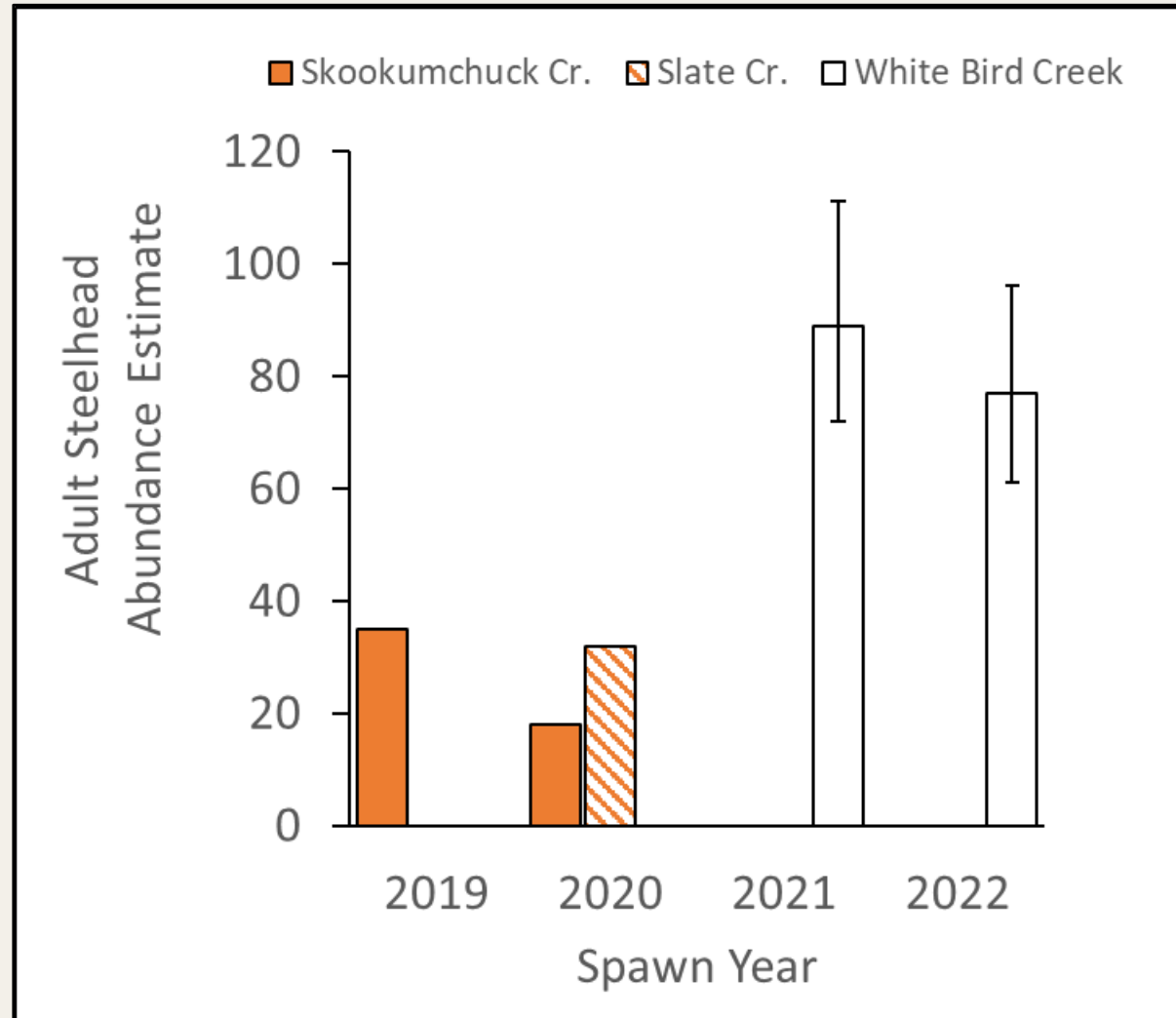
Slate Creek LITZ Cable (2020).



# Lower Salmon River Escapement



Tuning White Bird Creek in (2021).





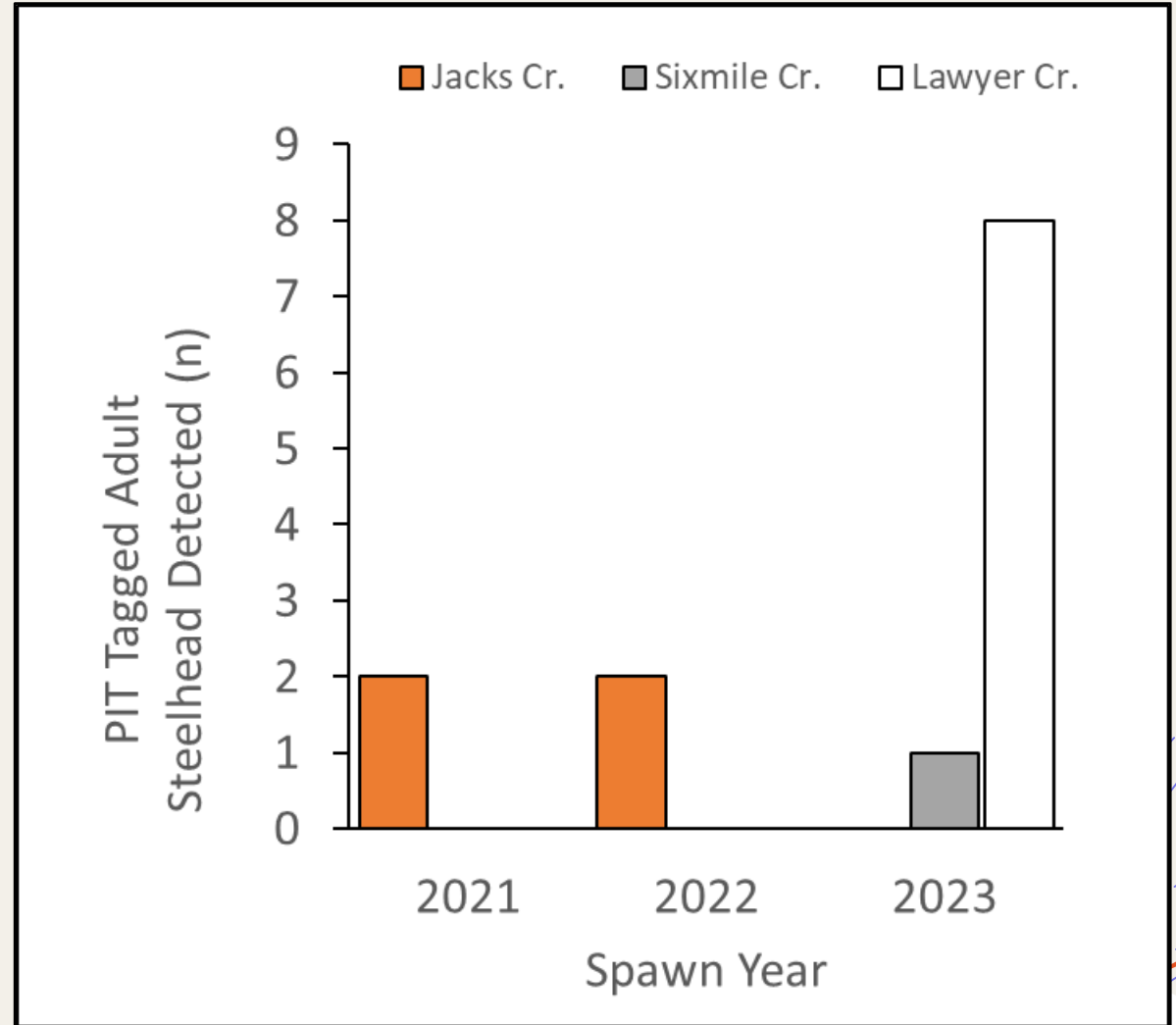
# Lower Clearwater R. Dates of Operation

Tributary	Year	Method	Dates of Operation	Median First Observation Dates
Jacks Creek	2021	IPTDS	1/28 - 6/8	3/15
		Weir	1/28 - 6/3	3/18
	2022	IPTDS	2/2 - 6/8	4/10
		Weir	2/9 - 6/1	3/20
Sixmile Creek	2023	IPTDS	2/21 - 6/5	3/15
		Weir	3/1 - 5/29	4/7
Lawyer Creek	2023	IPTDS	2/9 - 6/1	3/20

# Lower Clearwater River PIT Tag Detections



Steelhead being released upstream of the Sixmile Creek Weir (2023).

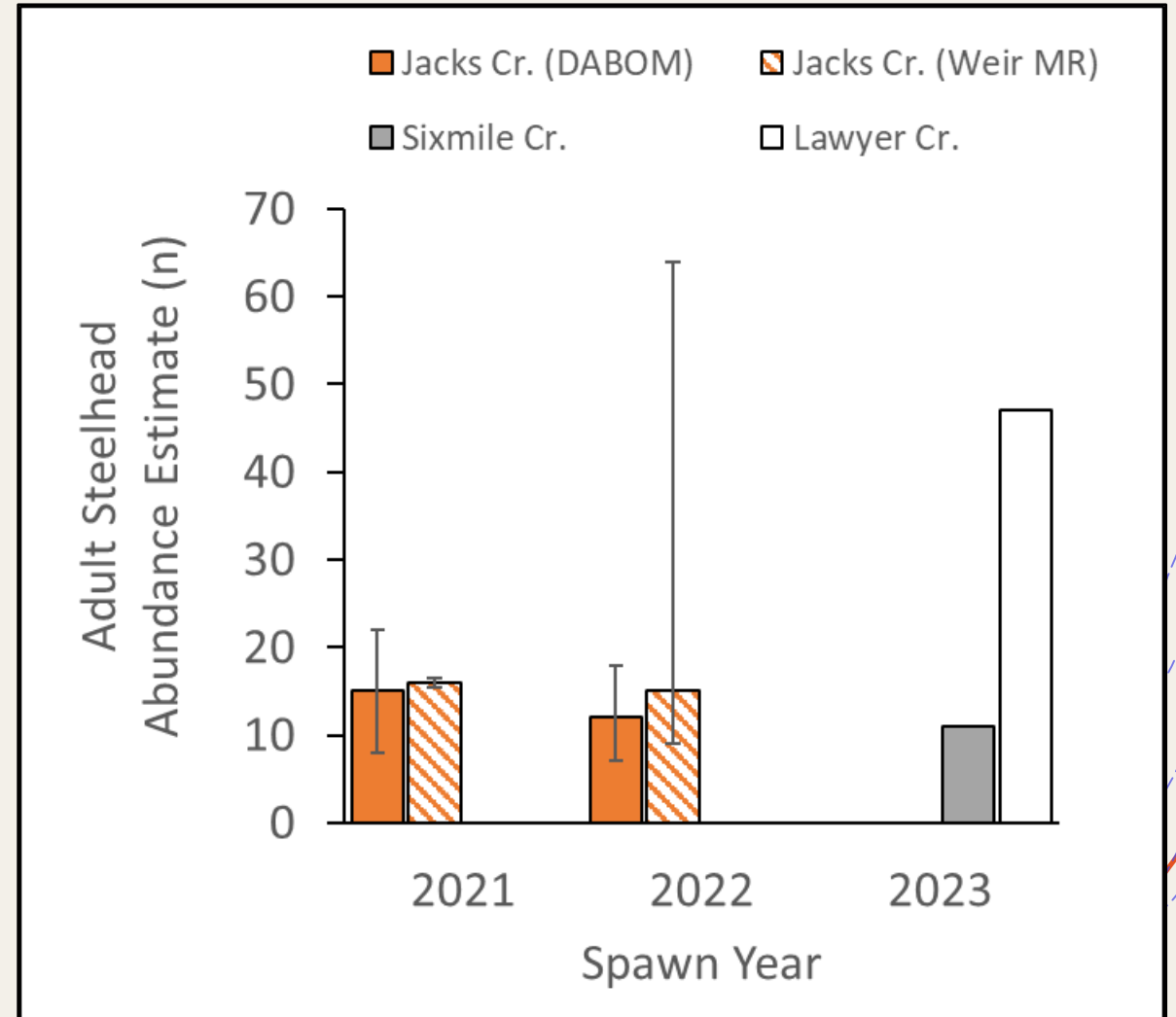




# Lower Clearwater River Escapement



Jacks Creek Weir 2022





# Sixmile Creek Weir Mark-Recapture Estimate

- A freshet washed out the weir for 2.5 days from 3/14 to 2 PM on 3/16
- No MR Estimate possible

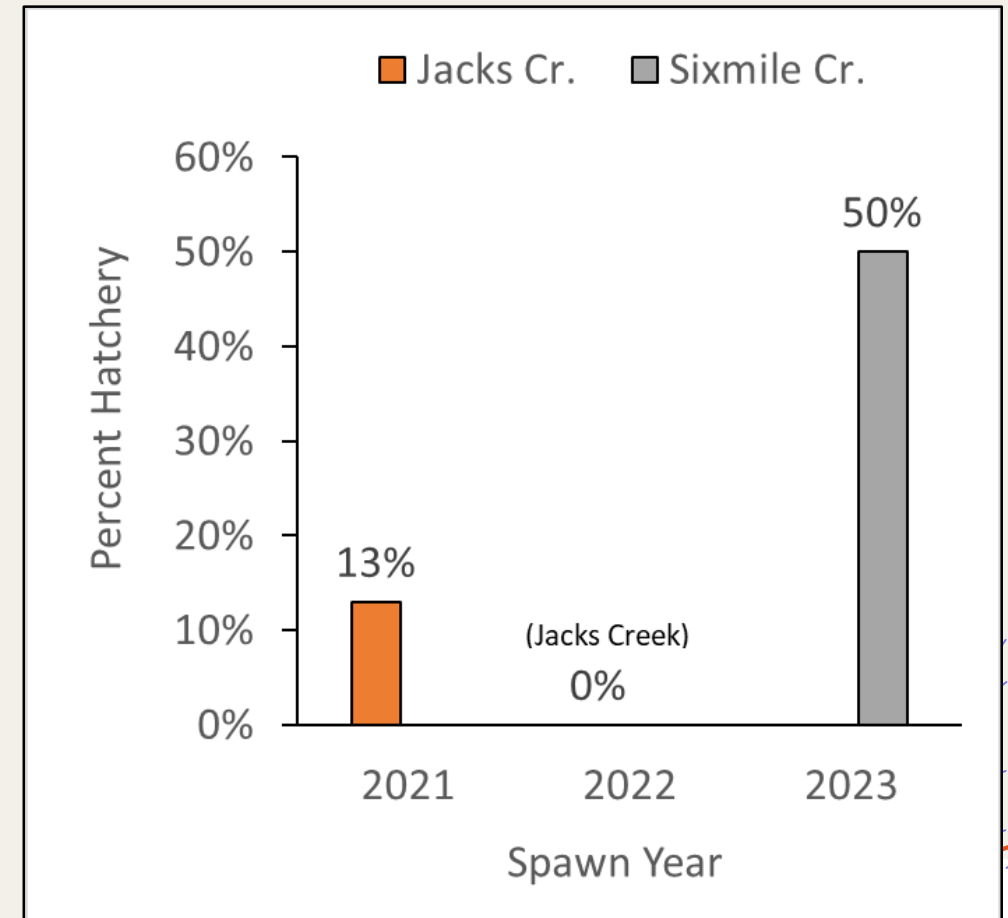




# Observations of Hatchery Origin Steelhead at the Lower Clearwater River Weirs



Six Mile Creek Weir (Photo by Mike Kosinski)



# Jacks Creek Resident Steelhead

- Adult Resident *O. mykiss* comprised 21% of the steelhead captured
  - One of six residents tagged in 2021 was recaptured in 2022
  - One 1-Ocean steelhead was a repeat spawner
  - The smallest 1-Ocean steelhead measured 43 cm and was identified by a saltwater checkmark



Side Note:  
Detections of Adult Steelhead  
Tagged at Bonneville Dam

Observation Site	Release Site: Bonneville Adult Fish Facility
White Bird Creek	3
Jacks Creek	2

# Another Side Note: Seasonal IPTDS Detections of PIT Tagged Juveniles

Site (Rkm)	Hatchery Coho	Hatchery Spring/ Summer Chinook	Hatchery Fall Chinook	Hatchery Summer Steelhead	Natural Spring/ Summer Chinook
Skookumchuck Cr. (0)	0	7	0	2	0
Slate Creek (8)	0	0	0	0	0
White Bird Cr. (2)	0	0	0	1	0
Jacks Cr. (1)	39	1	1	4	1
Sixmile Cr. (1)	17	0	0	6	0
Lawyer Creek (1)	4	4	0	13	0



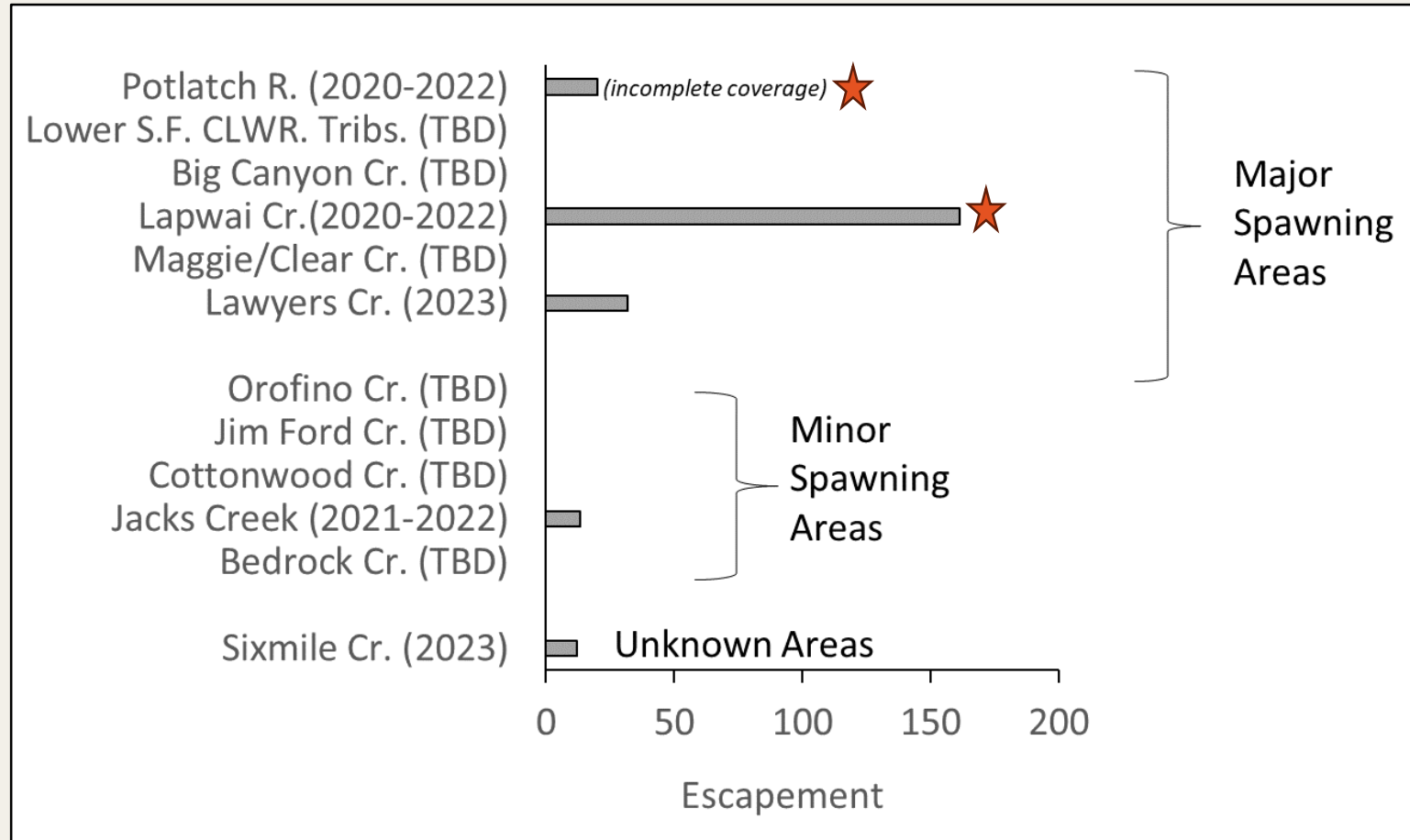
# Possible Explanations for Juvenile Emigration into Tributary Habitat

- Avoidance of high-water discharge
  - Bustard and Narver 1975, Tscaplinski and Hartman 1983, Scarlett and Cederholm 1984, Bramblette et al. 2002; as cited in Anderson et al. 2008
- Dispersal to better rearing habitat/feeding
  - Anderson et al. 2008, Bell et al. 2001



Sixmile Creek Confluence 2023

# Summary of Natural Origin Steelhead Abundance and Distribution (2020 to 2023)





# Closing Thoughts

- IPTDS can accurately estimate adult abundance without the need for a weir.
- Weirs are still useful for providing life history data
- Connectivity between small tributaries and mainstem rivers may be important for downstream migrating juveniles.



Lawyer Creek 2023