Residual Steelhead Investigations in NE Oregon

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2025 Lower Snake Compensation Plan Steelhead Symposium

January 21-23, 2025

Residual Monitoring History

1993-1996- initial investigations

- Primarily smallest males
- Densities decline with proximity, time
- High variation- not related to # released or flow
- Habitat partitioning & release timing minimize interactions- CHS piscivory not likely

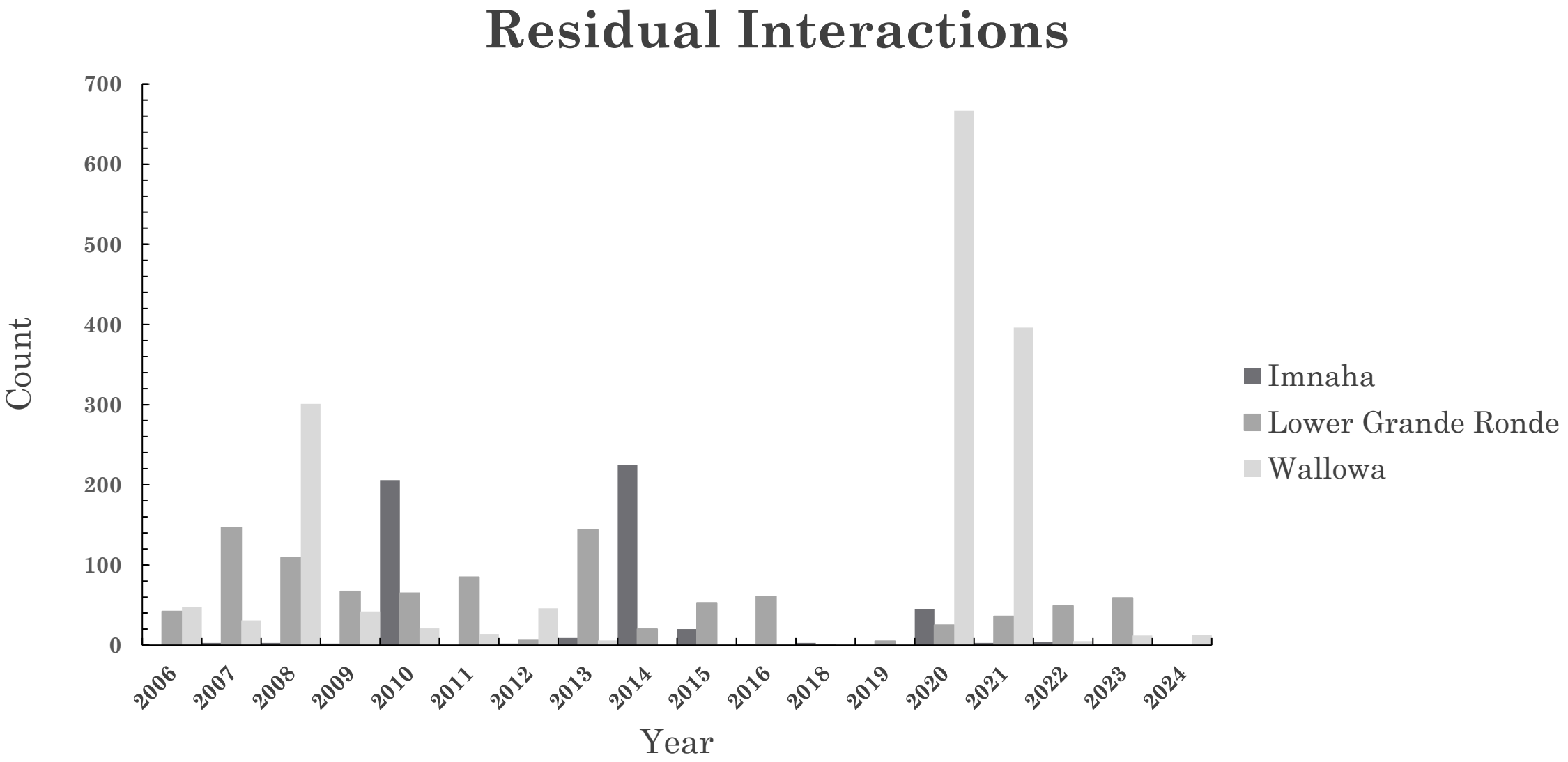
Residual Management History

2002, 2011 HGMP- Residual reduction high priority

2012 ISRP- "…investigate and minimize…"

- Monitoring requirement
- Angling regulations to encourage harvest
- Smaller releases of larger smolts
- Volitional releases/sex ratio

Creel Surveys



Tag Reward Study

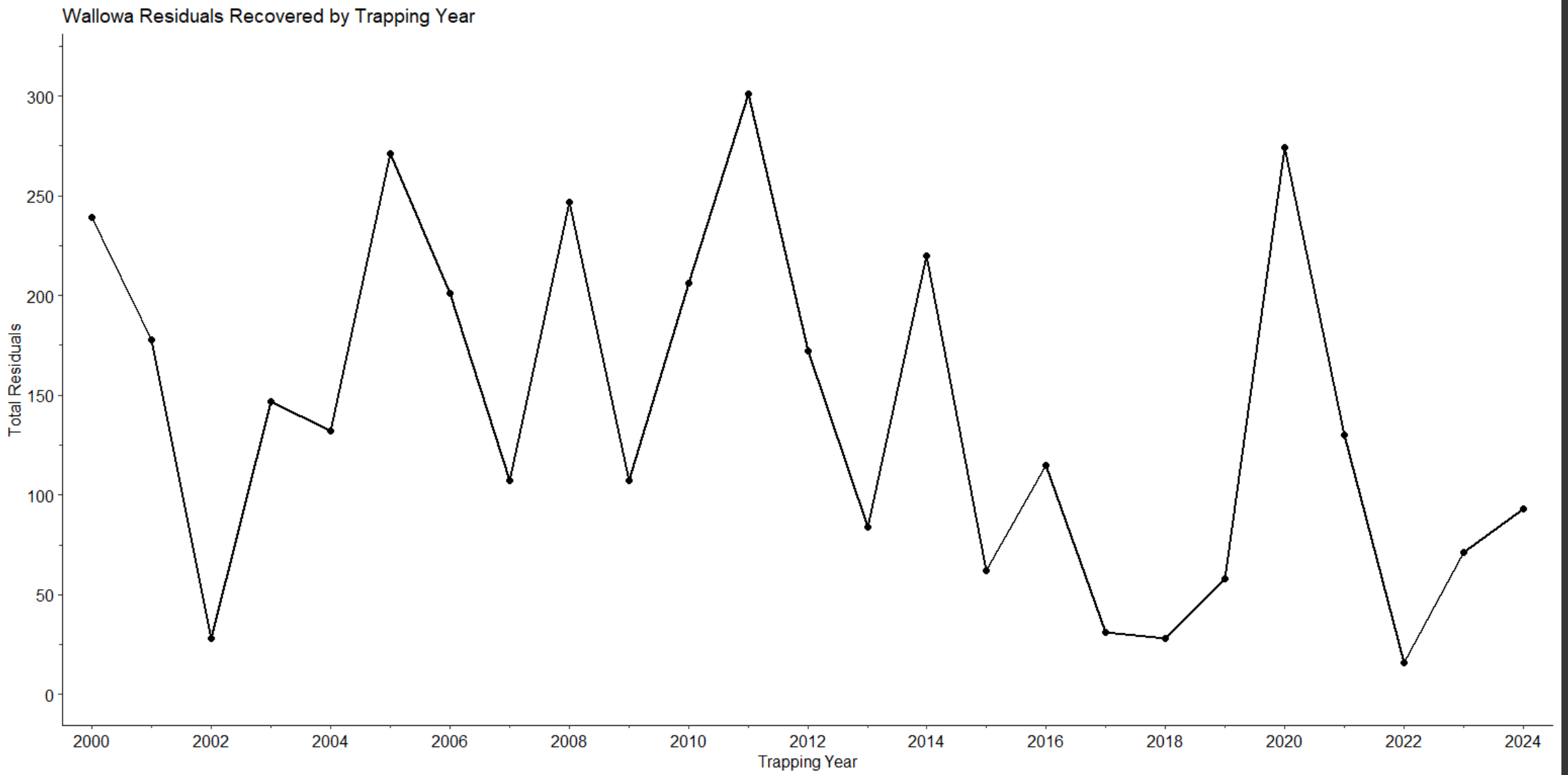
- Fish marked with FLOY tags

Species	Origin	Tag type	Number tagged	Reported angler catch	Reporting rate (%)
Rainbow Trout	Natural	$50 Reward	32	2	6.2
	Hatchery	$50 Reward	27	1	3.7
Mountain Whitefish		$50 Reward	36	0	0
Rainbow Trout	Natural	Non-Reward	181	7	3.9
	Hatchery	Non-Reward	21	2	9.5
Mountain Whitefish		Non-Reward	296	1	0.3

No reported harvest of any FLOY tagged fish

Tag Reward Study

- Very low participation
  - 2 of 13 responses ODFW
- Anecdotal reports from guides of tagged fish (reward tags) caught and never reported.
- Unable to evaluate exploitation, and no indication of harvest by anglers.
- “People won’t harvest even if you pay them”


Wallowa Residuals Recovered by Trapping Year
Total Residuals
0
50
100
150
200
250
300
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
Trapping Year

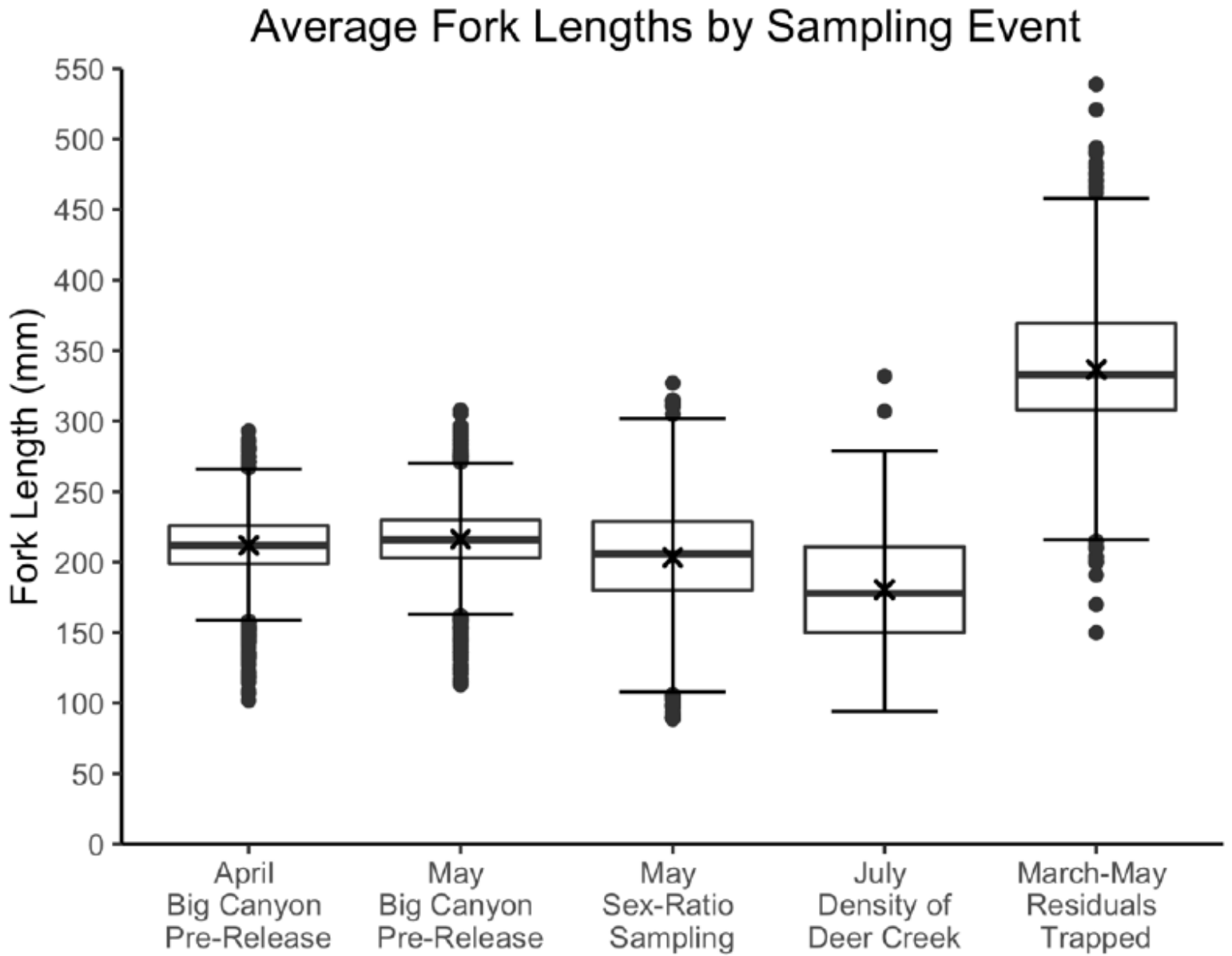


Figure 2. Fork lengths (mm) collected from April and May pre-release sampling at Big Canyon Acclimation Facility, summer density residual sampling, sex-ratio sampling, and the residuals recovered at the weirs from 2000 to 2021.

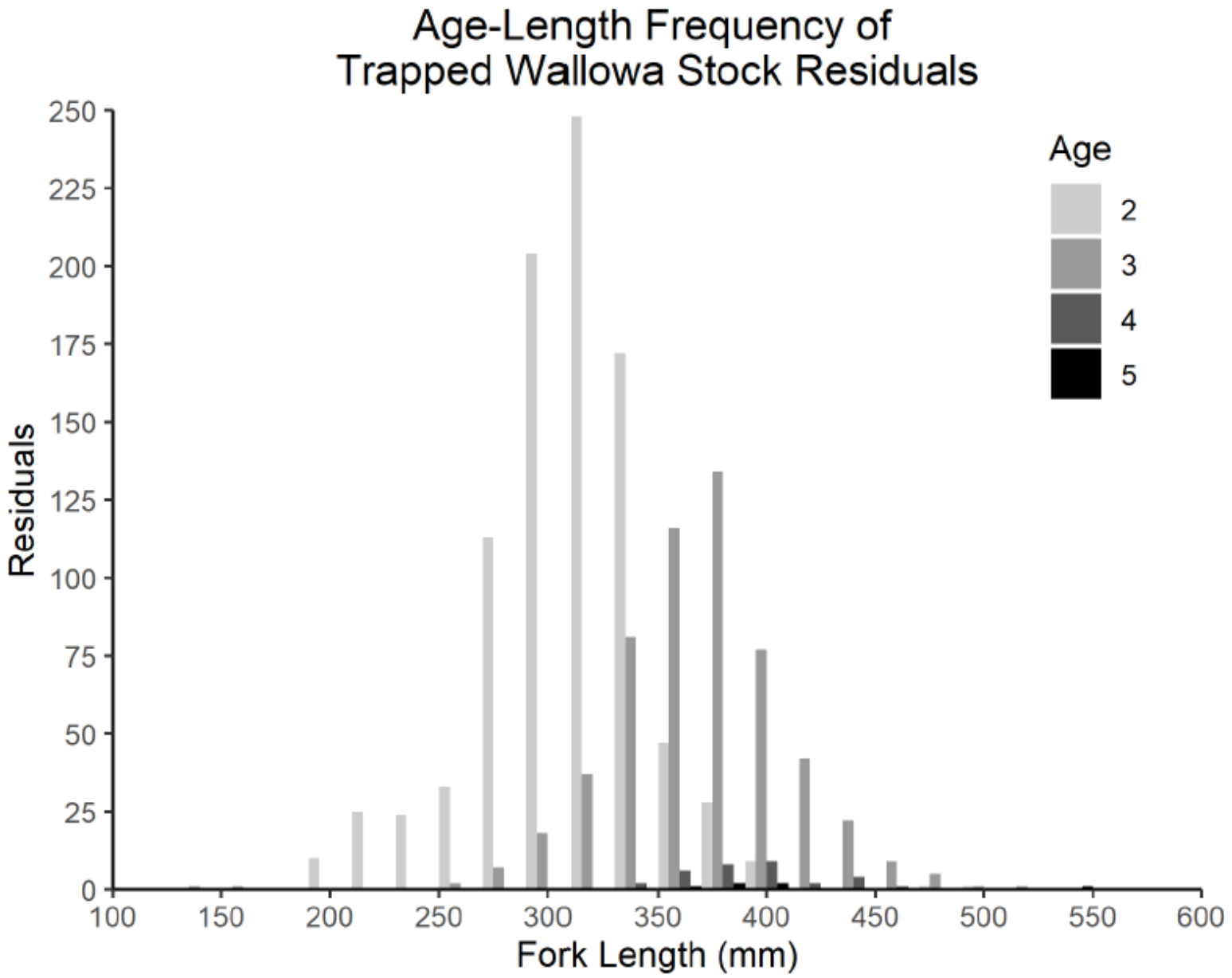


Figure 3. Estimated length frequency of Wallowa stock residuals recovered at the weir by age from 2000 to 2021.

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A Method to Reduce the Abundance of Residual Hatchery Steelhead in Rivers

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Abstract.—We developed and tested a release strategy designed to reduce the number of hatchery-reared steelhead *Oncorhynchus mykiss* that fail to migrate out of the Tucannon River (i.e., residualized) in southeast Washington. We also described the physical characteristics of those fish that failed to emigrate. Hatchery-reared steelhead that residualize may have negative effects on naturally produced salmonids through competition for food and space, predation, and the spread of disease. Steelhead residualism was reduced by retaining fish in the Curl Lake reclamation pond after volitional emigration had ceased. Fish that remained in the pond had a male : female ratio of 4.1; 90% of these fish were a combination of transitional, parr, and precocious male stages. This method resulted in 2,022 residualized fish in the Tucannon River, 3.1% of the fish planted in Curl Lake. During the same year, 4,186 fish (14.0% of fish released) residualized in the Tucannon River from a direct river release. The 3.1% residualism of the fish planted in Curl Lake in 1993 was significantly lower than the 14.0% residualism that occurred in 1992 from the direct river release and the 17.7% and 10.3% percent residualism for fish planted into Curl Lake in 1991 and 1992. By retaining 13,971 probable residual fish in Curl Lake in 1993, potential negative interactions in the natural river environment were substantially reduced. Fish remaining in Curl Lake were harvested by sport anglers after June 1, 1993, when the lake opened for sport fishing.

Populations of summer-run steelhead (anadromous rainbow trout *Oncorhynchus mykiss*) in the Snake River drainage of southeast Washington became depressed in the 1970s, in part because hydroelectric dams blocked steelhead migratory routes (Raymond 1988). Large federally funded hatcheries were built to mitigate for the losses and are stocked. Spring chinook salmon are listed as threatened under the U.S. Endangered Species Act (USOFR). The Washington Department of Wildlife (WDW 1992) and the American Fisheries Society (Williams et al. 1989) have identified the bull trout as a species of special concern. The Wash-

Sex Ratio Sampling

- Outplant if > 70% male after volitional release
- Big Canyon switch to forced (2021)
- Little Sheep emergency releases
  - BKD
  - Flooding

Sex Ratio Events 2005-2024

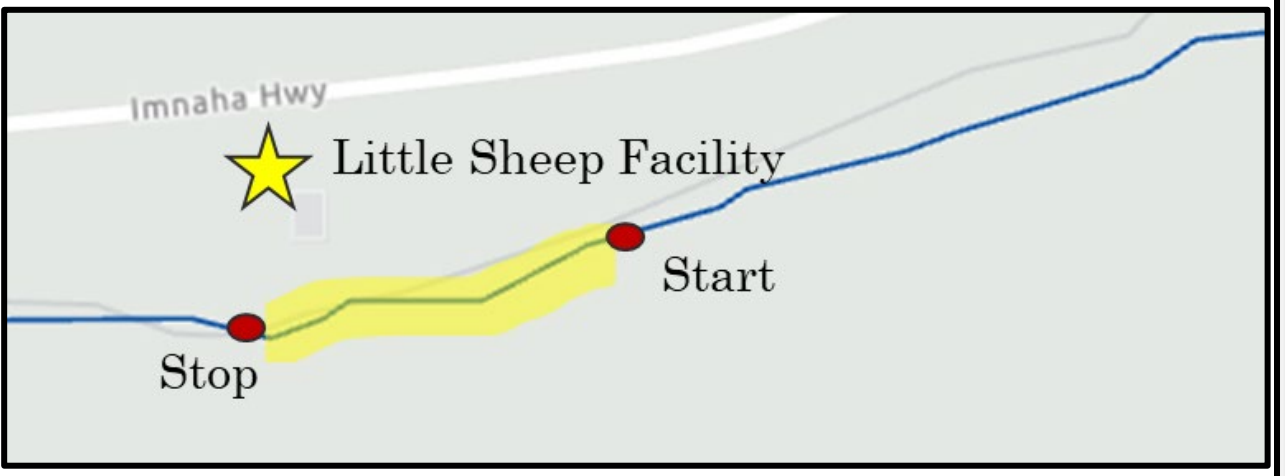
	Big Canyon	Little Sheep
Not Sampled	7	6
Under 70%	6	9
Over 70%	7	5

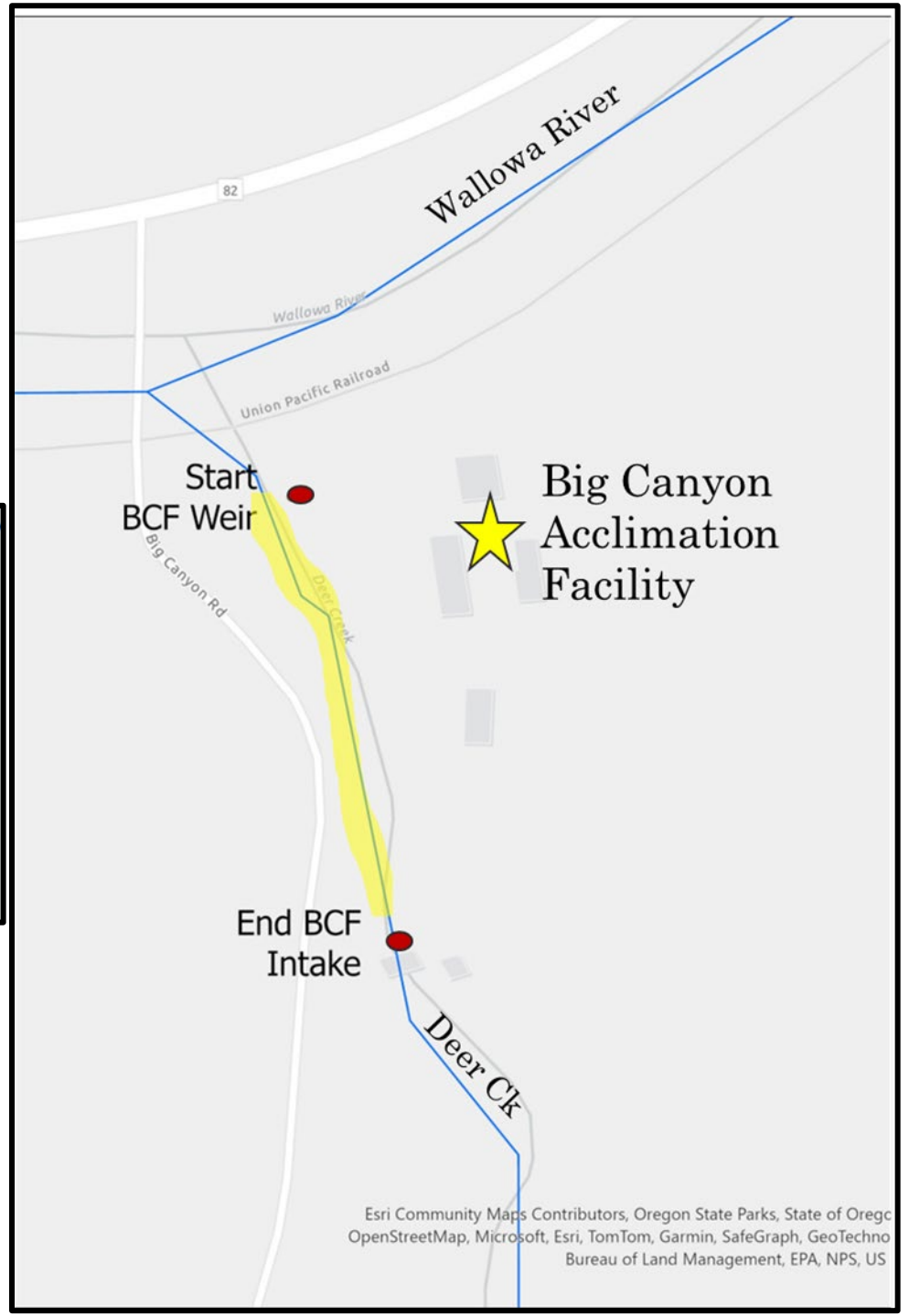
Perspective

	Smolts Produced	Outplanted as trout	Smolt %	Outplant %
Imnaha	4,982,692	35,143	99.3%	0.7%
Wallowa	16,069,697	13,578	99.9%	0.1%

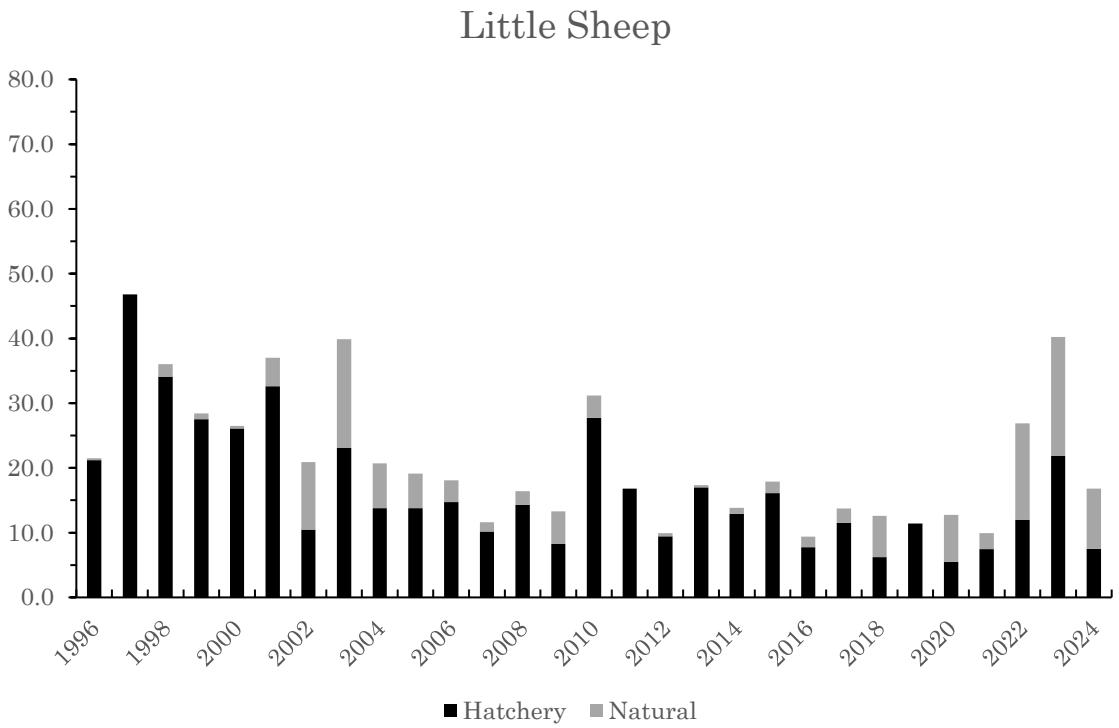
Density Sampling

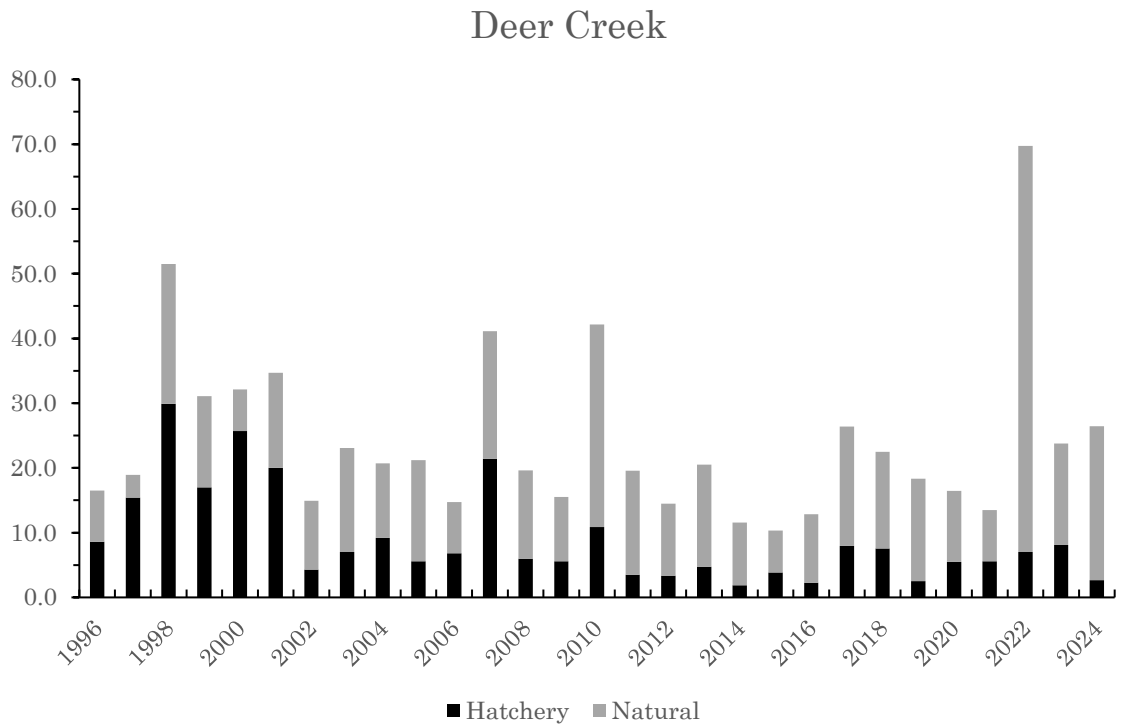
- 70% depletion



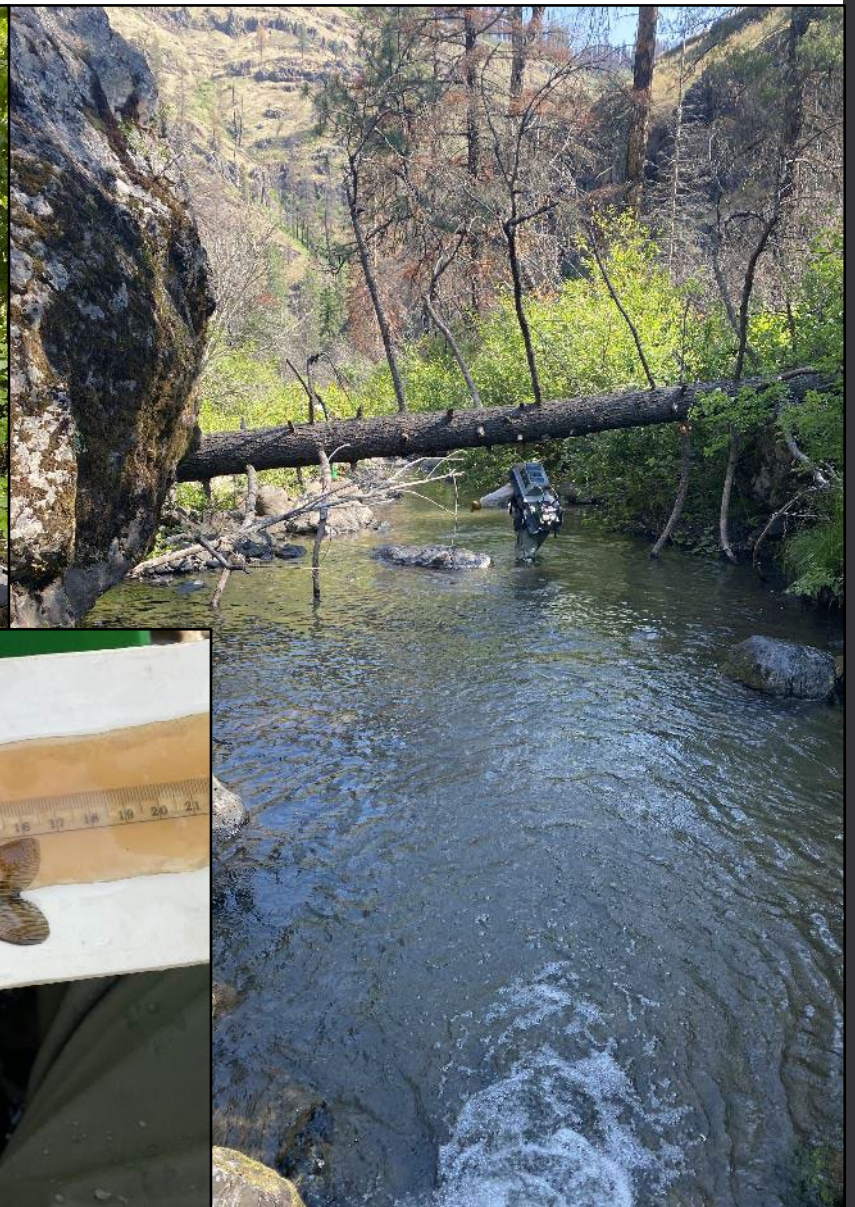


Residuals/100m²





Exploratory Sampling 23 & 24

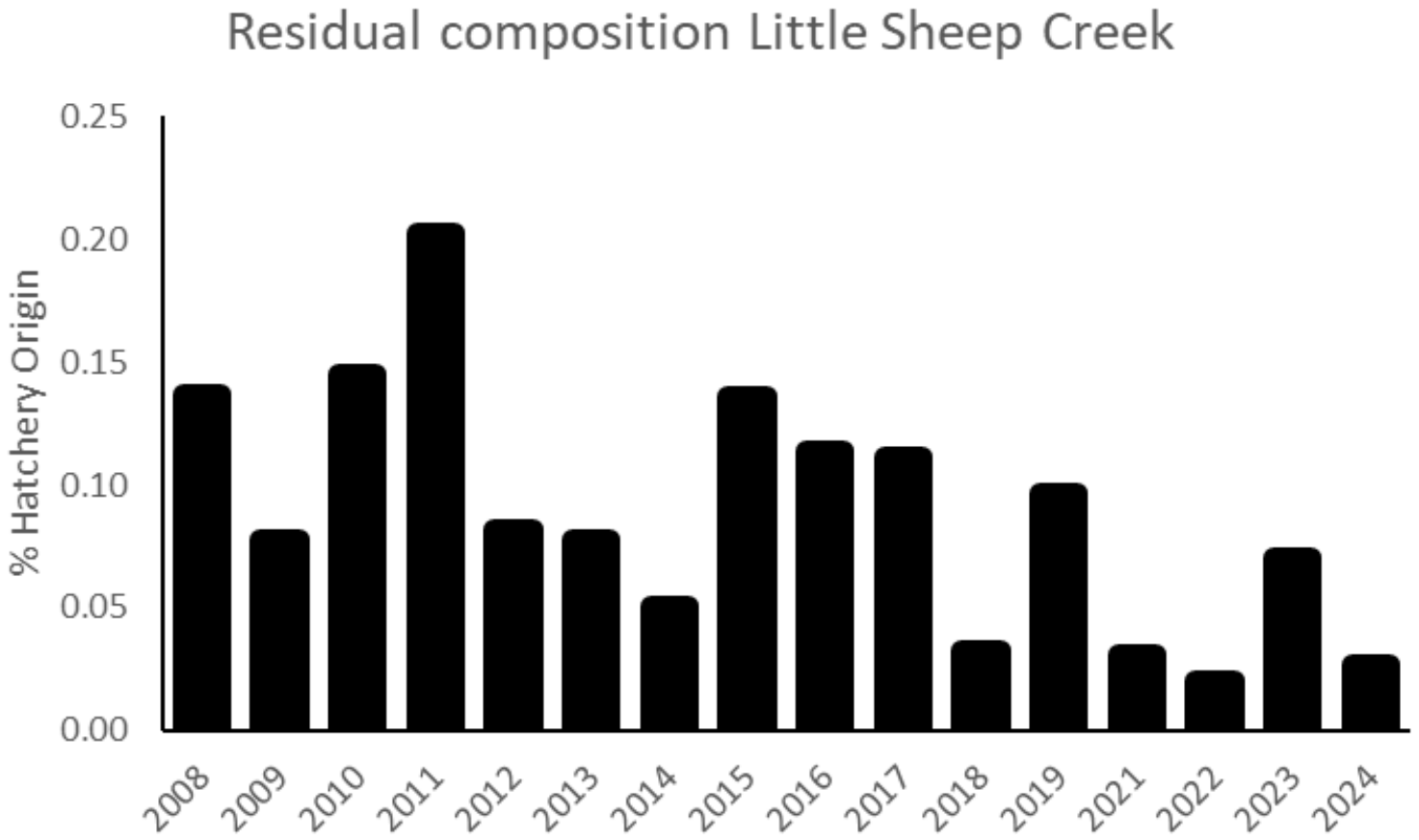


NOAA Genetic Sampling

1st week of August

Backpack e-fishing upstream of Little Sheep (8 sites, 31 km)

Genetics from all juvenile O. mykiss



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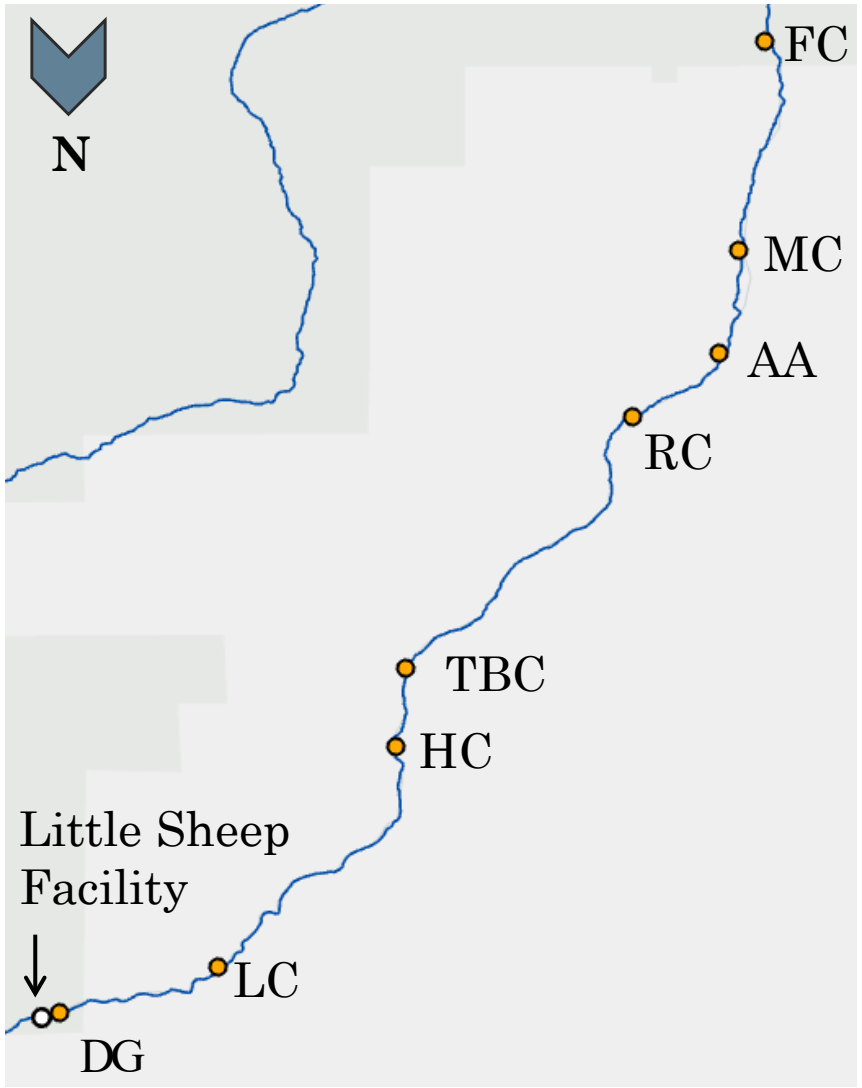
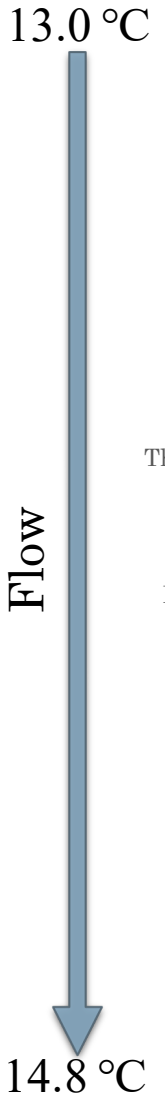
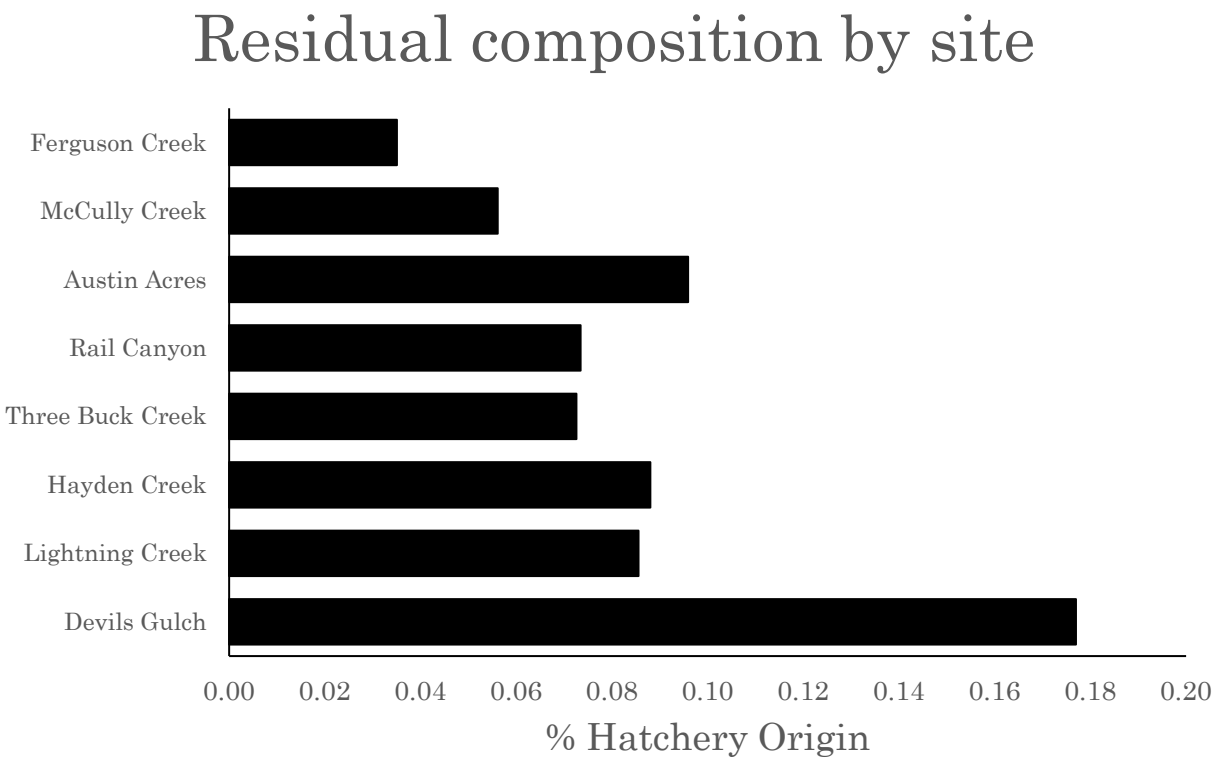
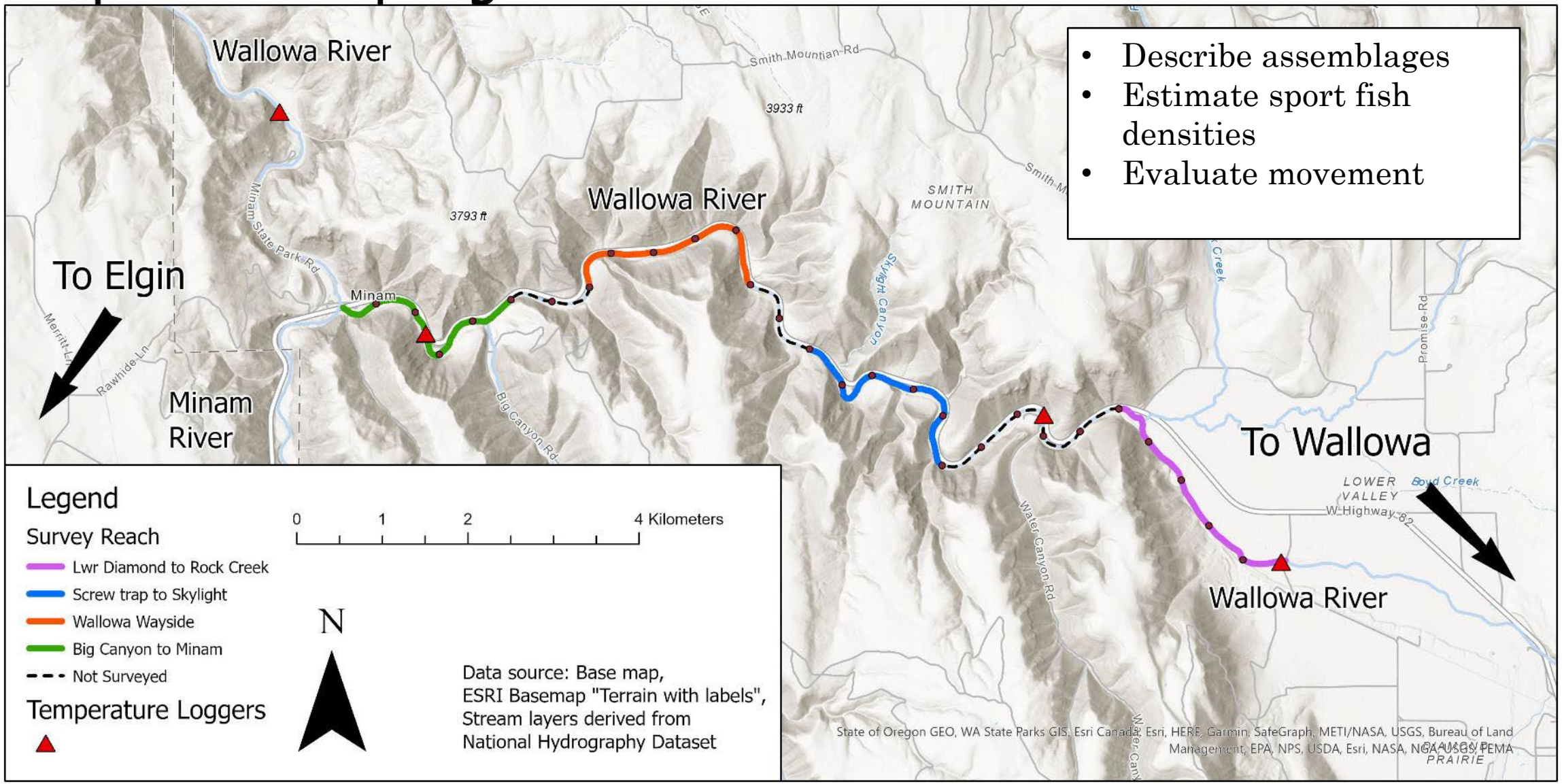






Wallowa River Fisheries Inventory Project
Proposed sampling sites

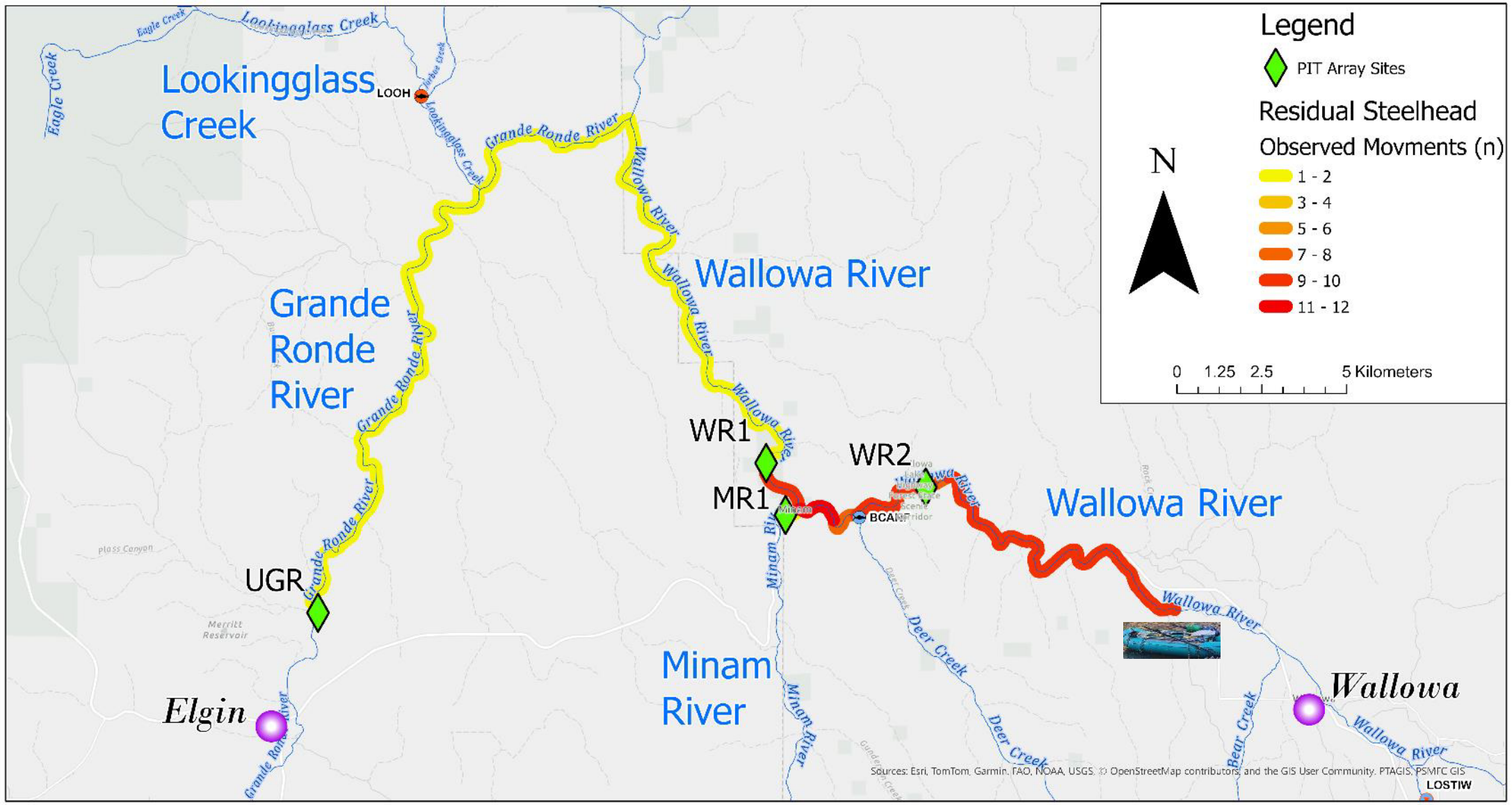


- Describe assemblages
- Estimate sport fish densities
- Evaluate movement

Raft electrofishing

Section	Midpoint to Big Canyon	Natural (2023)	Natural (2024)	Natural (Total)	Hatchery (2023)	Hatchery (2024)	Hatchery (Total)	% Hatchery
Lower Diamond to Rock Creek	12.68 km	64	153	217	6	3	9	4.0%
Skylight Canyon	6.97 km	157	240	397	10	11	21	5.0%
Wallowa Wayside	2.74 km	203	44	247	25	10	35	12.4%
Big Canyon to Minam	1.22 km	183	43	226	43	9	52	18.7%
Totals		**607**	**480**	**1087**	**84**	**33**	**117**	**9.7%**

Wallowa River Fishery Evaluation Project
Residual steelhead movements



Conclusions

- Anglers don't appear to harvest residuals
- Removing the smallest individuals may be a better approach than sex ratio
- Persist longer and move further than originally thought
- Have not been found in high abundance

Questions