

VIE...Viable? Seeing is Believing

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July 2026, PGE Fisheries Workshop



Visible Implanted Elastomer

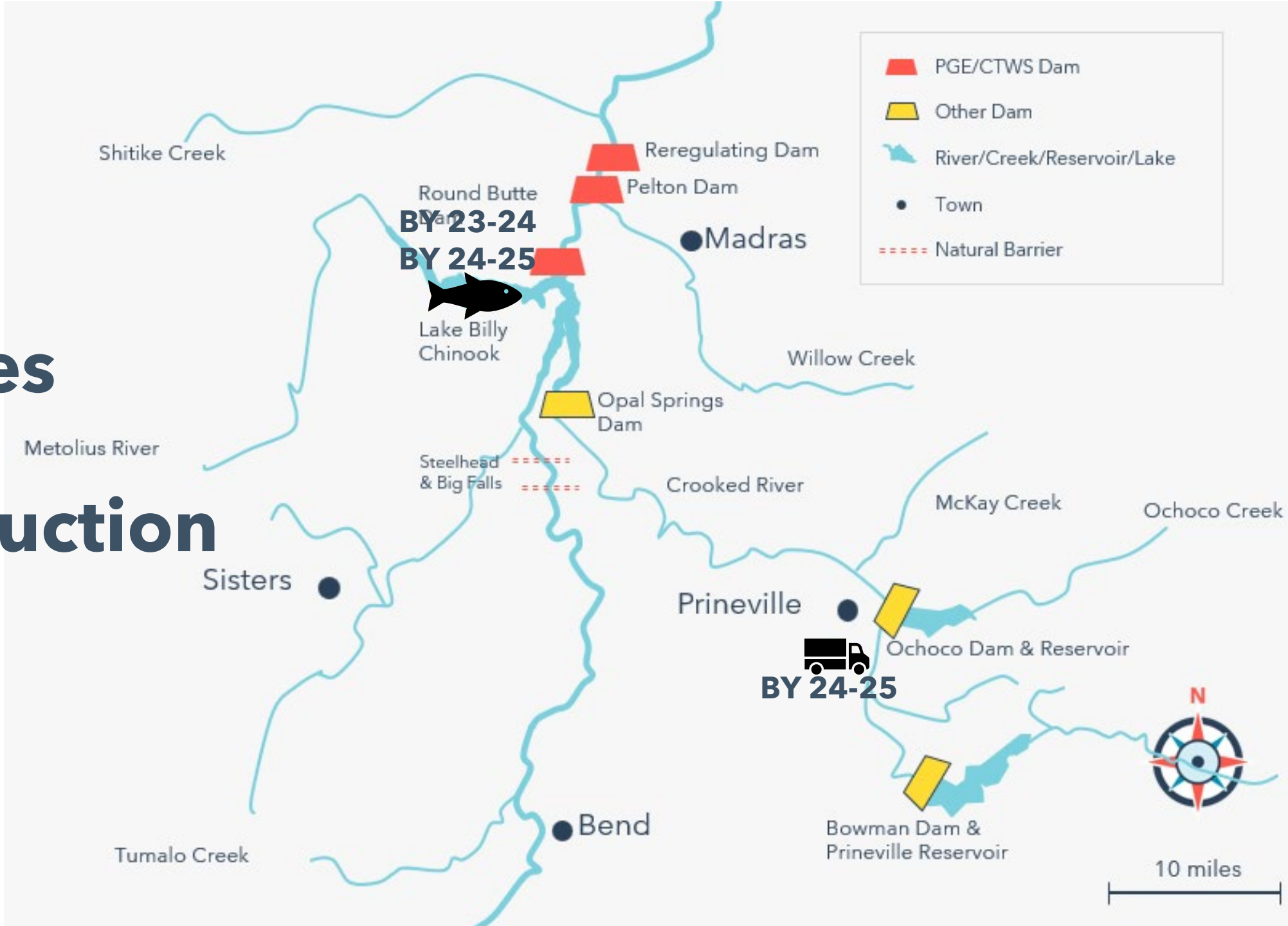


Opportunistic pilot study

- In May of 2025 ODFW Round Butte Hatchery communicated there were extra steelhead fry (~50k) that needed to be disposed of by August of 2025
- Customary disposition transport to Haystack Reservoir
- Co-manager preference is to incorporate them into reintroduction
- Concern with simply releasing extra unmarked fry in middle basin is the confounding effect adding uncertainty to Natural Production estimates (screw trap work)



Middle Deschutes Basin Reintroduction Area



Under the lens of adaptive management want to put “Eggs” in multiple baskets and use mark recapture to test theories that lead to positive outcomes.

Tag type	Tag burden concern	Persistent >200 days	Size compatible fry/parr	Cost efficient	ID tag Mortal
CWT	✓	✓	✓	\$\$	X
Otolith	✓	✓	✓	\$\$	X
Caudal/Pectoral Clip	✓	X	✓	\$	✓
Caudal punch	✓	X	X	\$	✓
Maxillary clip	✓	✓	In use	\$	✓
PIT	X	✓	X	\$\$	✓
Radio	X	X	X	\$\$\$	✓
VIE	✓	?	✓	\$	✓



What is VIE?

Visible Implanted Elastomer



- Bio-compatible two-part elastomer that hardens into a silicone pellet
- Injected into tissue with hypodermic syringe
- Material is injected into transparent or translucent tissue
- Material reflects light in multiple colors with UV light (multiple experimental groups)
- With an experienced crew can mark thousands of fish in a week's time period -> How many?



Northwest Marine Technology, Inc.



Air Driven Elastomer Injection System



Northwest Marine Technology, Inc.



Pilot study design

Two-pronged approach:

1) Want to assess tag retention using control groups

**-Reared three groups at Round Butte hatchery marked
early, middle and late (4 weeks)**

**2) Took advantage of extra production released all VIE marked
fry into Whychus Creek**



Marking by the numbers



- **Marked total of 49,875 fry**
- **4 primary taggers**
- **May 21 to June 19**
- **Tagging and handling mortality 191 individuals**
- **Delayed mortality 42 individuals**



VIE Marked fry distributions

Control Group

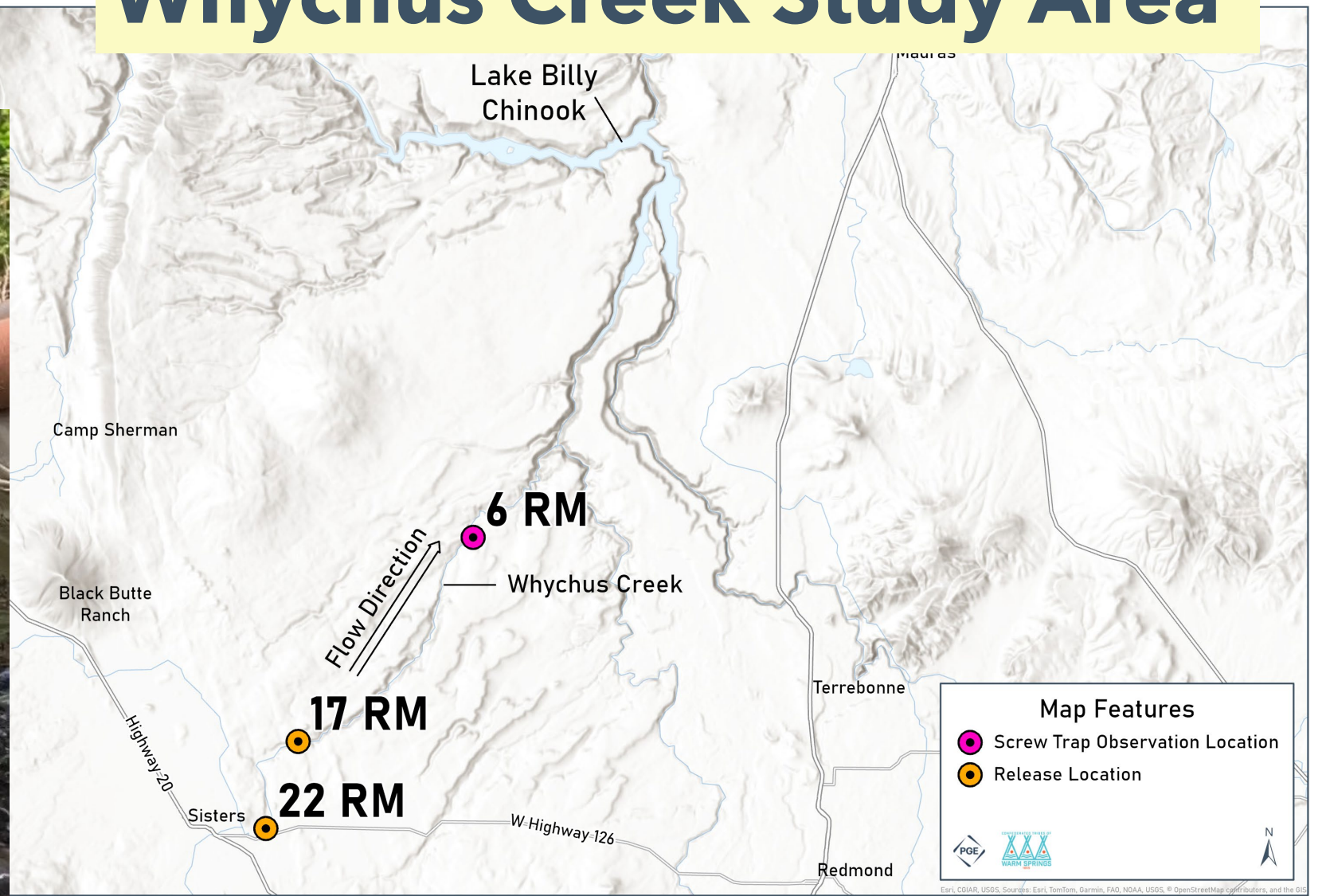
Batch	Dates Marked	Total	Mean size (mm)	Percent tagged by top four taggers			
				1	2	3	4
Early	5/21- 6/4	800	53.4	18	20	33	9
Middle	6/5 - 6/12	750	57.3	18	20	42	20
Late	6/13 - 6/19	750	57.5	14	15	37	34

Parr released into Whychus Creek

Release Group	Date Released	Total Released
Early	6/12	16,542
Middle	6/23	15,137
Late	6/24	15,881



Whychus Creek Study Area



**Elastomer injection
behind the left eye**

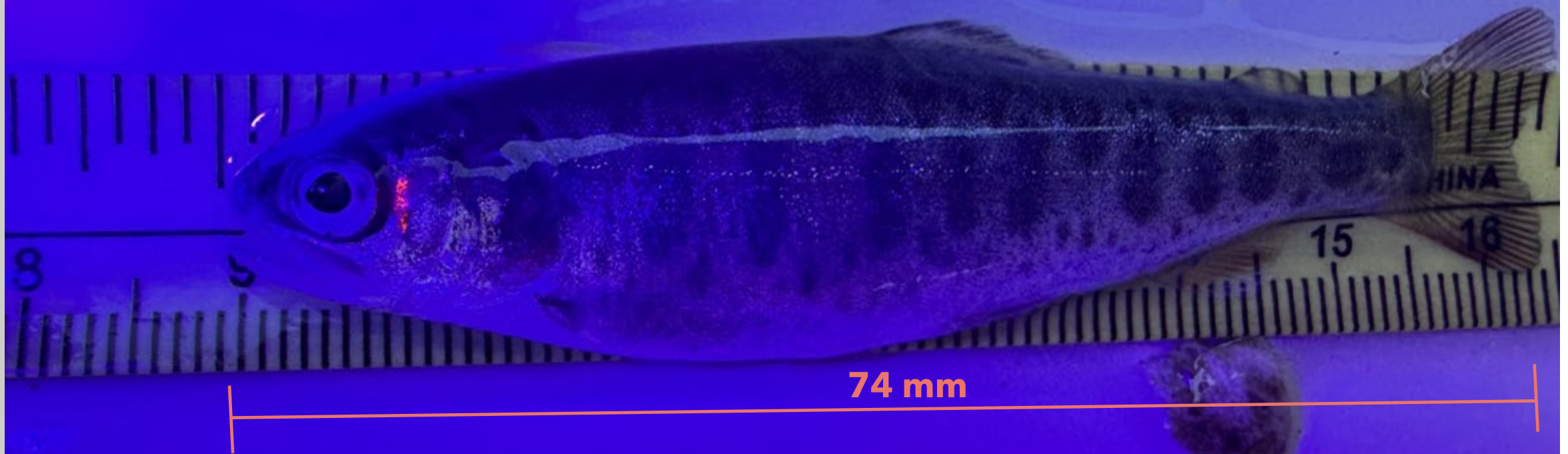
**The eye area has
least proportional
growth over time**

**Next to traditional
left maxillary clip
location**

**fry pictured here is
about 48-54mm**



VIE highly visible

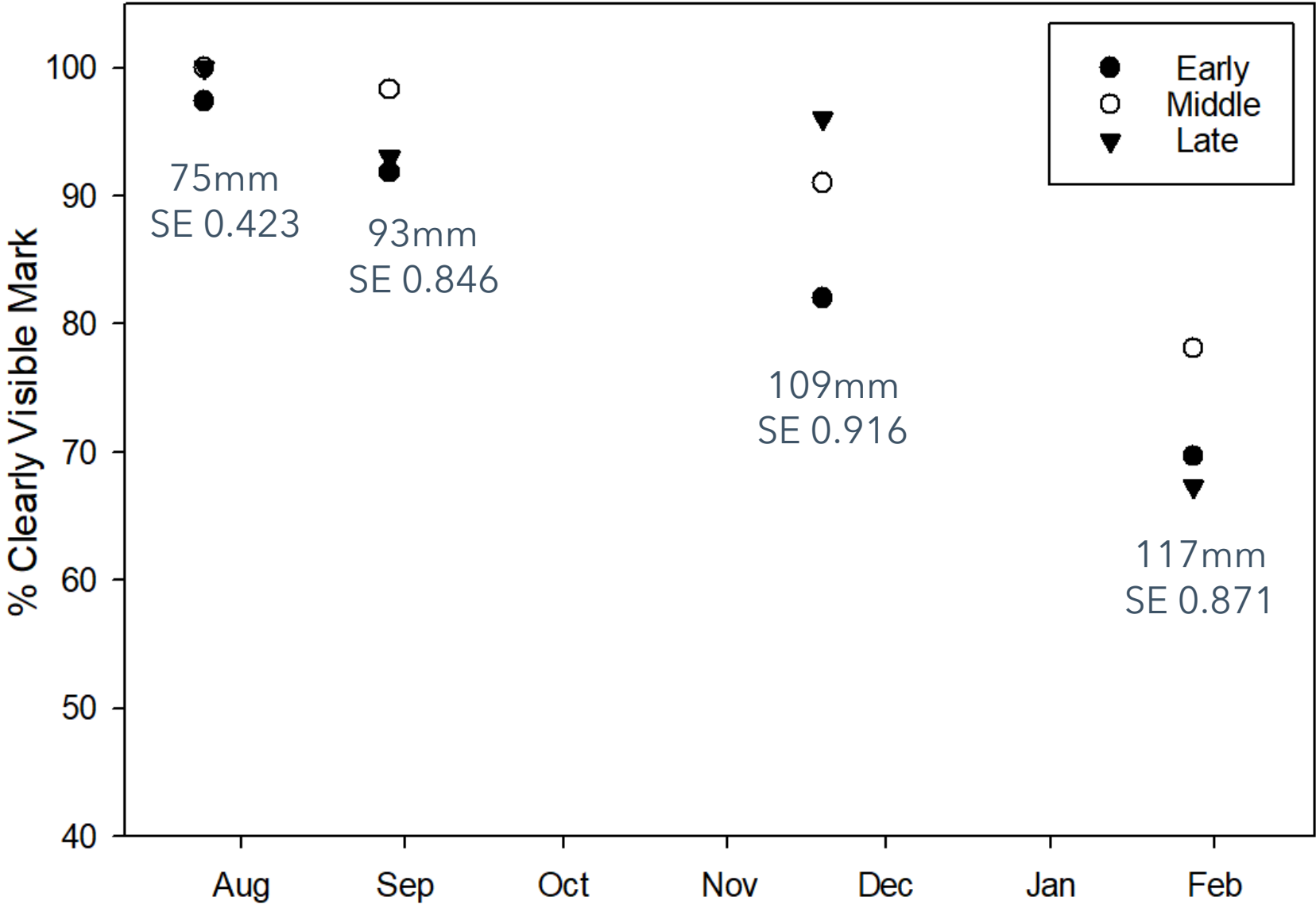


**Even the
smallest
amount of
VIE is
identifiable
under UV
light if
injected in
the right
tissue**

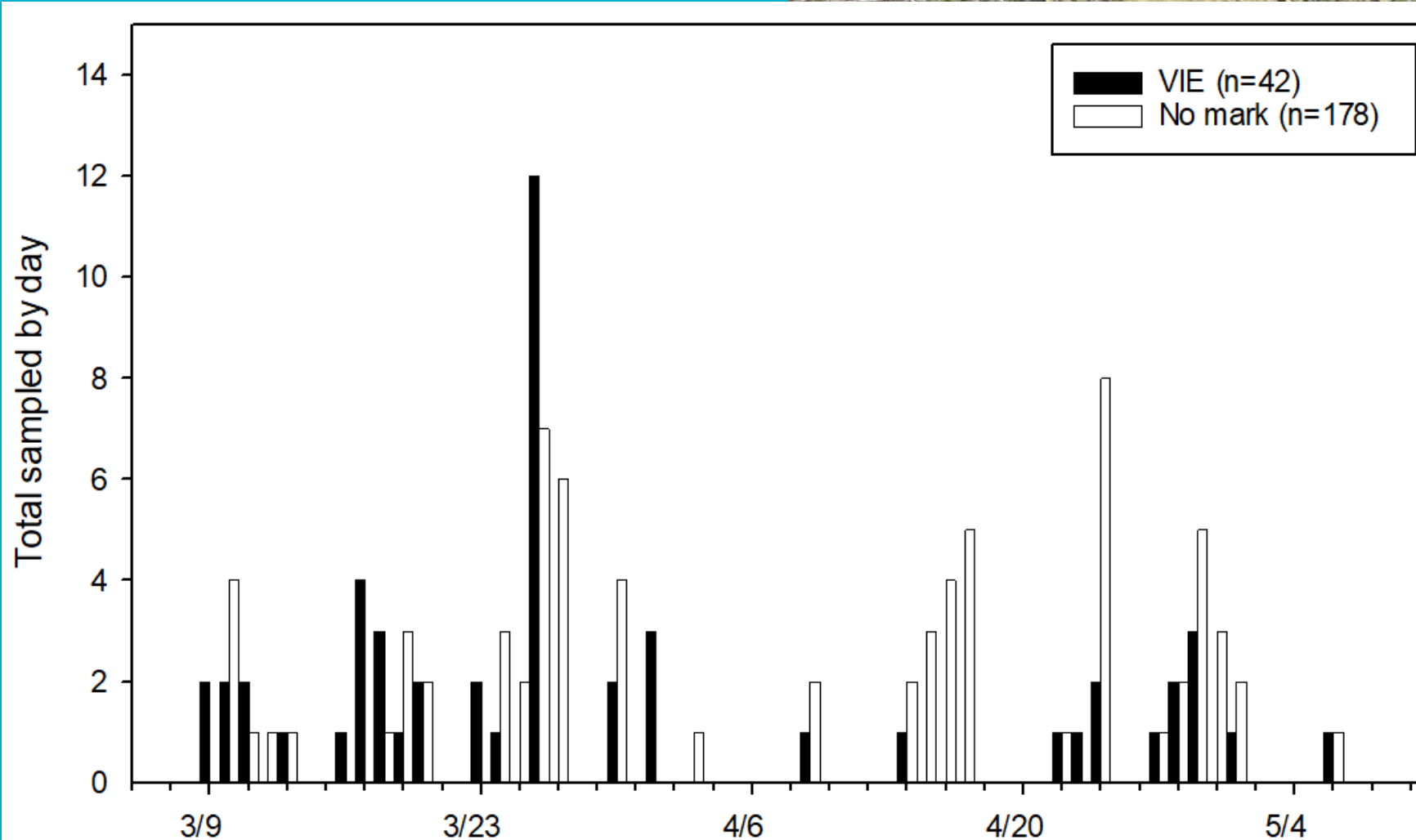


Mark Retention Results

Moderate tag loss over time (186 d) in all control groups



VIE positive vs VIE negative O Mykiss sampled at Whychus Creek in 2026



Mean Length

VIE positive 148mm (n=42)

VIE negative 133mm (n=178)

Mann-Whitney Rank Sum Test ($P = <0.001$)

- **Seven VIE positive steelhead were collected at SWW**



Summary

- Expected tag retention is approximately 70% when fish grow to approximately double the size
- Initial size at marking matters
- Marking capacity ~15,000 fish per week with three experienced taggers & Air Driven Elastomer Injection Systems
- Batch marking one group is feasible but more sophisticated study designs would require better preparation and space for control groups
- Successfully detected VIE marked juveniles in the field



Take home message - lessons learned

- VIE realistic tool for sub-sampling ~30,000 fish (2 weeks & 8 hours a day)
- Sub-sampling will produce lower precision of Natural Production Estimates (screw trap sampling)
- Parr may be a better life stage with higher tag retention rate
- July/August is a good time frame for marking with release in September



Questions?

Thank you to:

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