A Field Evaluation of the Growth and Survival of Age-0 *Oncorhynchus mykiss* Tagged with 8-mm Passive Integrated Transponder (PIT) Tags

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Background

Goal: represent as much of the population through PIT tagging; requires small tags

8-mm tags introduced in 2011 and resulted in lab studies of effects on small fish

Results of many were great: high survival, good growth, etc.

Common Discussion point: field evaluations needed

Conducted a field evaluation of 8-mm tags in the Wind River in 2017

Objective: Evaluate growth and survival in age-0 *O. mykiss* tagged with 8-mm tags under field conditions

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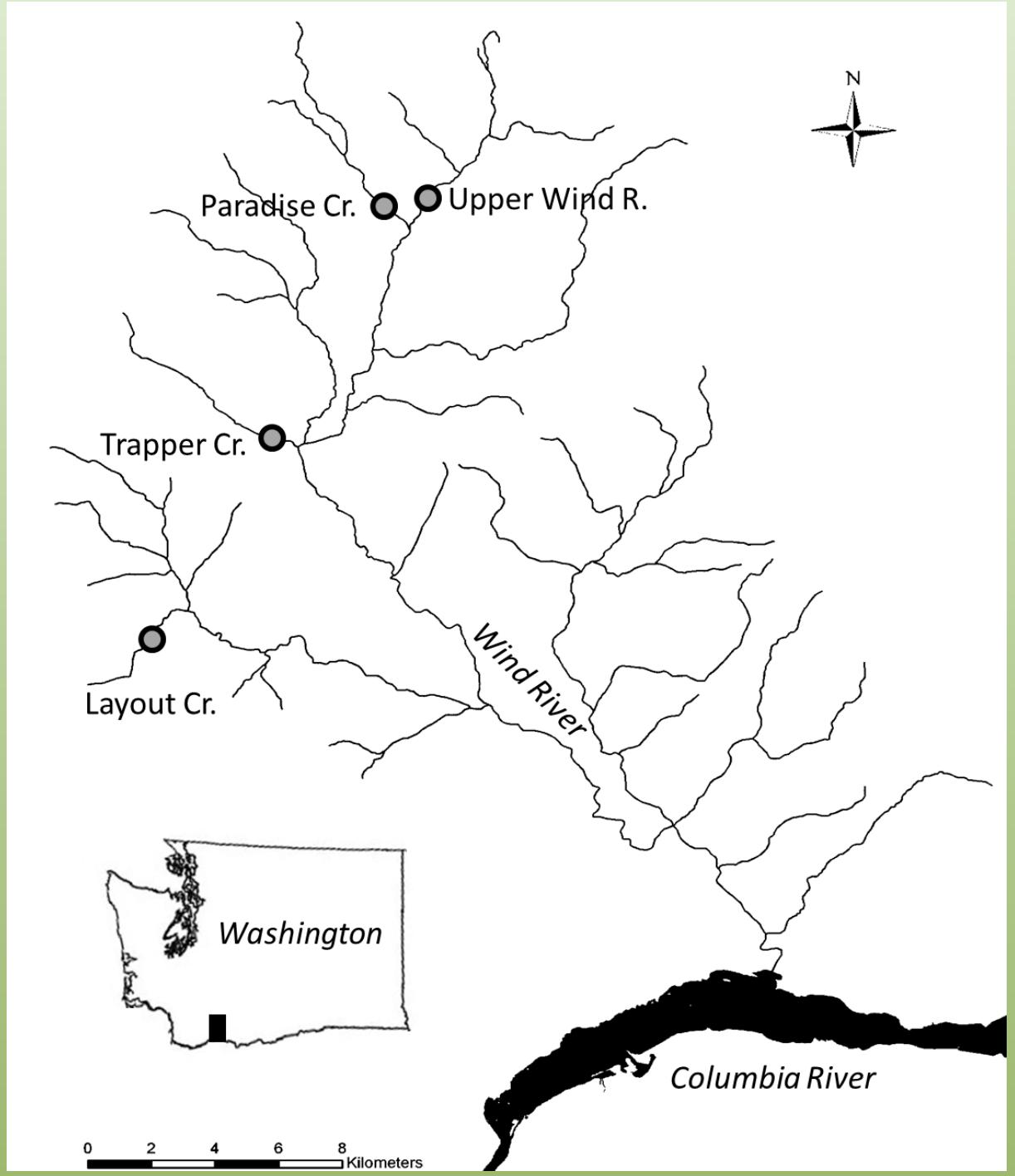
Study Area



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Methods

Fish collected first week in August 2017 by backpack electrofishing (550–700 m reaches)

Small group: 42–54 mm, large group: 55–64 mm

All fish received 8-mm tags (Biomark MiniHPT8)

Control fish had right or left pelvic fin clipped

Fish recaptured 57 days later in late September

3-pass removal in 80–100 subsections to estimate capture probabilities to later estimate the joint probability of survival and remaining at site

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Analysis

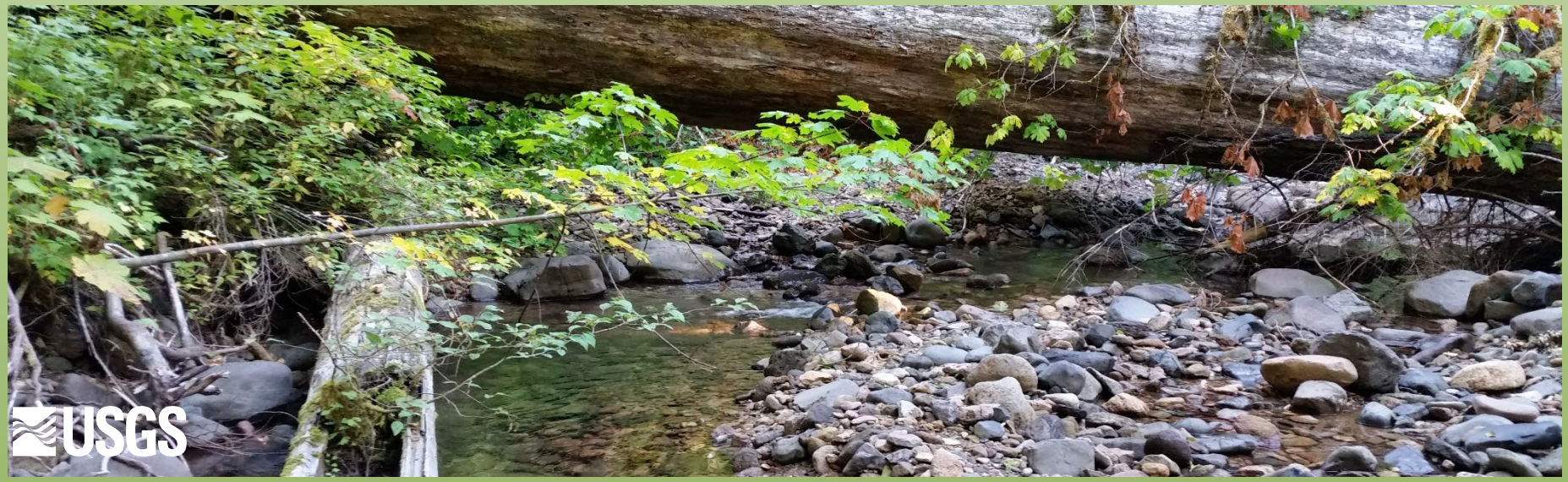
Growth in length: mm/d, Growth in mass: mass standardized (g/g/d)

Pooled fish across all streams to compare growth between fish groups

Use a linear regression to relate fish growth in mass to tag burden

Bayesian mark-recapture model to estimate the effect of tag burden on survival and to estimate the joint probability of survival and remaining in the study area

Estimated the effects of fish size on capture probability



Results

Mean length and weight

Small: 44–49 mm, 0.9–1.3 g

Large: 55–59 mm, 1.5–2.3 g

Tag burden

Small: 2.3–3.3%

Large: 1.3–2.0%

Recapture rates

Treatment	Small	Large
Tagged	15–30%	14–32%
Control	0–10%	5–17%

Growth

Treatment	N	mm/d	g/g/d
Small tagged	64	0.20±0.073	0.017±0.006
Small control	11	0.19±0.083	0.013±0.007
Large tagged	19	0.19±0.081	0.015±0.007
Large control	6	0.09±0.095	0.010±0.006

Not different

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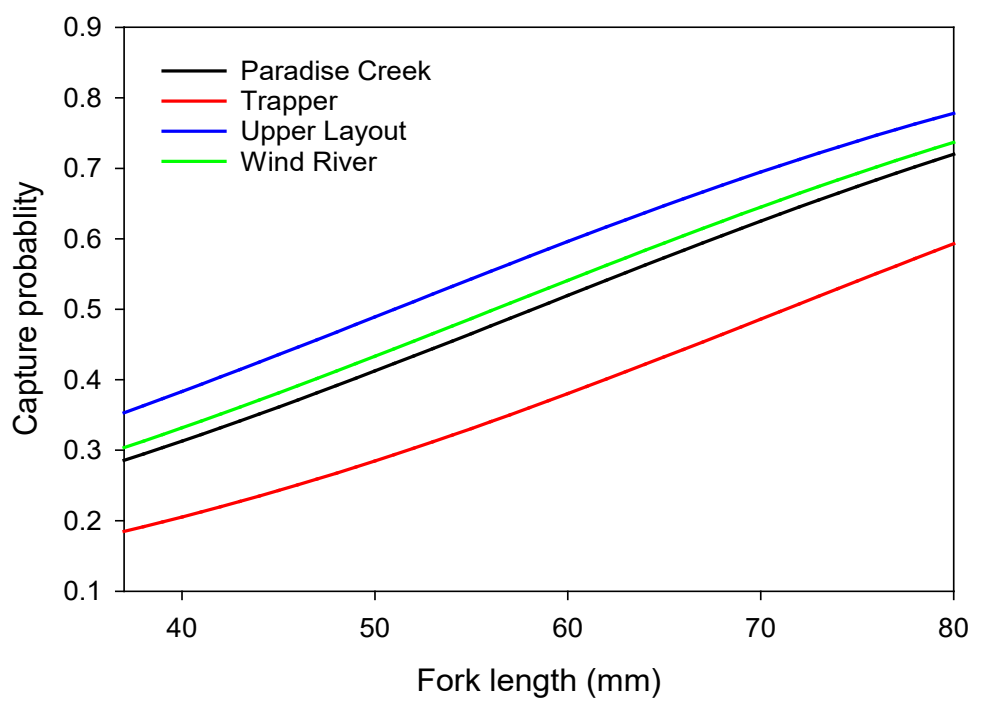
Strong effect of fish size on capture probability (slope = 0.359)



No effect of tag burden on fish survival (slope = 0.027)

Stream	Survival	95% credible interval
Paradise	0.478	0.302, 0.651
Trapper	0.457	0.268, 0.683
Layout	0.303	0.131, 0.530
Wind	0.228	0.119, 0.382

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Discussion and Conclusions

Low recaptures of control fish: fin regrowth, misidentification, higher predation mortality, differential emigration from study area?
(12 tagged fish detected leaving)

Fin clipping somewhat confounded with PIT tagging: fin clipping is common, but mark not unique. Controls didn't influence tag comparisons or survival of tagged fish.

Size-related capture probability not surprising: larger fish e-fished and observed more easily. Larger substrate in Trapper Cr = more hiding places for fish.

Growth: Fish size and tag burden did not negatively affect growth. Control fish grew same or slightly slower than tagged fish.

Survival: Not affected by tagging. Varied widely between study streams but within range reported by other studies.

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Questions?

Tiffan, K.F., I.G. Jezorek, and R.W. Perry. 2019. A field evaluation of the growth and survival of age-0 Oncorhynchus mykiss tagged with 8-mm passive integrated transponder (PIT) tags. Animal Biotelemetry 7(1):1–8

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