

# A Long-Term Assessment of Juvenile Steelhead Growth and Age Structure in Idaho

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## Introduction

- Previous analyses (“A Decade of Scales”) examined length and scale-based age estimates from more than 13,000 juvenile steelhead collected at four Idaho screw traps (2007–2017). That work revealed strong site- and year-specific variation in growth and age structure.
- We extend the dataset through 2024 to evaluate long-term trends in juvenile growth at these same sites.

## Objective

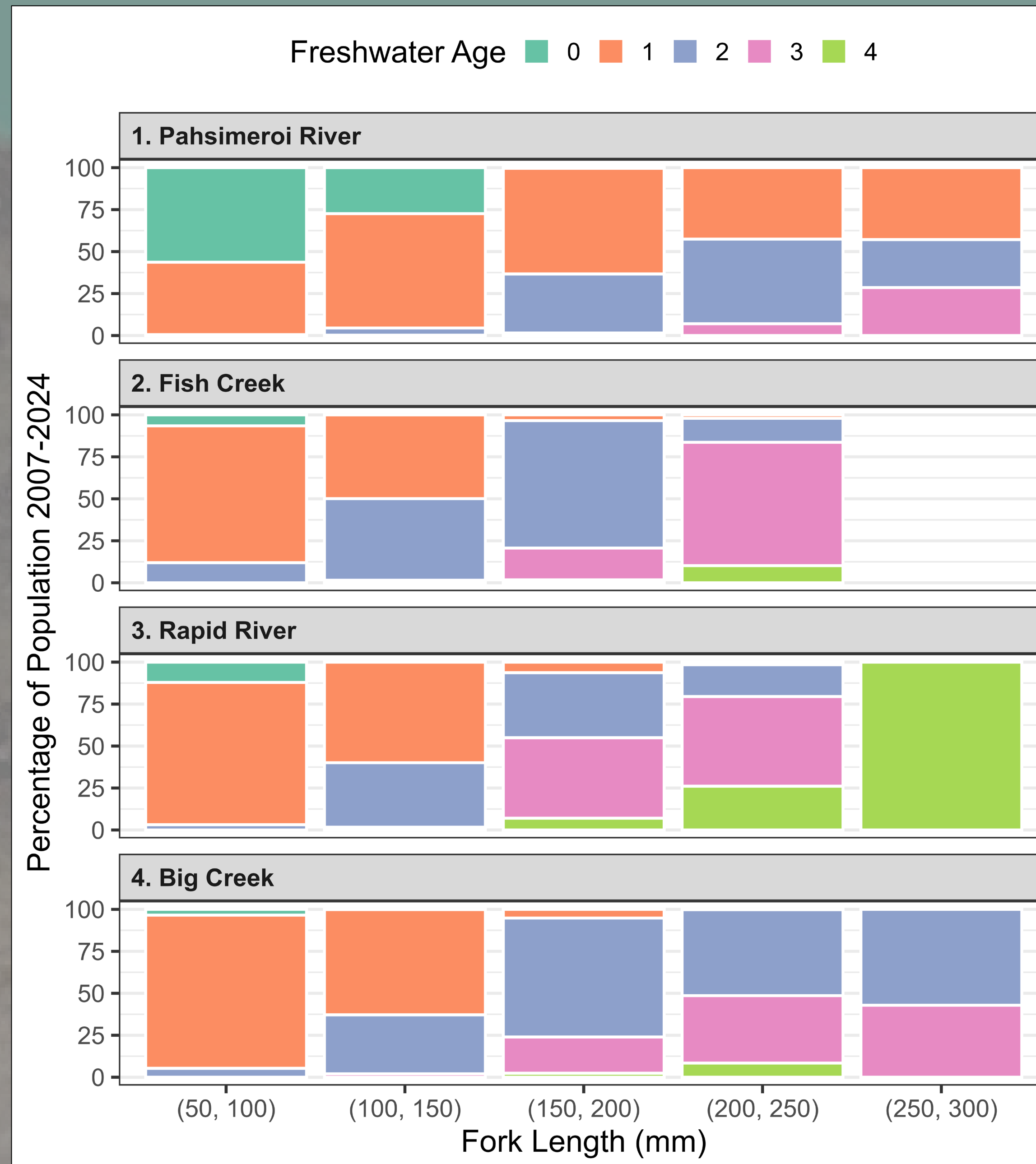
- We examined the length-at-age relationship using 17 years of scale-aging data to better understand:
  1. Age composition at four Idaho collection sites
  2. Similarities and differences in freshwater growth patterns among sites

## Methods

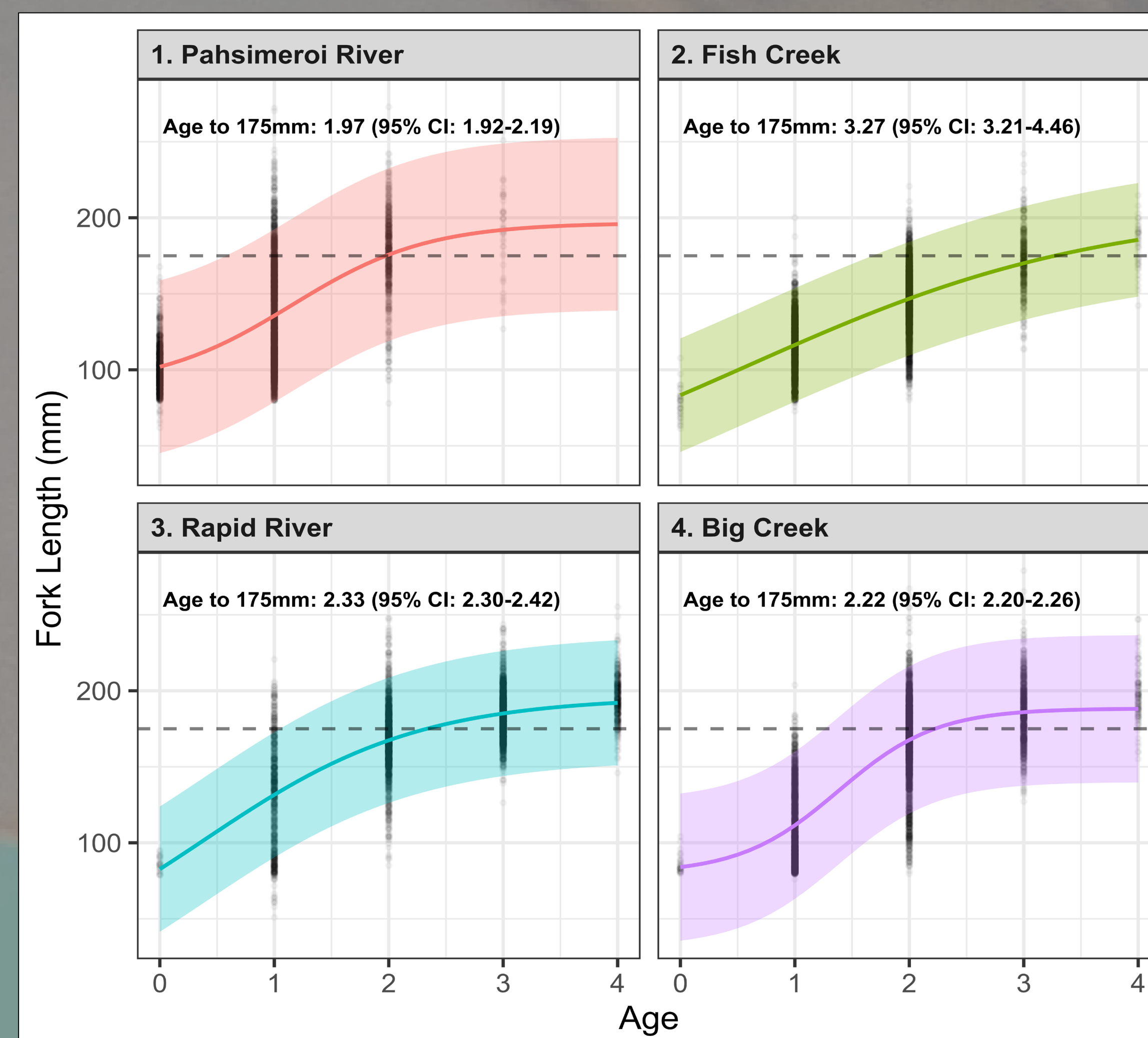
- Juvenile scales were collected at four sites representing different populations: 1. Pahsimeroi River ( $n=4,775$ ), 2. Fish Creek ( $n=6,207$ ), 3. Rapid River ( $n=5,198$ ) and 4. Big Creek ( $n=6,131$ ) (Fig.4).
- Scales were digitally imaged and independently aged by two readers, with discrepancies refereed against historical length-at-age relationships.
- Four-parameter logistic growth models estimated the age at 175 mm for each stream, with 95% confidence intervals.

## Results

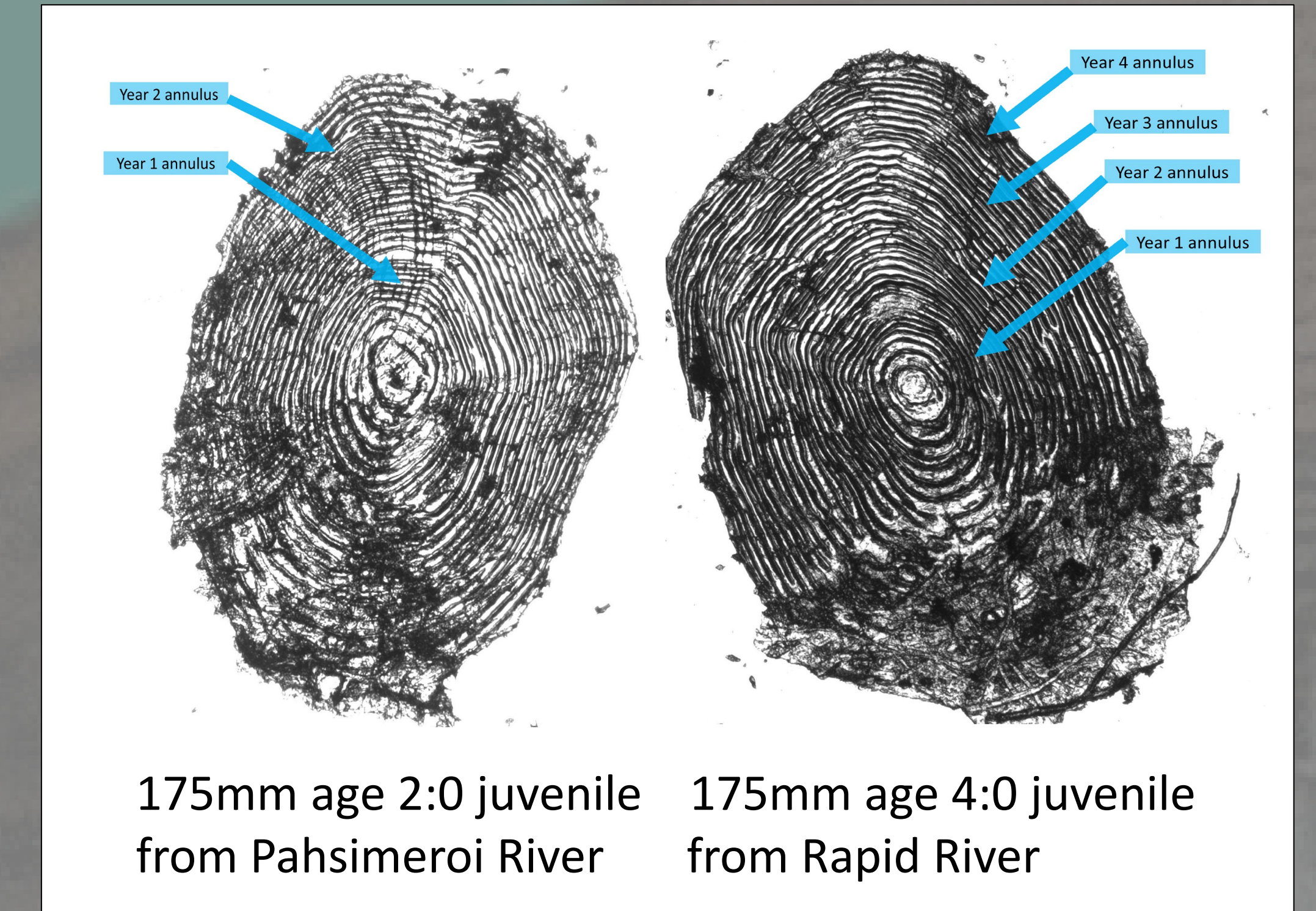
**Figure 1.** Age composition by length across four Idaho steelhead populations, 2007-2024 ( $n=22,311$ ).



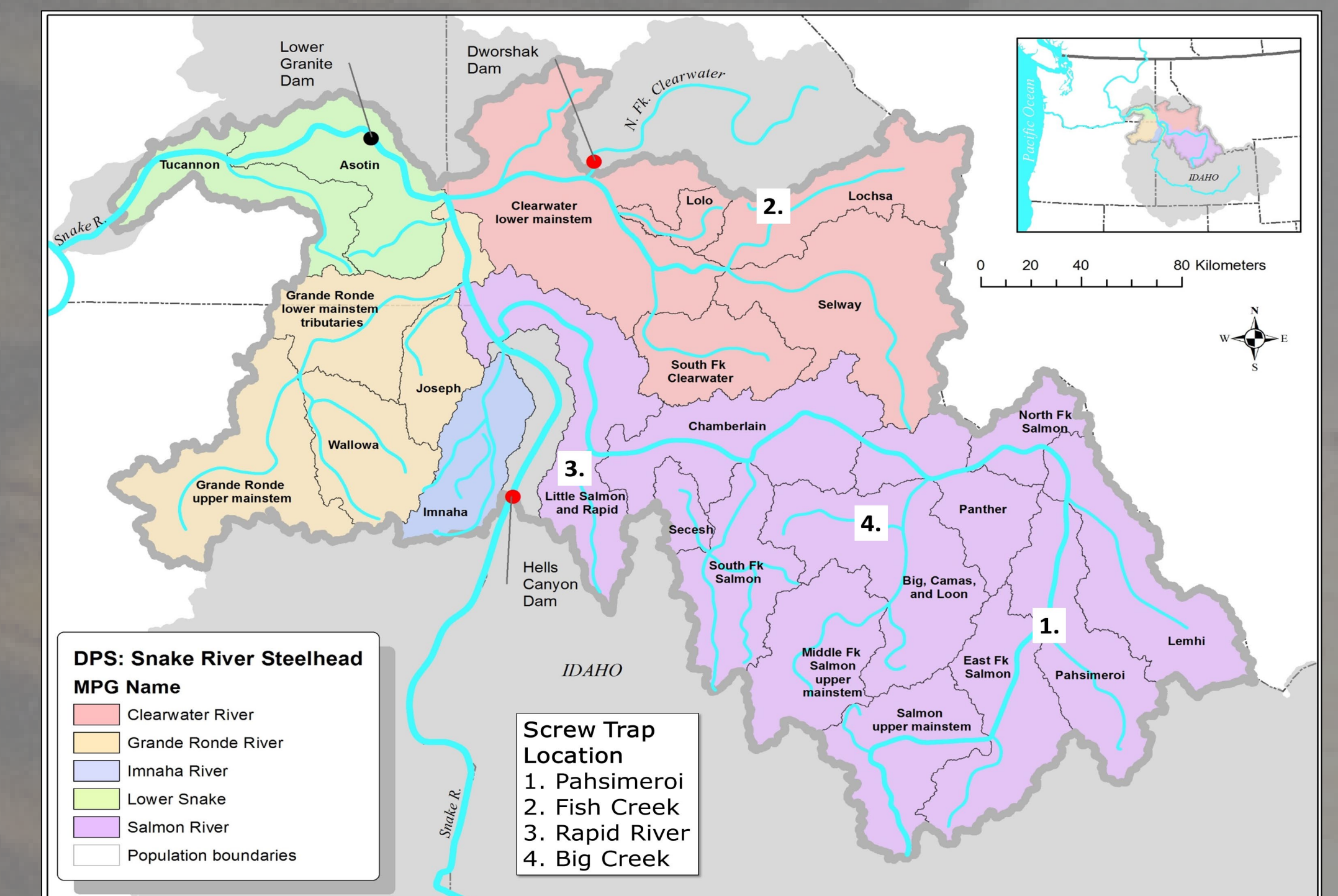
**Figure 2.** Growth trajectories showing age to reach 175mm. Lines show logistic models with 95% CI.



**Figure 3.** Comparison of scale growth patterns.



**Figure 4.** Juvenile screw trap location and steelhead Major Population Groups.



## Discussion

- Natal stream conditions strongly shape juvenile steelhead growth.
- Age at 175 mm varies from 1.97 to 3.27 years across sites, with non-overlapping confidence intervals.
- These differences indicate population-specific growth strategies relevant for forecasting and management.
- Future work will link growth variation to habitat drivers such as temperature, productivity, and flow.