Bull Trout Reintroduction Efforts in the Upper Willamette Basin

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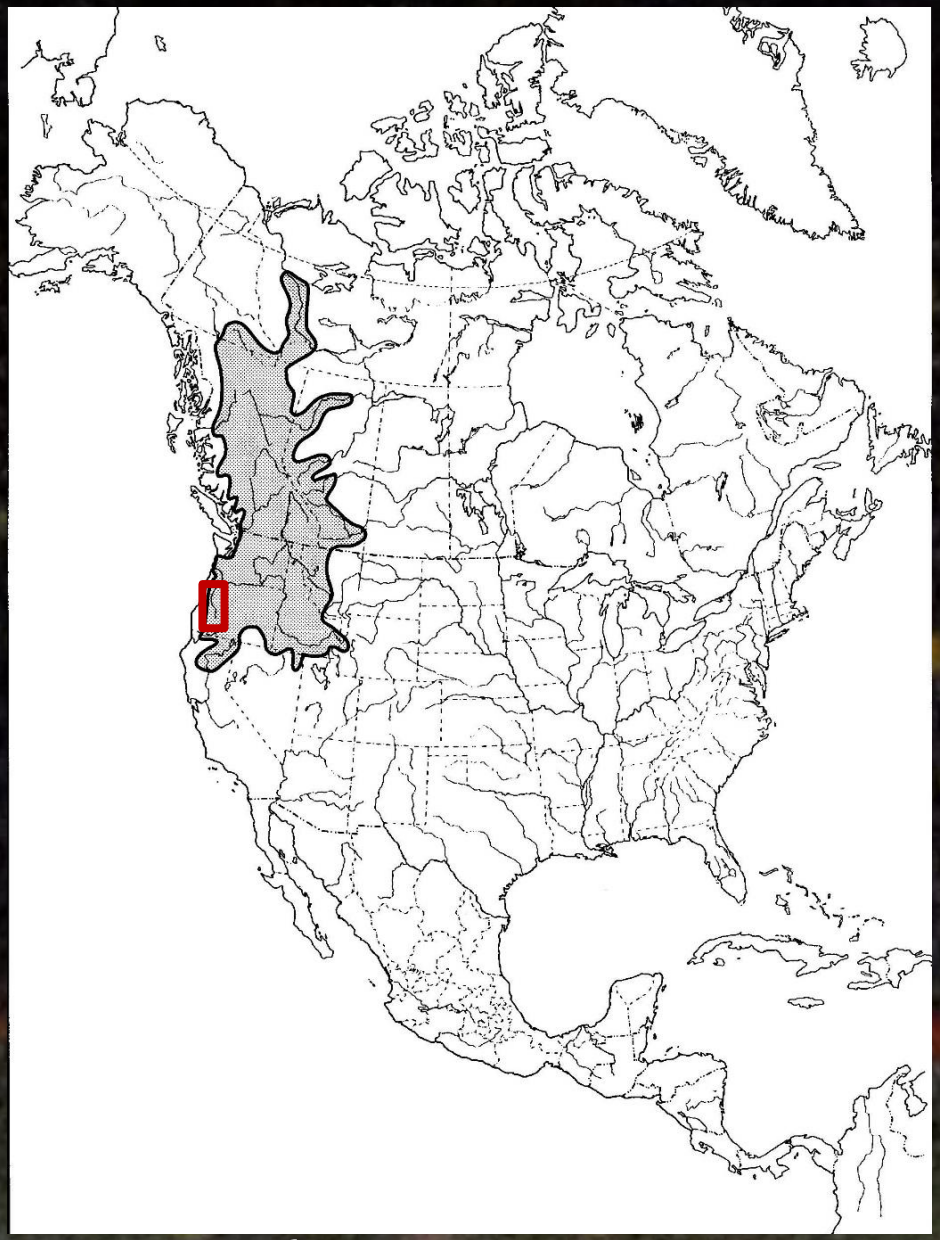
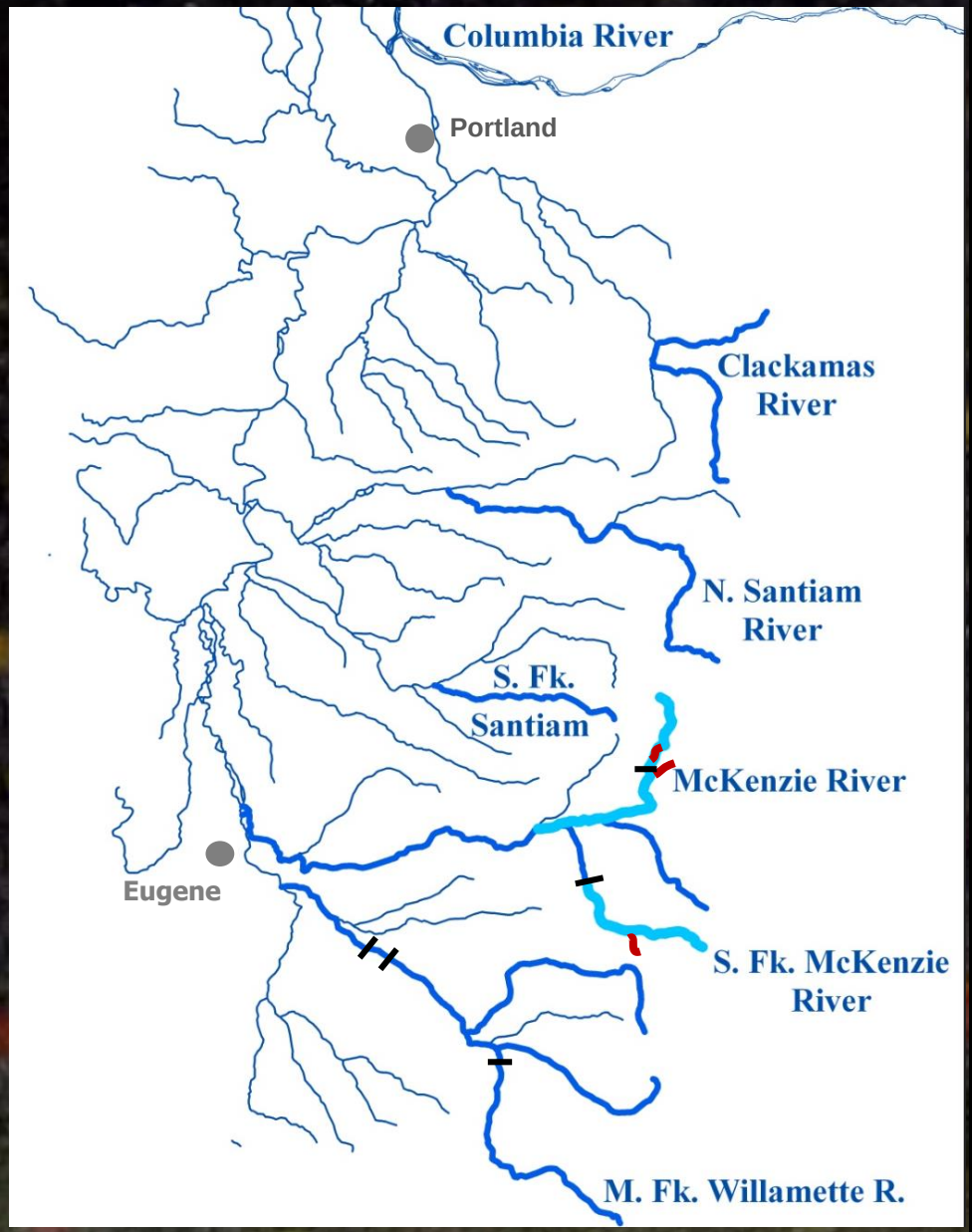
Bull Trout Distribution



Historical Range (McPhail & Baxter 1996)

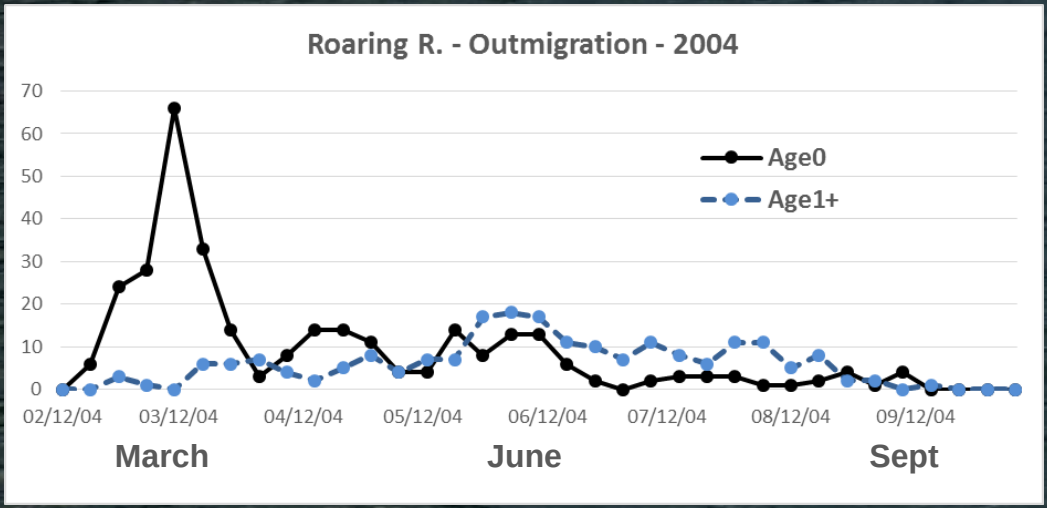


Willamette Basin

Factors Contributing to Decline

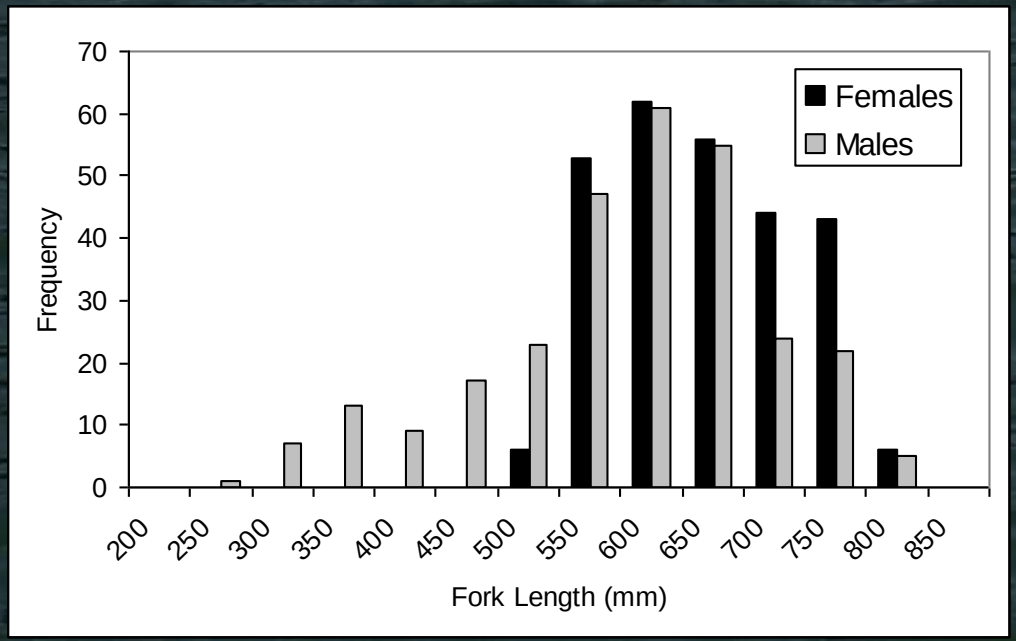
Pathogens?

Upper Willamette Bull Trout
Migratory Life History



Post-Spawn Adults

Juveniles – Screw Trap



Upper Willamette Bull Trout Reintroduction Background

- 1980s: Increasing concern, Status assessment
- Upper Willamette Bull Trout Working Group
- Reintroduction planning
  - Feasibility
  - Implementation
  - Monitoring

Upper Willamette Reintroduction

Feasibility

- Recipient habitat
  - Historical occupation
  - Habitat suitability
  - Threats mitigated
  - Natural recolonization
- Donor population
  - Evolutionary match
  - Sufficient abundance

Upper Willamette Reintroduction

Feasibility

- Recipient habitat
  - Historical occupation
  - Habitat suitability
  - Threats mitigated
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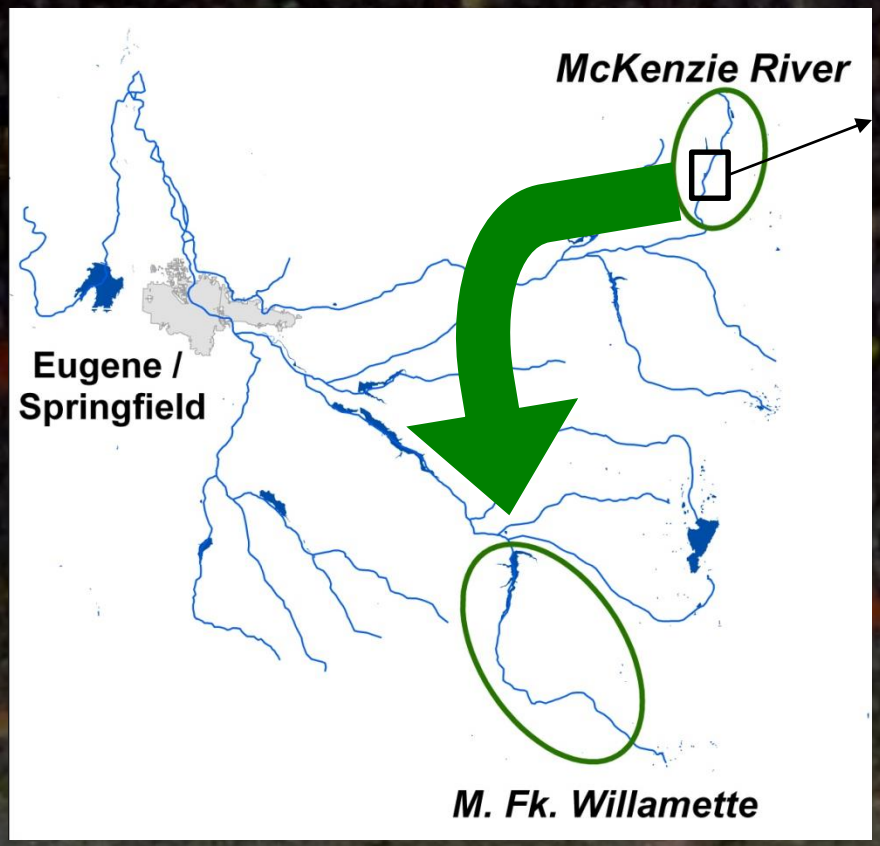
- Donor population
  - Evolutionary match
  - Sufficient abundance

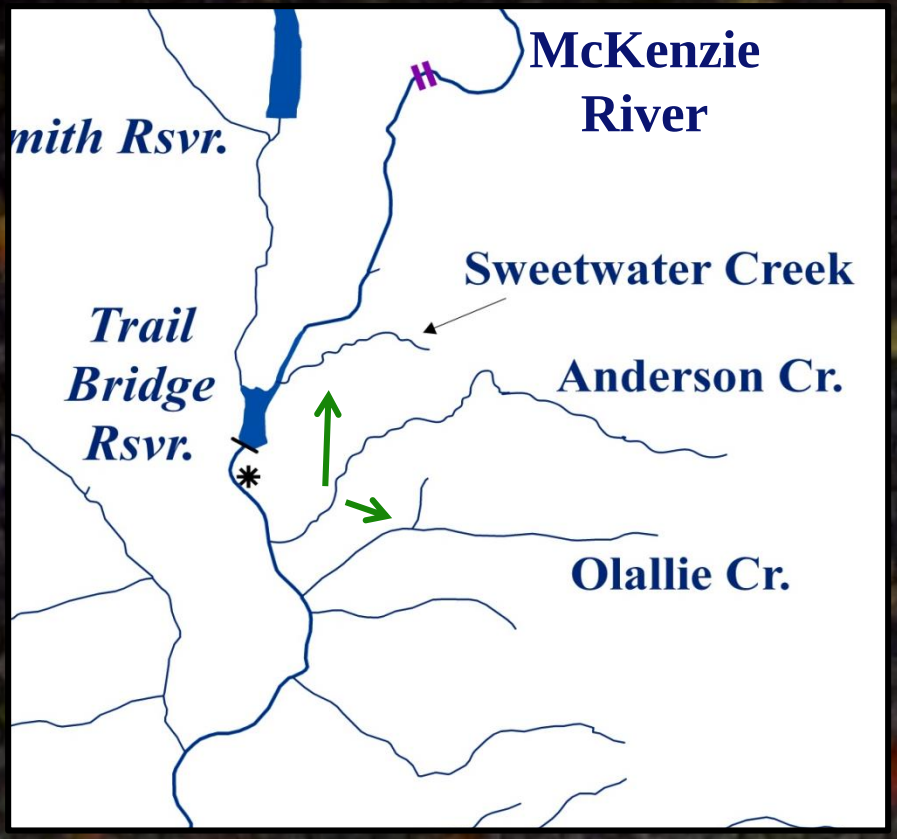
Sweetwater Creek
Olallie Creek
M Fk Willamette River

Anderson Creek

Upper Willamette Reintroductions

1. Sweetwater Creek
2. Olallie Creek
3. M Fk Willamette





Upper Willamette Reintroduction

Implementation

- Collect fry from Anderson Creek
  - Screw trap 0.7 km from mouth
  - February – May
  - High abundance (take <10% of estimated annual production)
  - High genetic diversity
- Immediate transfer
  - Wild fish (no domestication)
  - Appropriate size
  - Likely to imprint

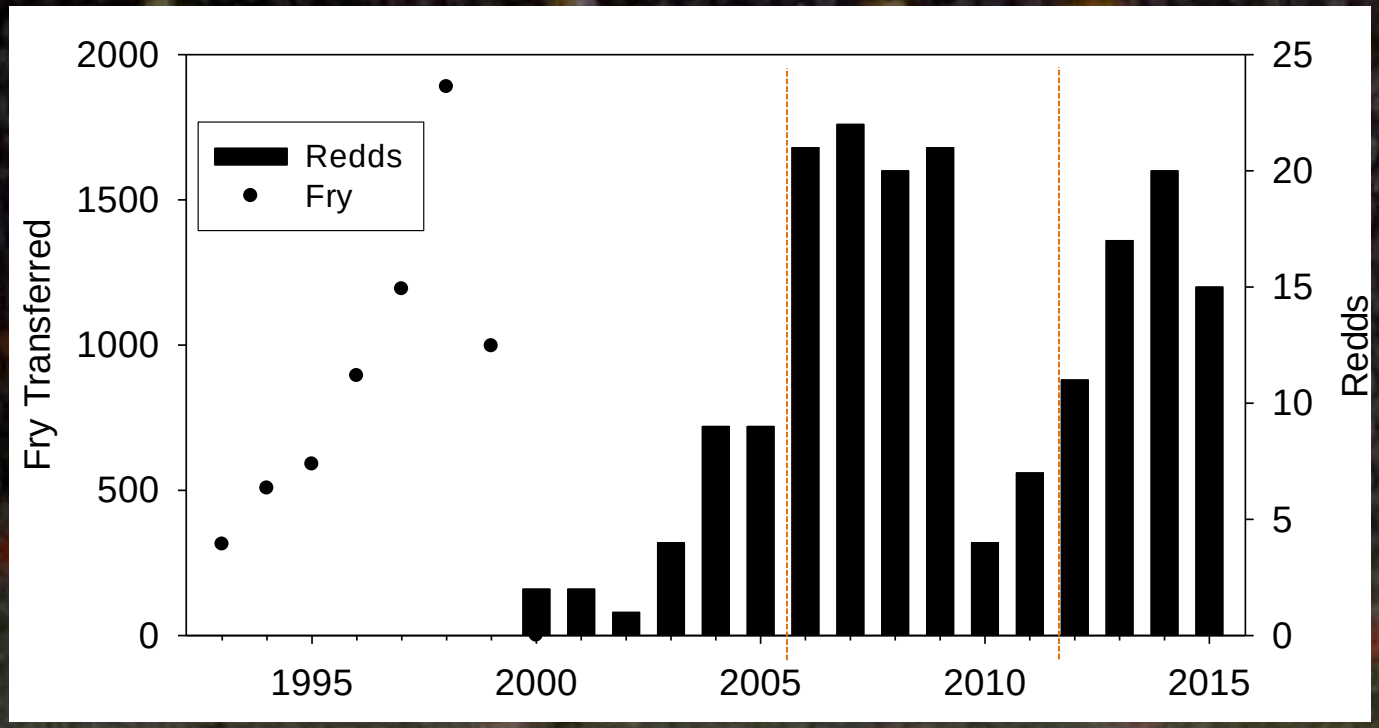
Upper Willamette Reintroduction

Monitoring

- Screw traps
- Snorkeling
- Minnow traps
- Redd surveys
- Electronic monitoring (PIT tags, video)

Sweetwater Creek

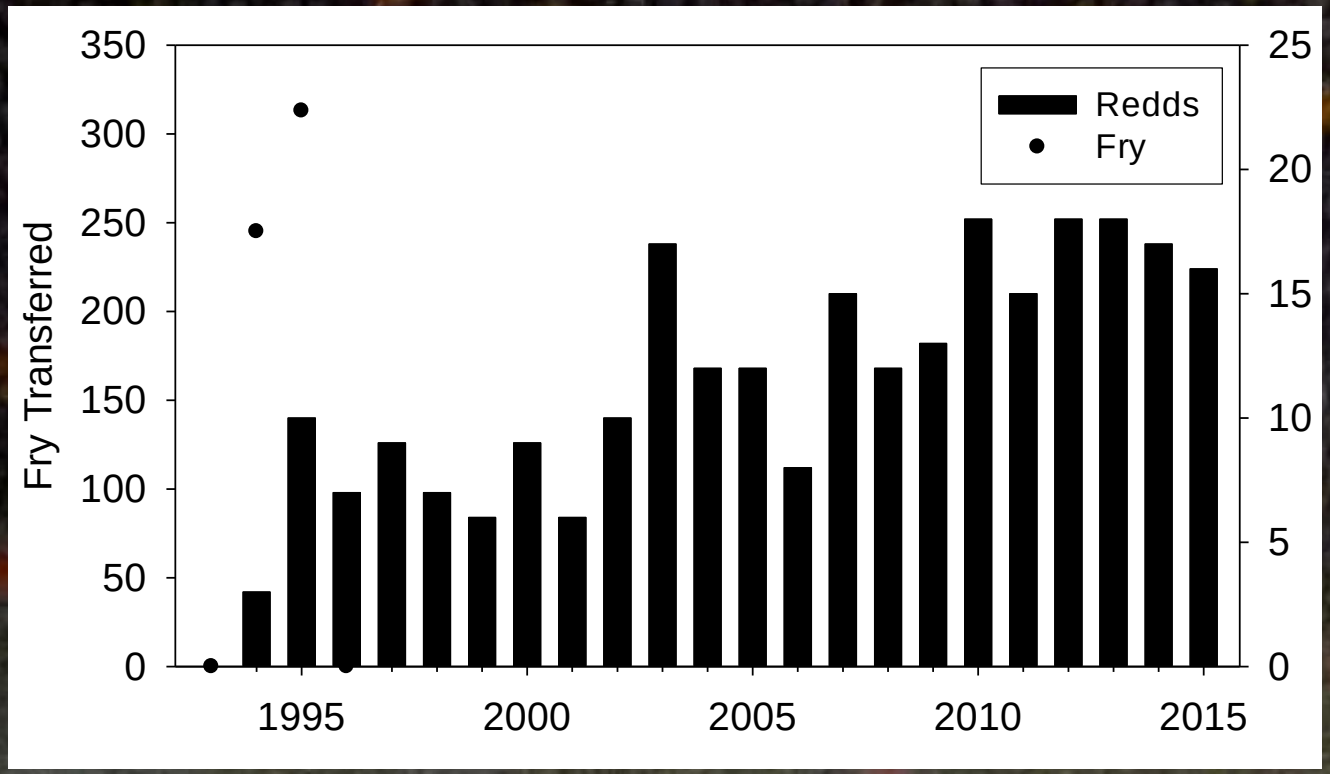
- 1962: Impassable culvert at mouth
- 1993: Corrected culvert
- 1993 – 1999: Transferred 6,377 fry
- Median 894 fry/yr -> 3 redds/yr ('00–'05)



Olallie Creek

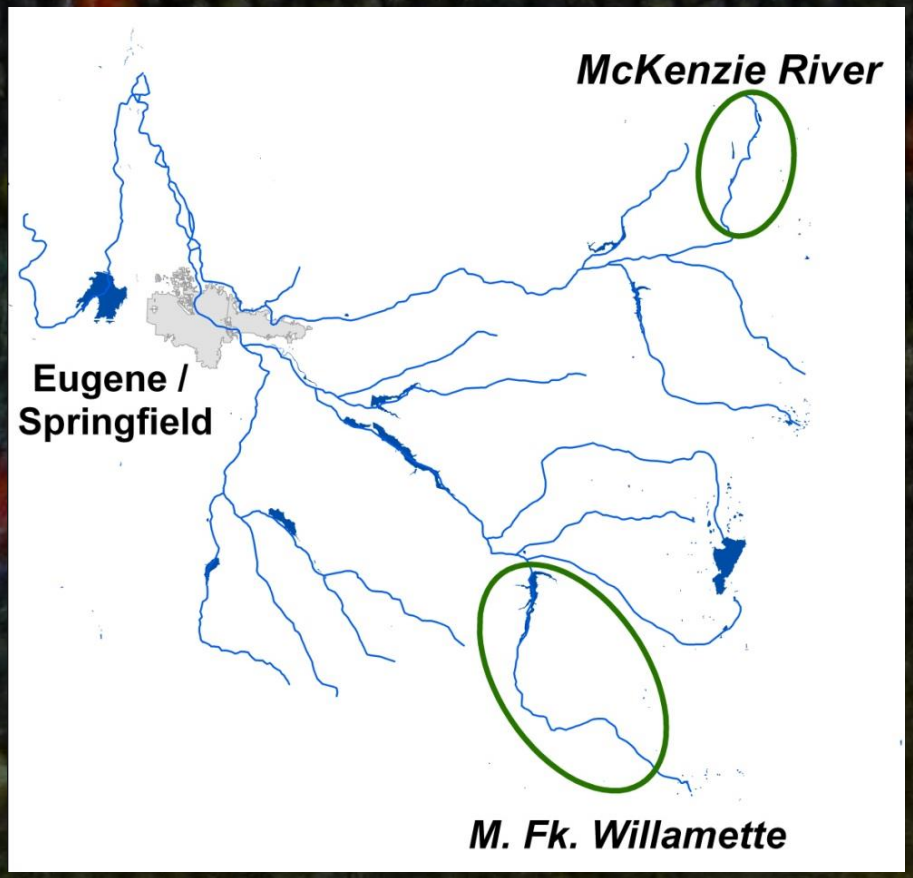
- 1962: Impassable culvert ~100m from mouth
- 1993: Corrected culvert
- 1994 – 1997: Transferred 670 fry

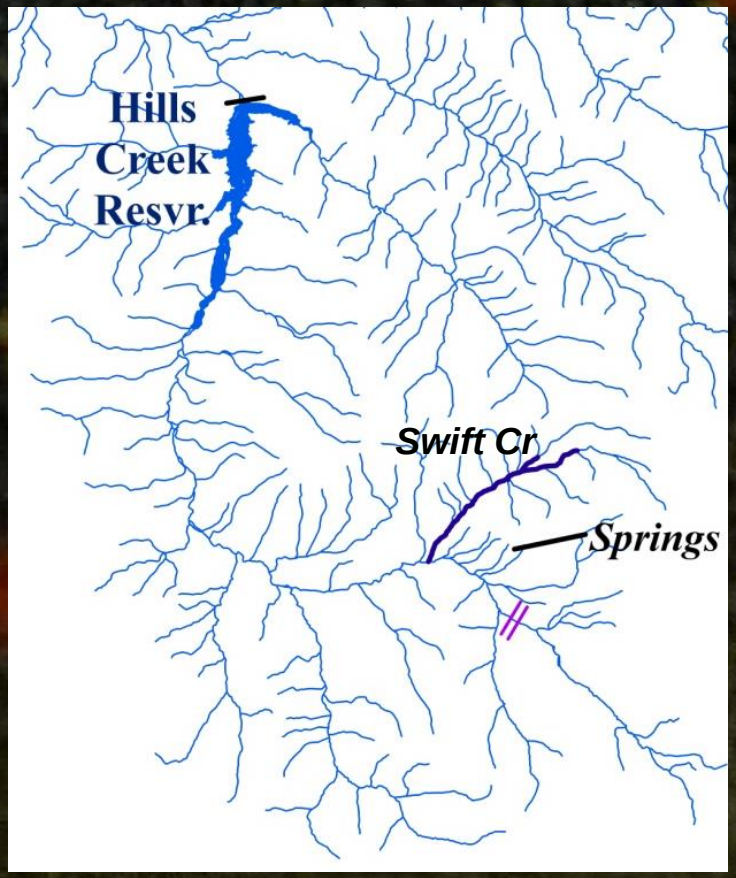
  * *Natural re-colonization*



M Fk Willamette

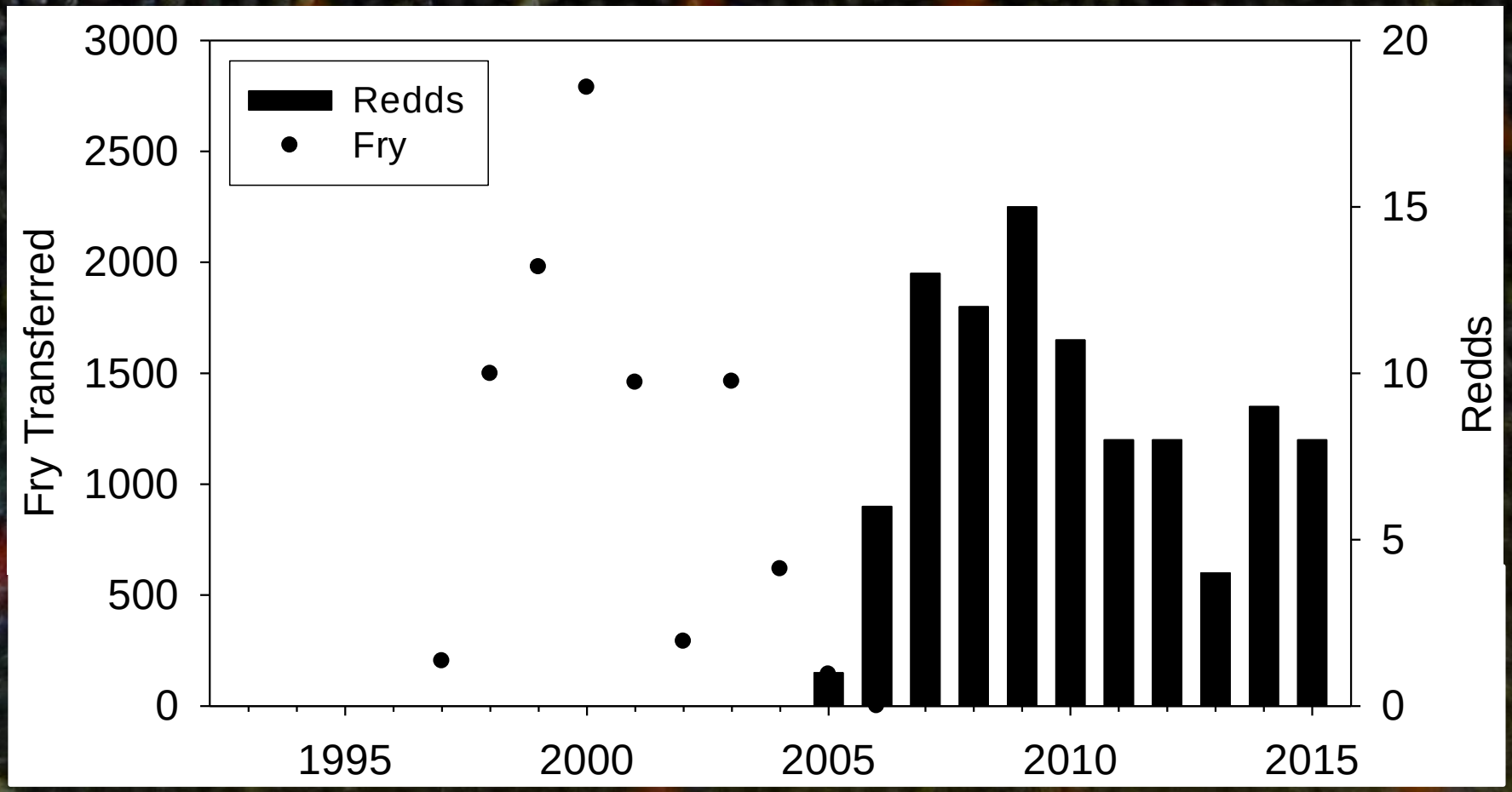
- 1997–2005: Transferred 10,408 fry
- Added LWD, spawning gravel





M Fk Willamette

1997–2005: Transferred 10,408 fry → ~11 redds/yr

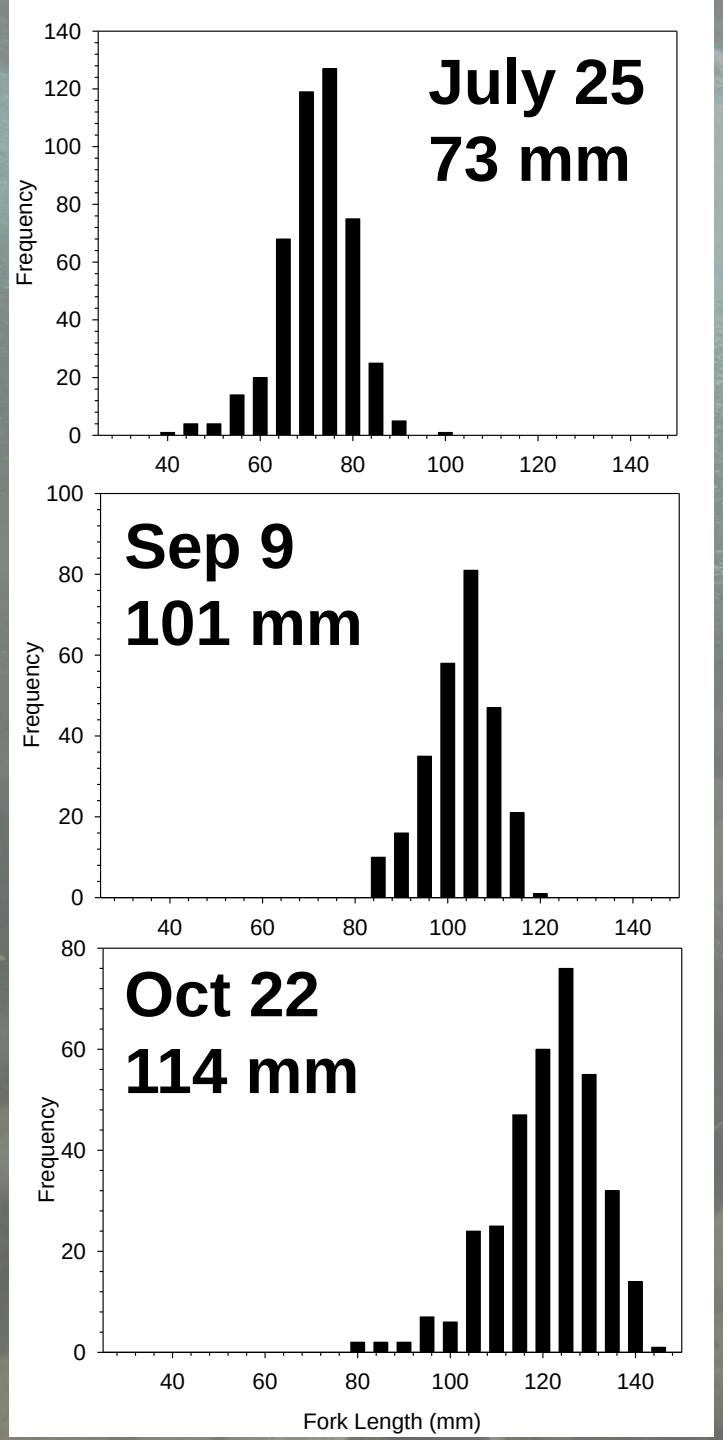


Captive Rearing (Headstart) 2007-2013

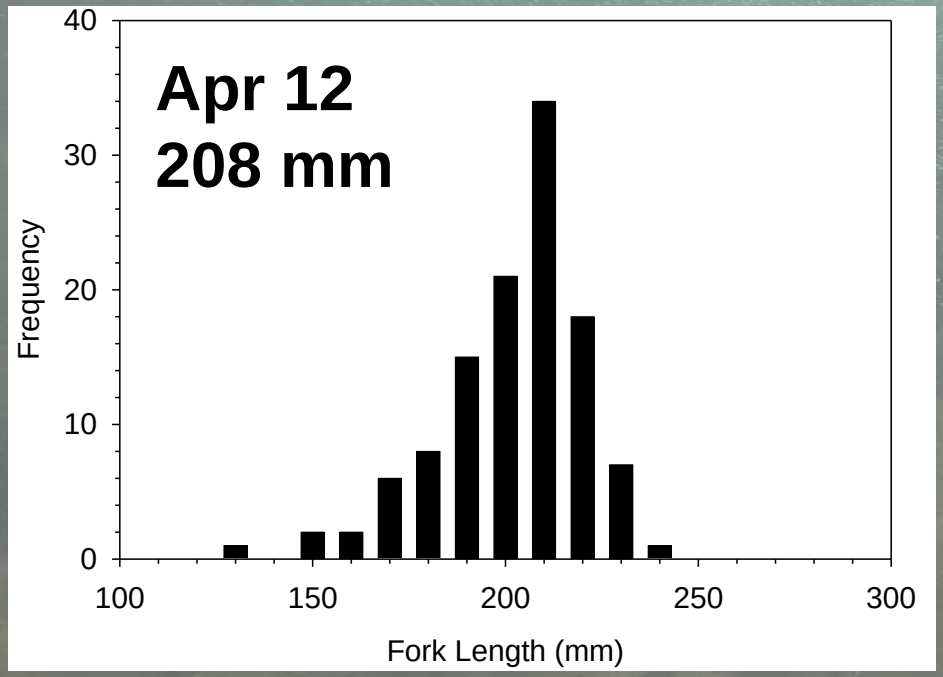
Circumvent predation, minimize take from donor pop.

- Fry → Leaburg Hatchery (~30 km downstream)
- Release in Aug – Nov or following April

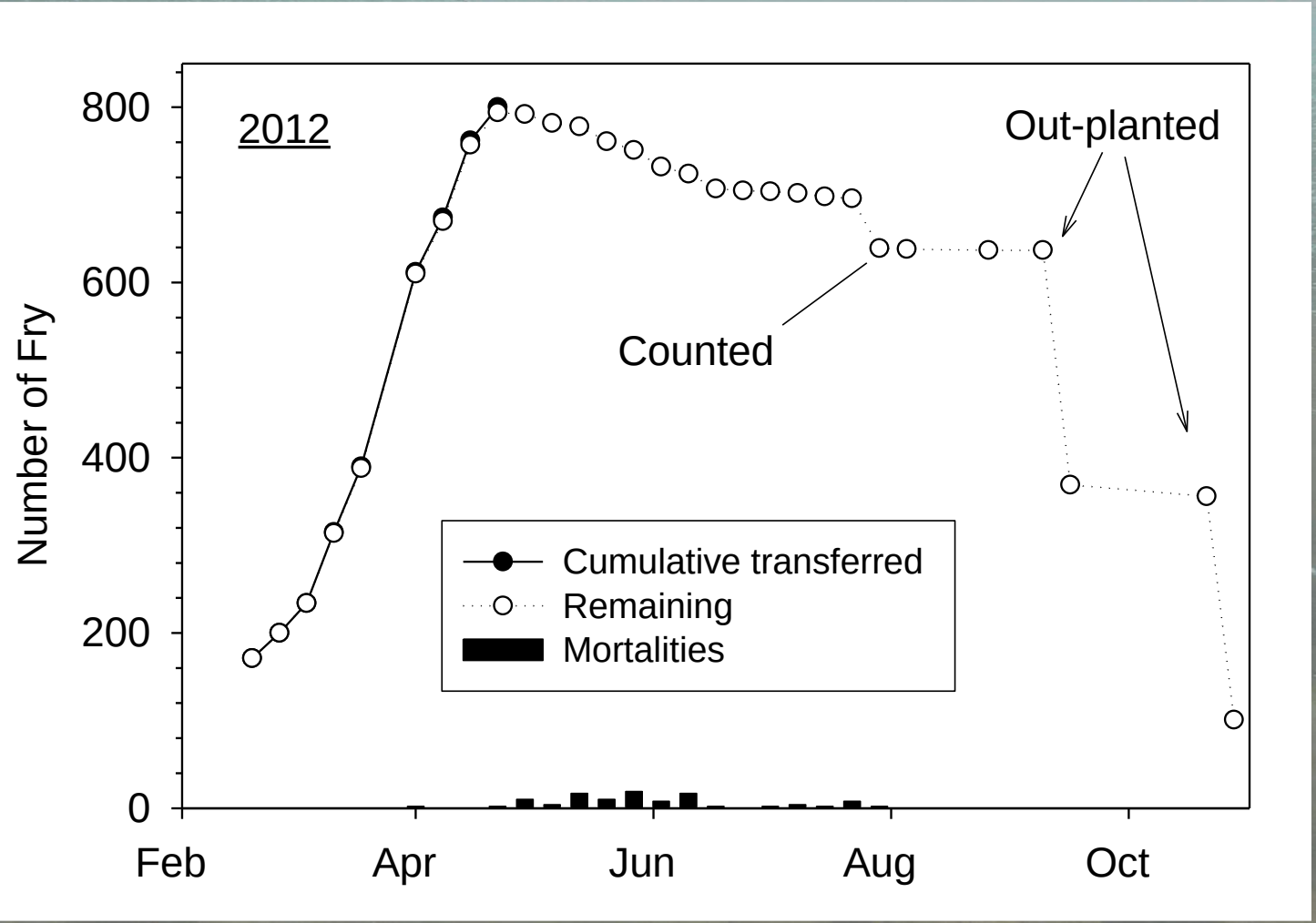
Growth at Leaburg



Growth at Leaburg



Captive Rearing (Headstart) 2007-2013 - Survival to Out-planting



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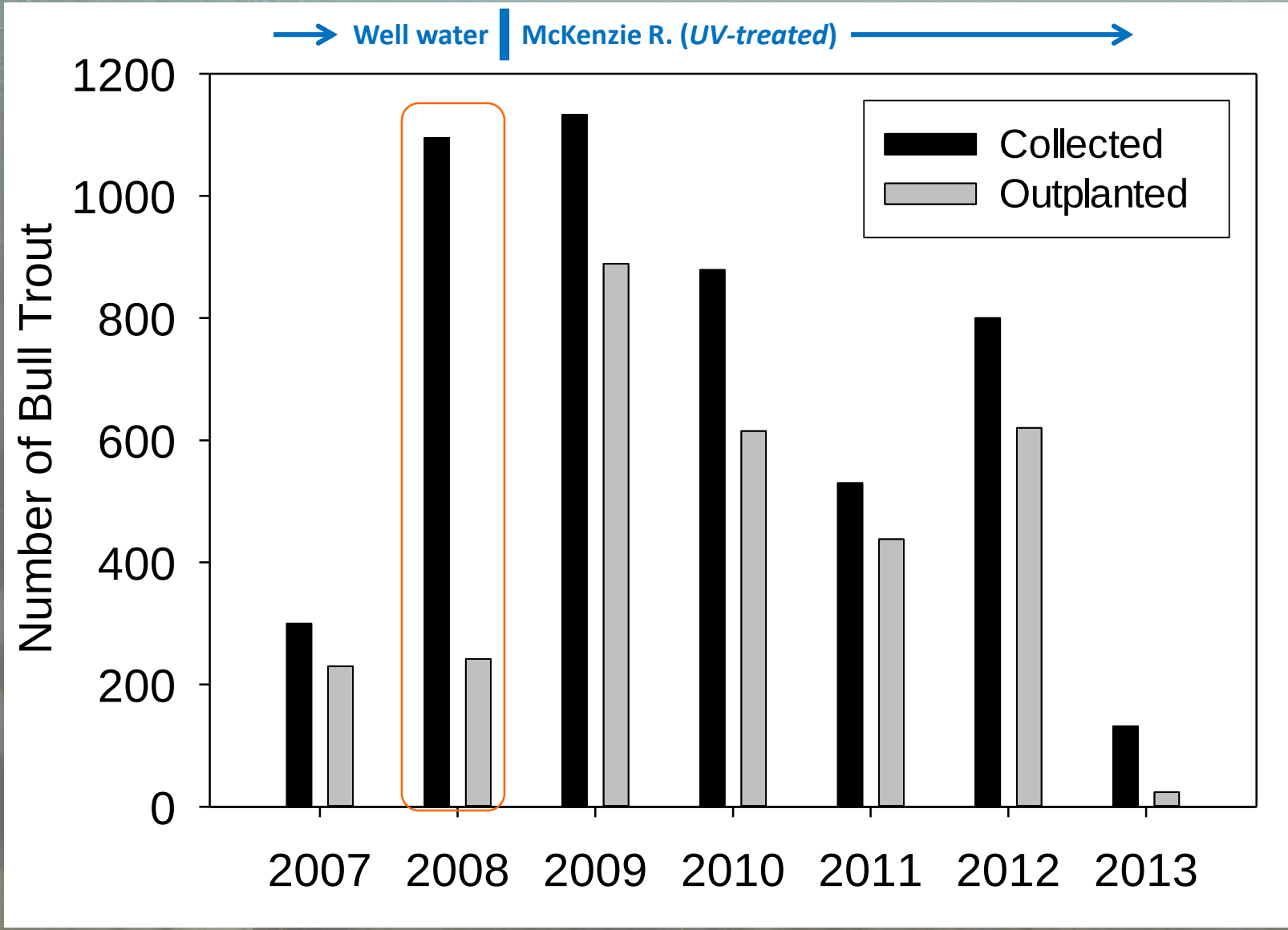
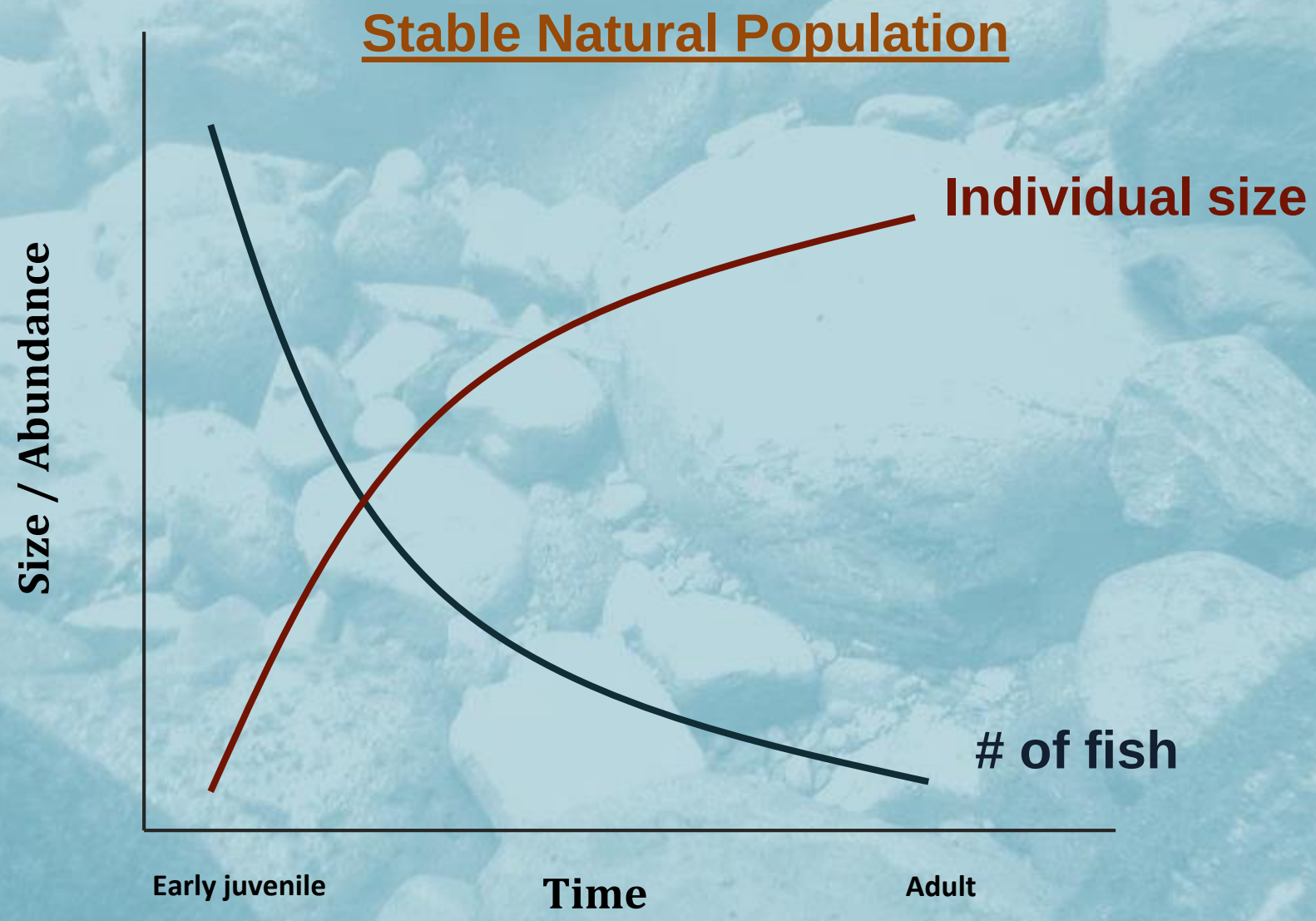


Survivors from 2013 cohort
- Early exposure to *Nanophetus salmincola*

Captive Rearing (Headstart) 2007-2013 - Survival After Out-planting

- Recipient stream: diminishing *N* with time;
- Evidence for high predation (radio telemetry, PIT tags);
- Migration into black box (vast habitat);
- Returning adults found beginning in 2014;
- In 2015/2016 verified reproduction and survival of juveniles into autumn;
- Premature to judge success/failure

Conceptual Dynamics of Captive-Rearing



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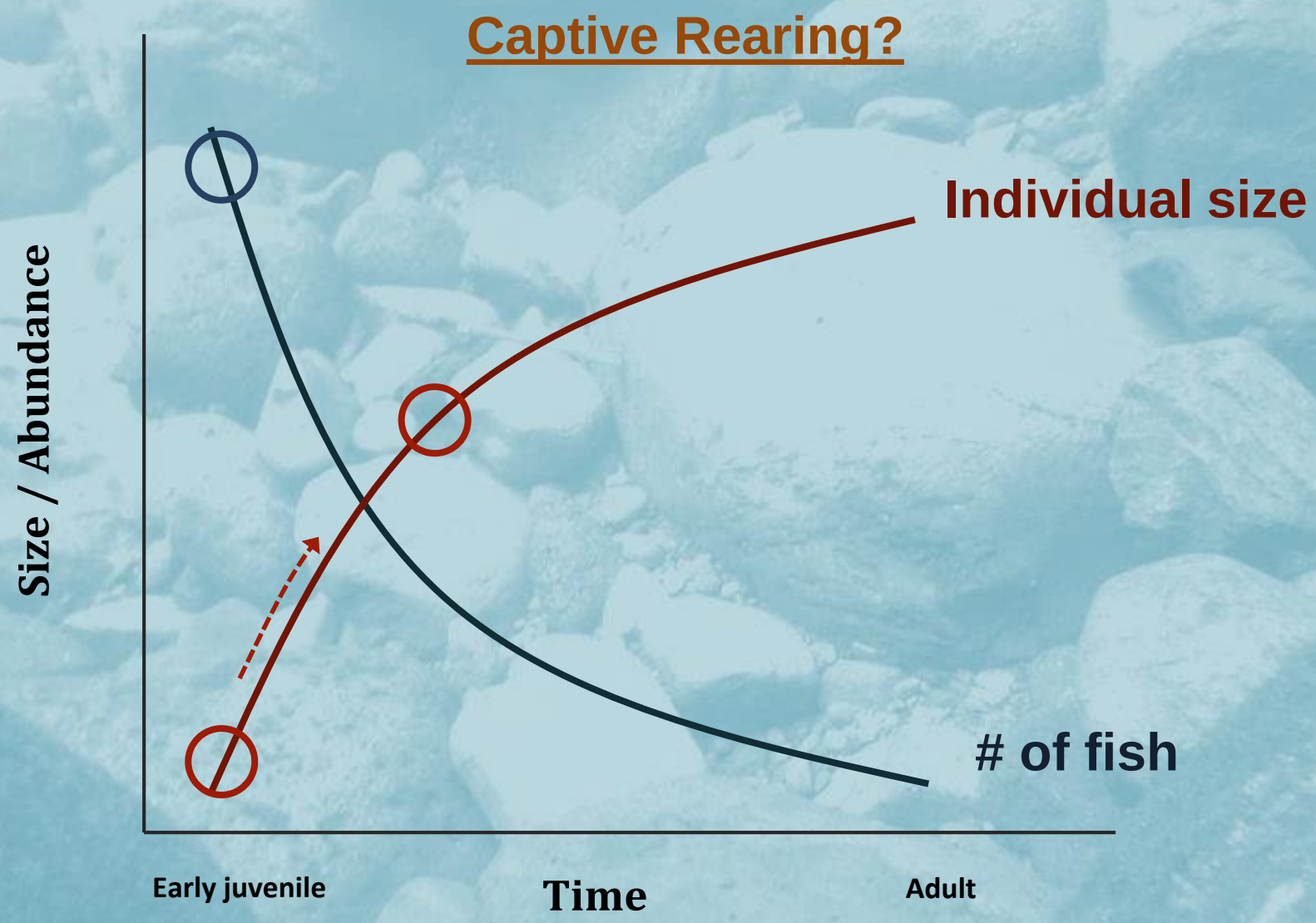

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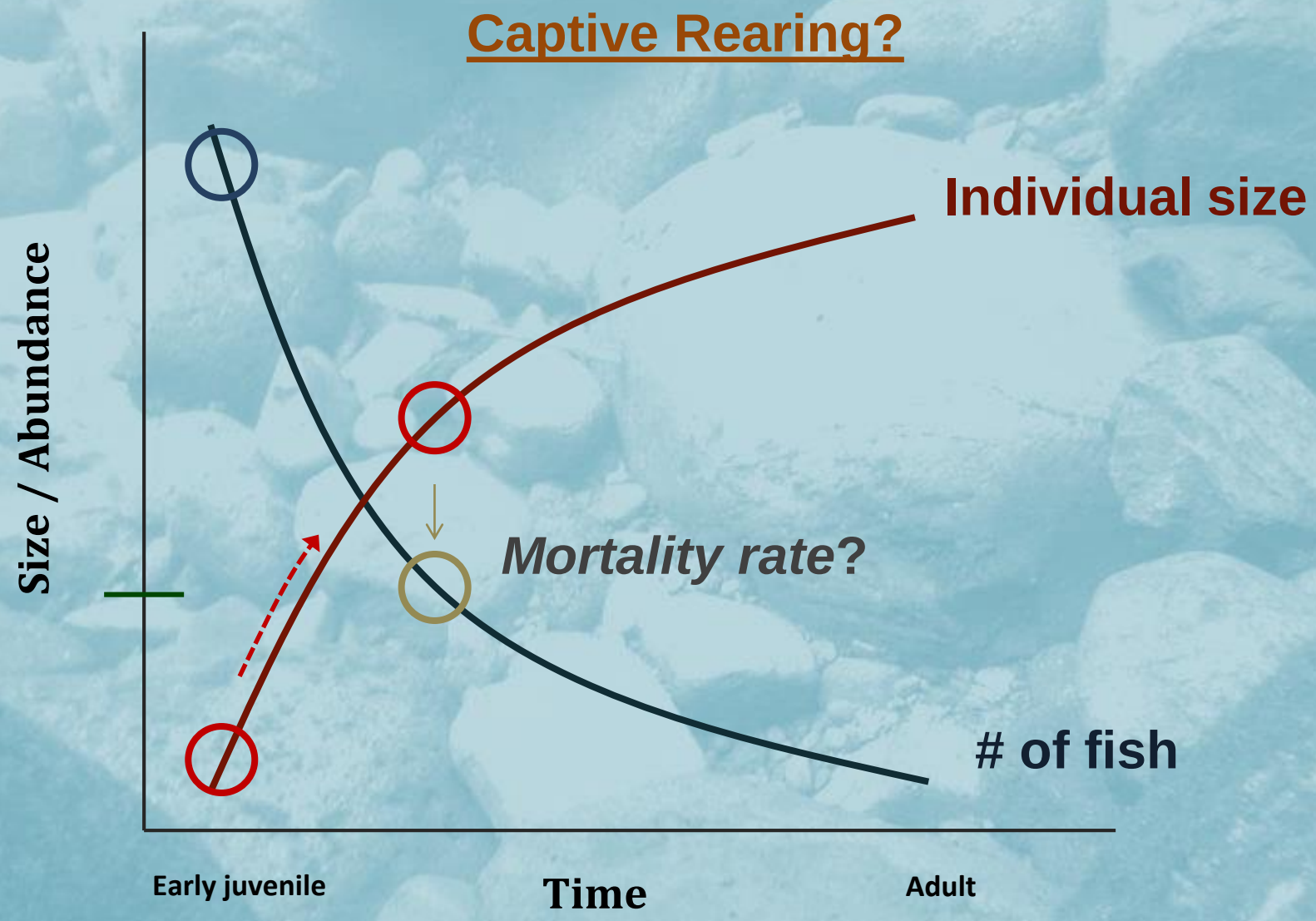

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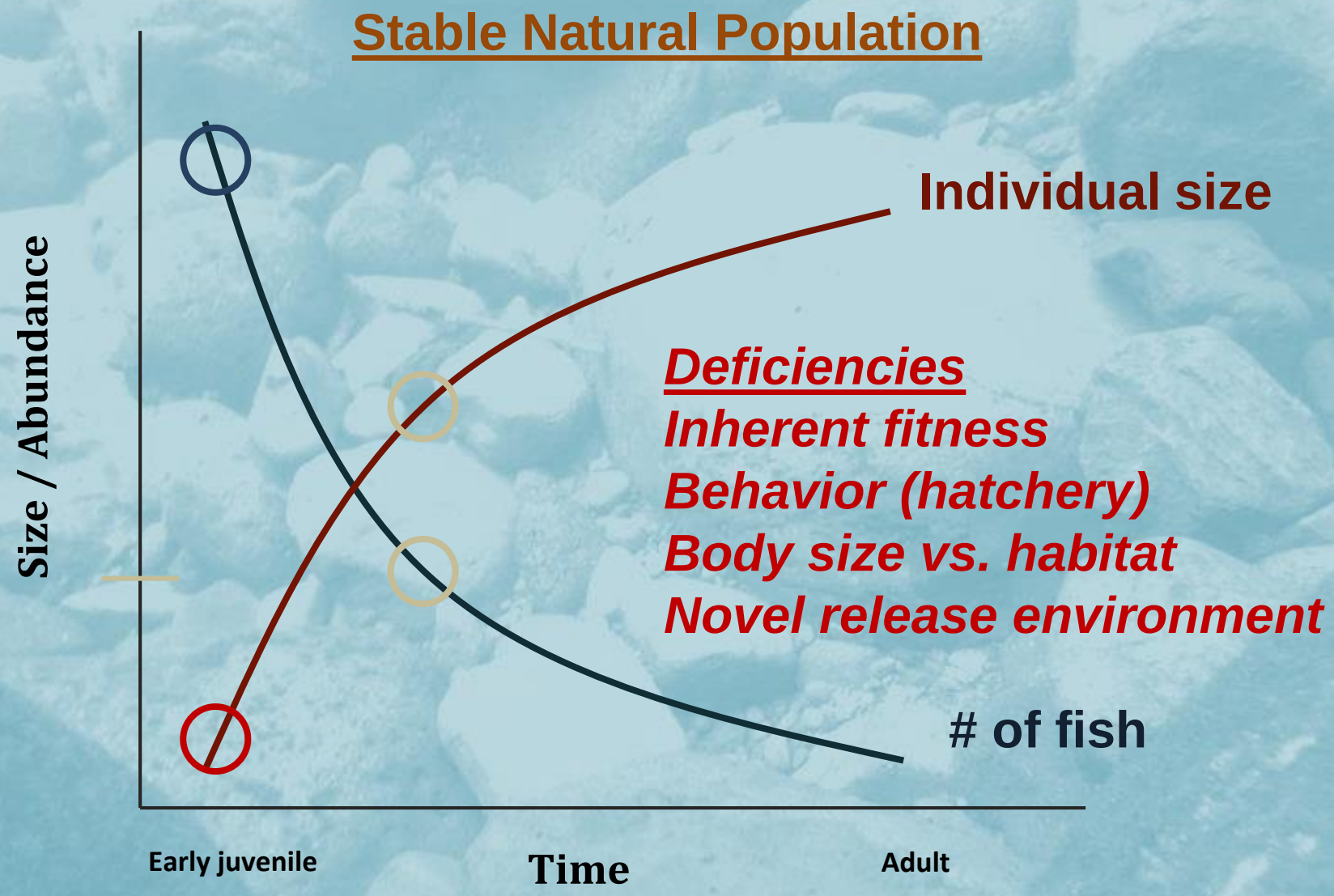

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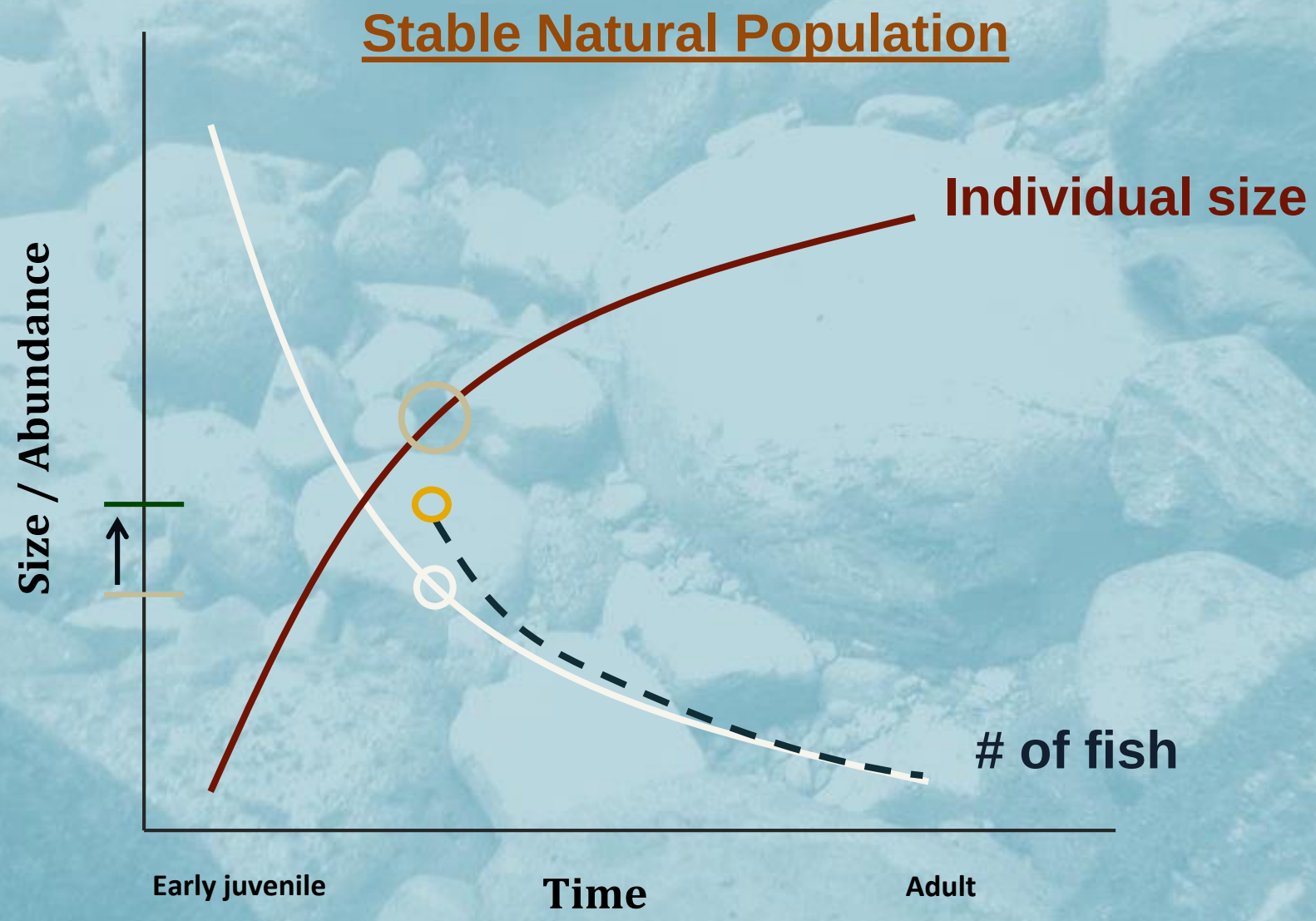

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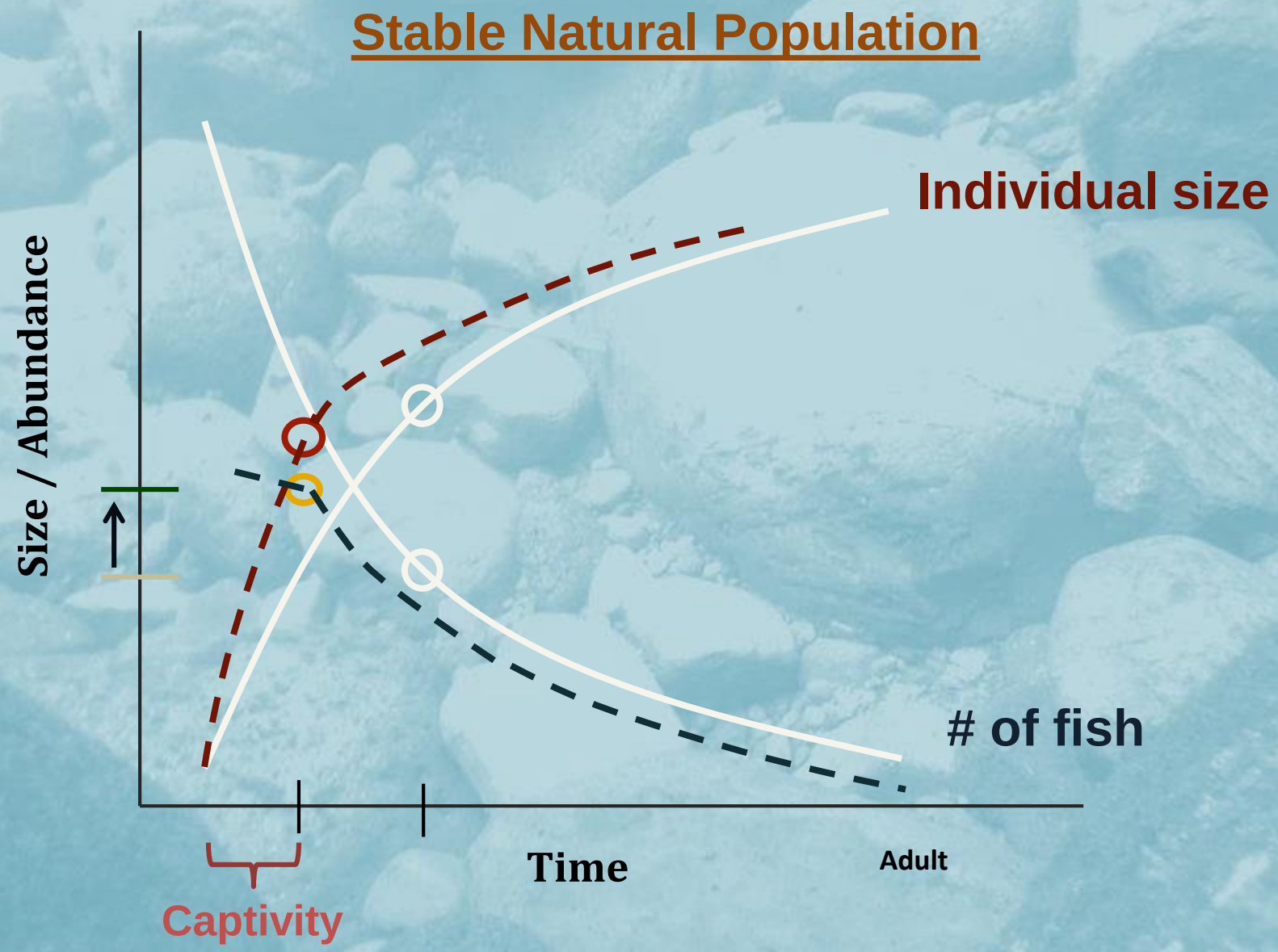

Summary

- Mixed success…various factors
  - Direct transfer of fry successful in small, optimal habitat
    (but sufficient quantity of such habitat?)
  - Preliminary evidence that captive rearing can be successful
    (but production challenges, also relatively high post-release mortality for size compared to wild fish)

	YOY Reintroduction Approaches:		
Attribute	Immediate	Headstart (brief)	Headstart (extended)
• Quantity:	Max	Fewer	Fewest
• Size at release:	Smallest	Larger	Largest
• Domestication:	None	More	Most
• Genetic var.:	Highest	Lower	Lowest
• Imprinting:	High	?	?
• Tags:	None (genetic)	PIT	Radio

- Match to habitat…Prey…Movement…Predation risk
- Sufficient numbers to surmount mortality (compare to fry/redd)
- Spawning in novel environs (location, timing)?
- Resulting population genetic viability?

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