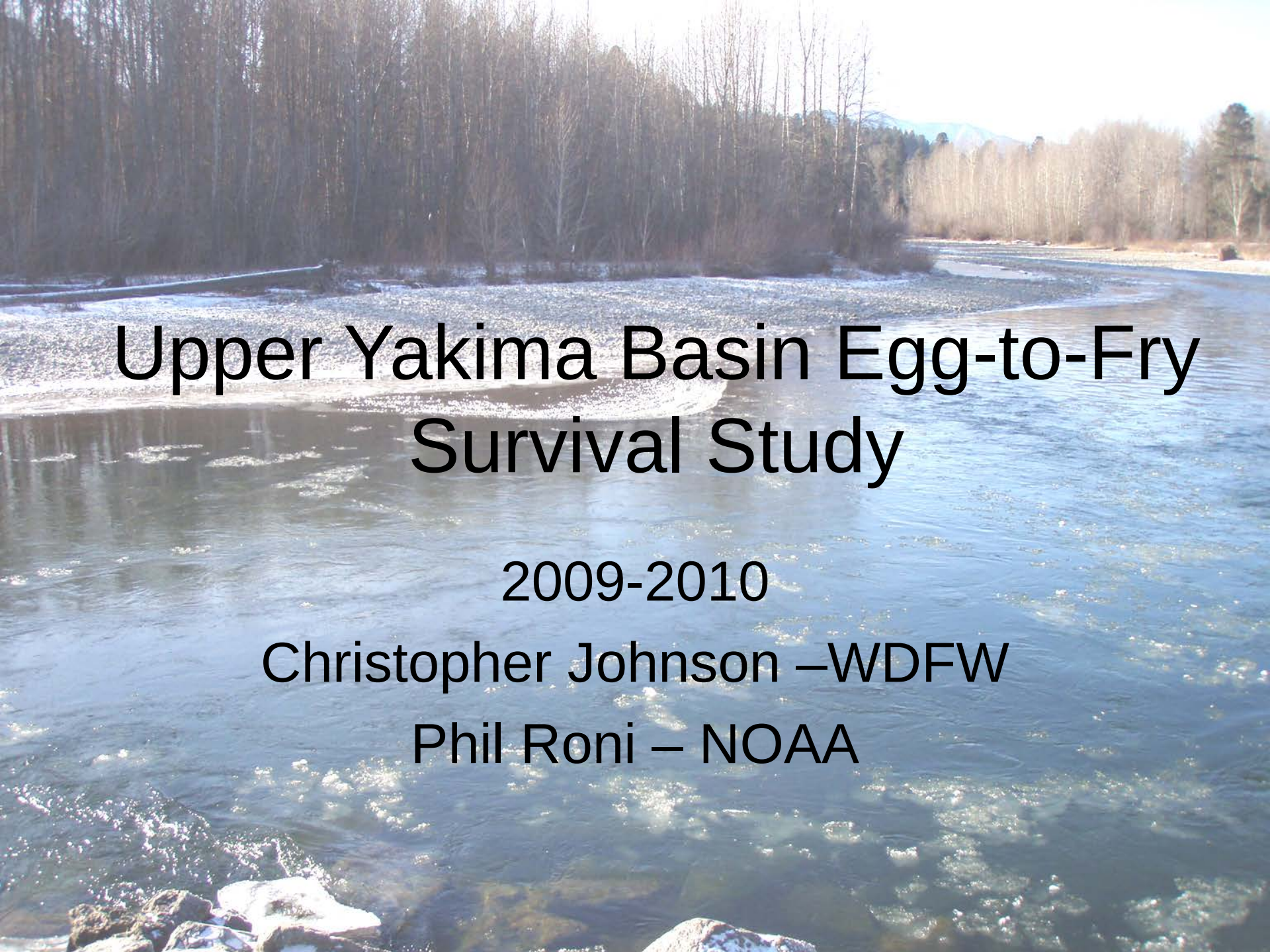


Upper Yakima Basin Egg-to-Fry Survival Study

2009-2010

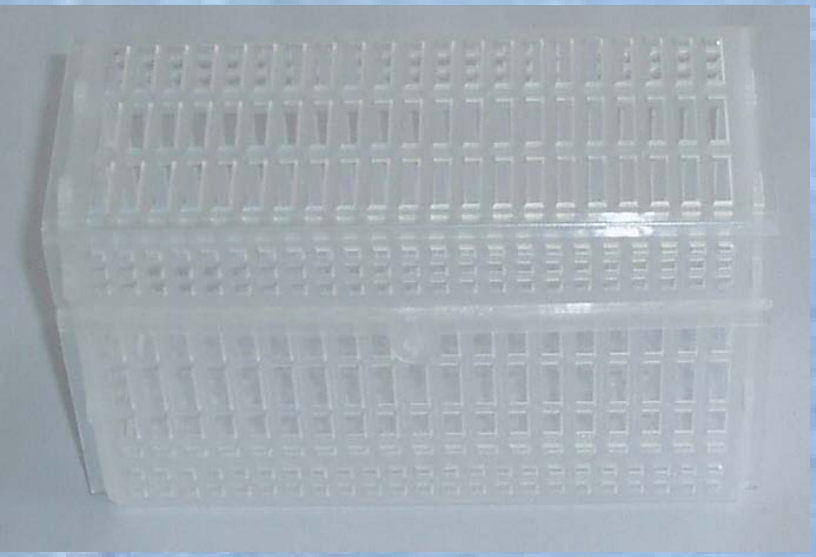
Christopher Johnson –WDFW

Phil Roni – NOAA

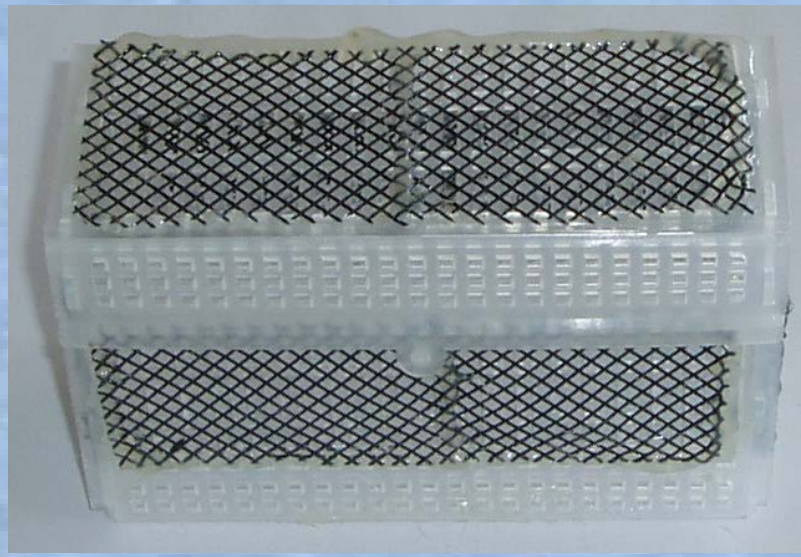
Study objectives

- Create and assess standardized methods that can be used to evaluate egg-to-fry survival in multiple sub-basins of the Columbia River.
- Perform an initial egg-to-fry study of spring Chinook in the upper Yakima River.
- Identify factors that may limit egg-to-fry survival

Whitlock-Vibert egg-box

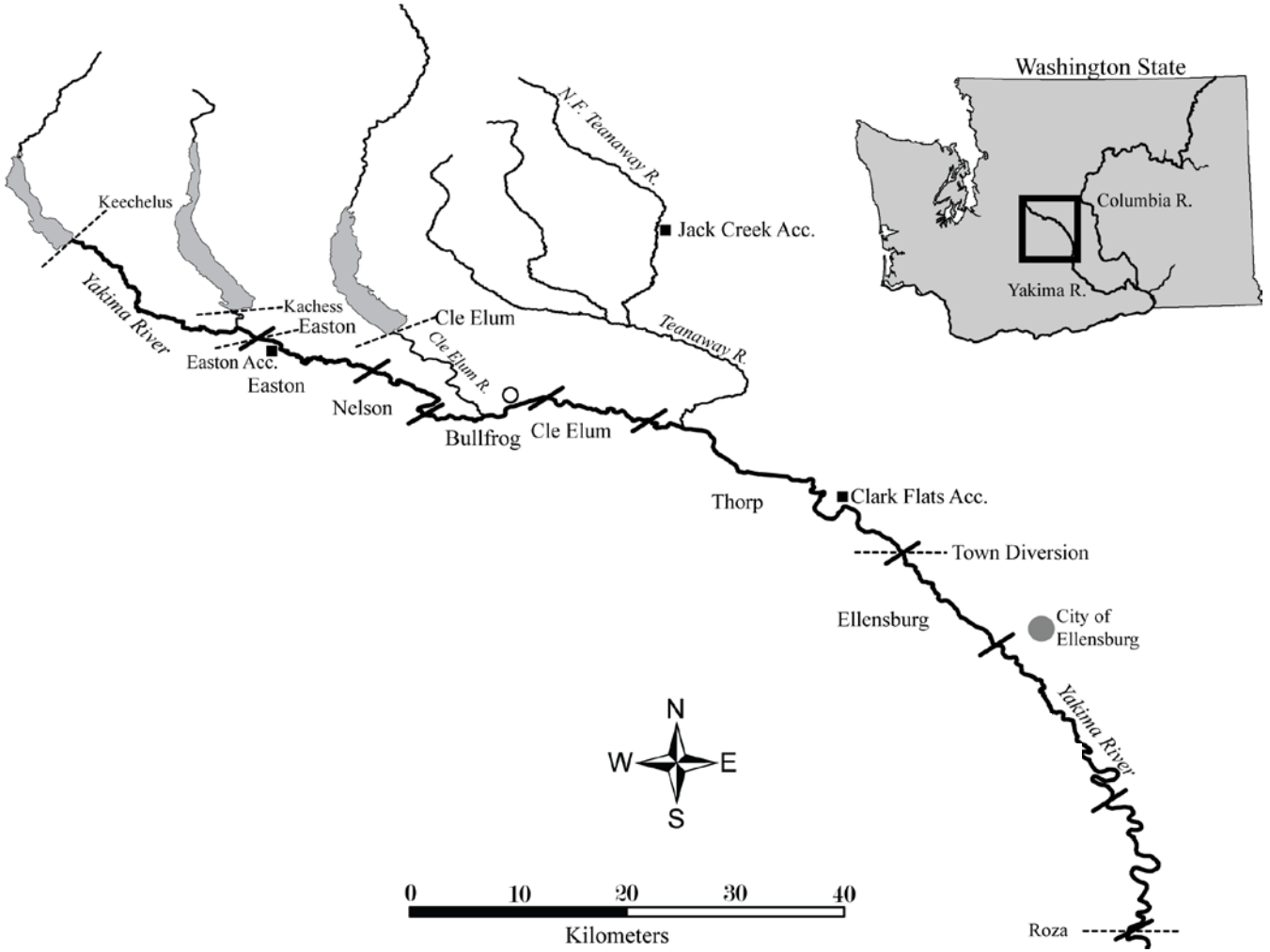


Whitlock-Vibert egg-box



Modified Whitlock-Vibert egg-box

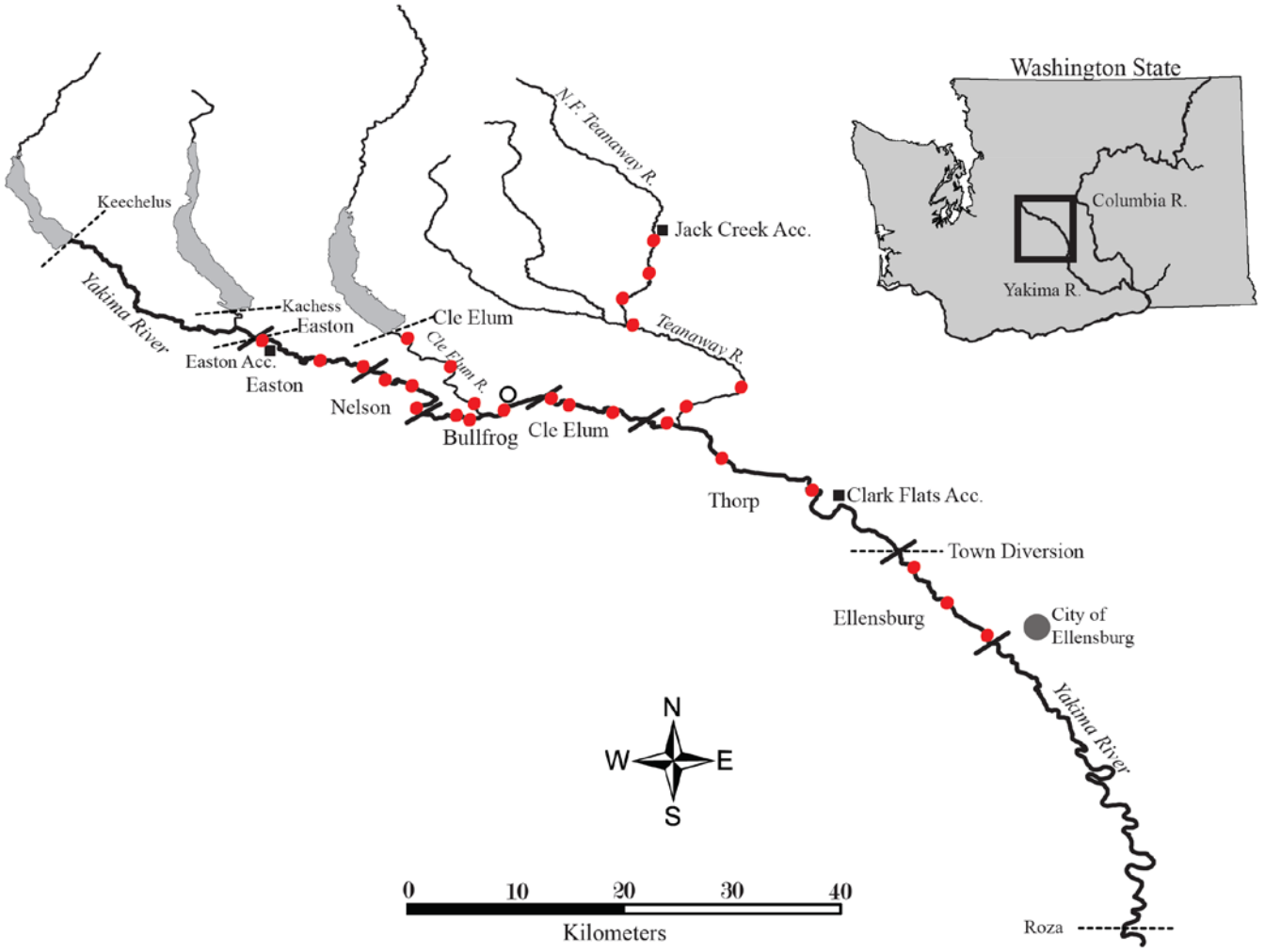
Study reaches



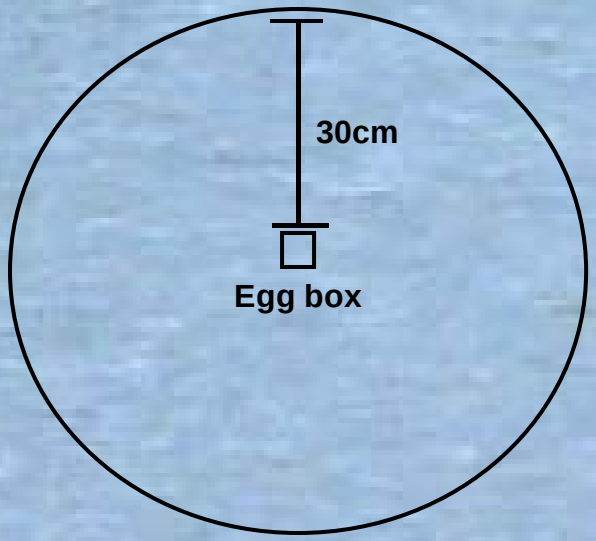
Site and artificial redd locations

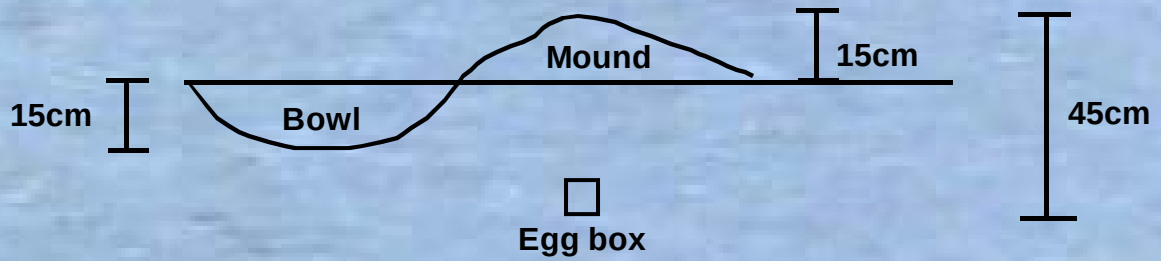
- Three sites selected in each sample reach based on 2008 spawning locations and densities (Andy Dittman; NOAA).
- One redd in each site stocked per week for three consecutive weeks: September 16th, 23rd, and 30th 2009 (27 redds per week, 81 total redds)
- Redd locations at each site based on 1) adjacent spawning activity, 2) GPS redd locations from the previous year, or 3) institutional knowledge.

Study reaches and site locations



Redd construction





DeVries, P. 1997. Riverine salmonid egg burial depths: review of published data and implications for scour studies. Canadian Journal of Fisheries and Aquatic Sciences 54: 1685-1698.

Gamete collection

- Gametes collected on September 15th, 22nd, and 29th 2009.
- 100 eggs and 3ml of milt per box
- 900 eggs from each of three females each week, plus 200 for in-hatchery hold time comparisons (0hr and 24hr)

Egg box placement

- On-site fertilization
- Previously excavated gravels strained to remove fine sediment
- Marked with red Mylar flagging for identification and in an attempt to prevent superimposition

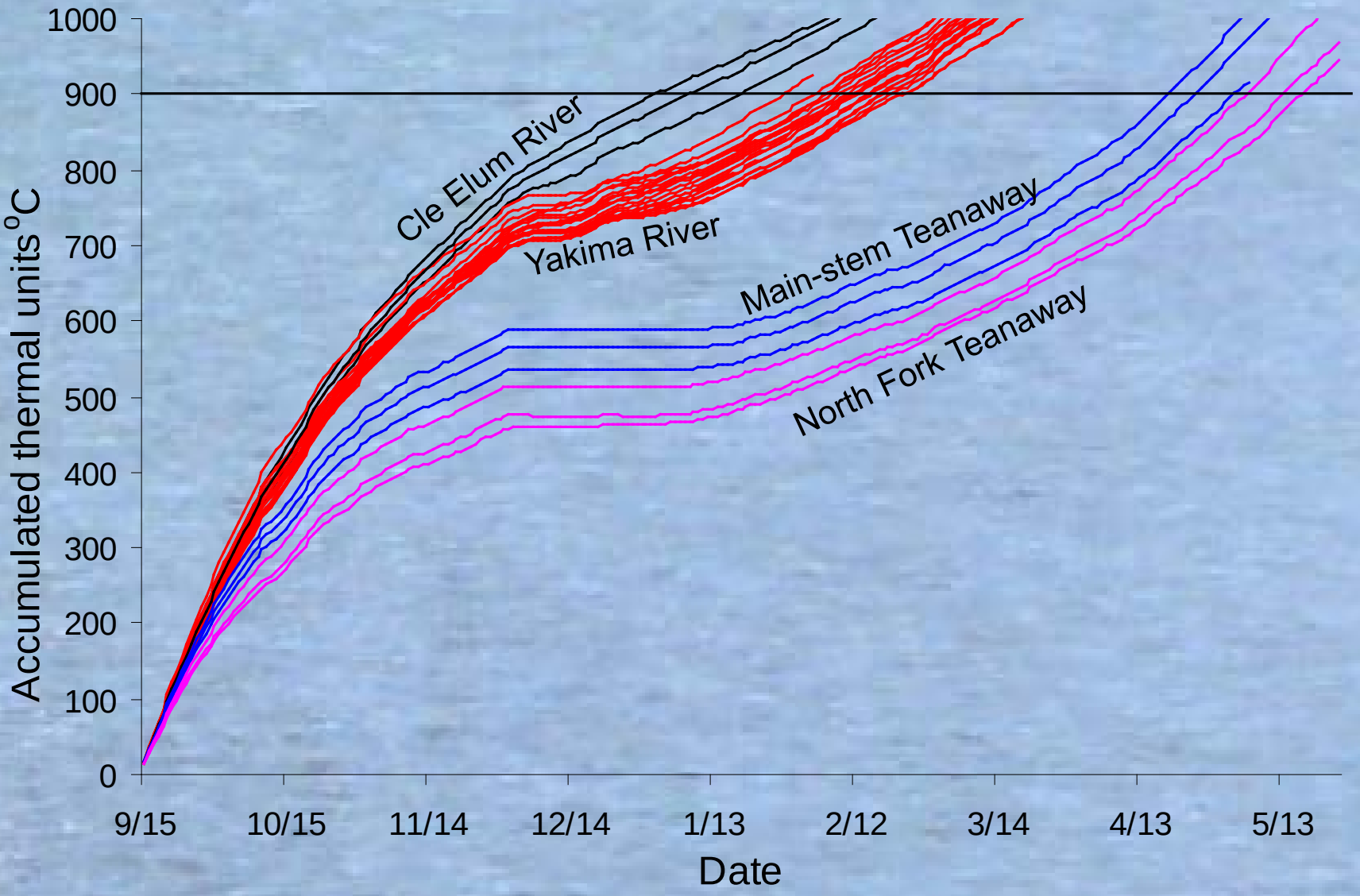



Egg box recovery

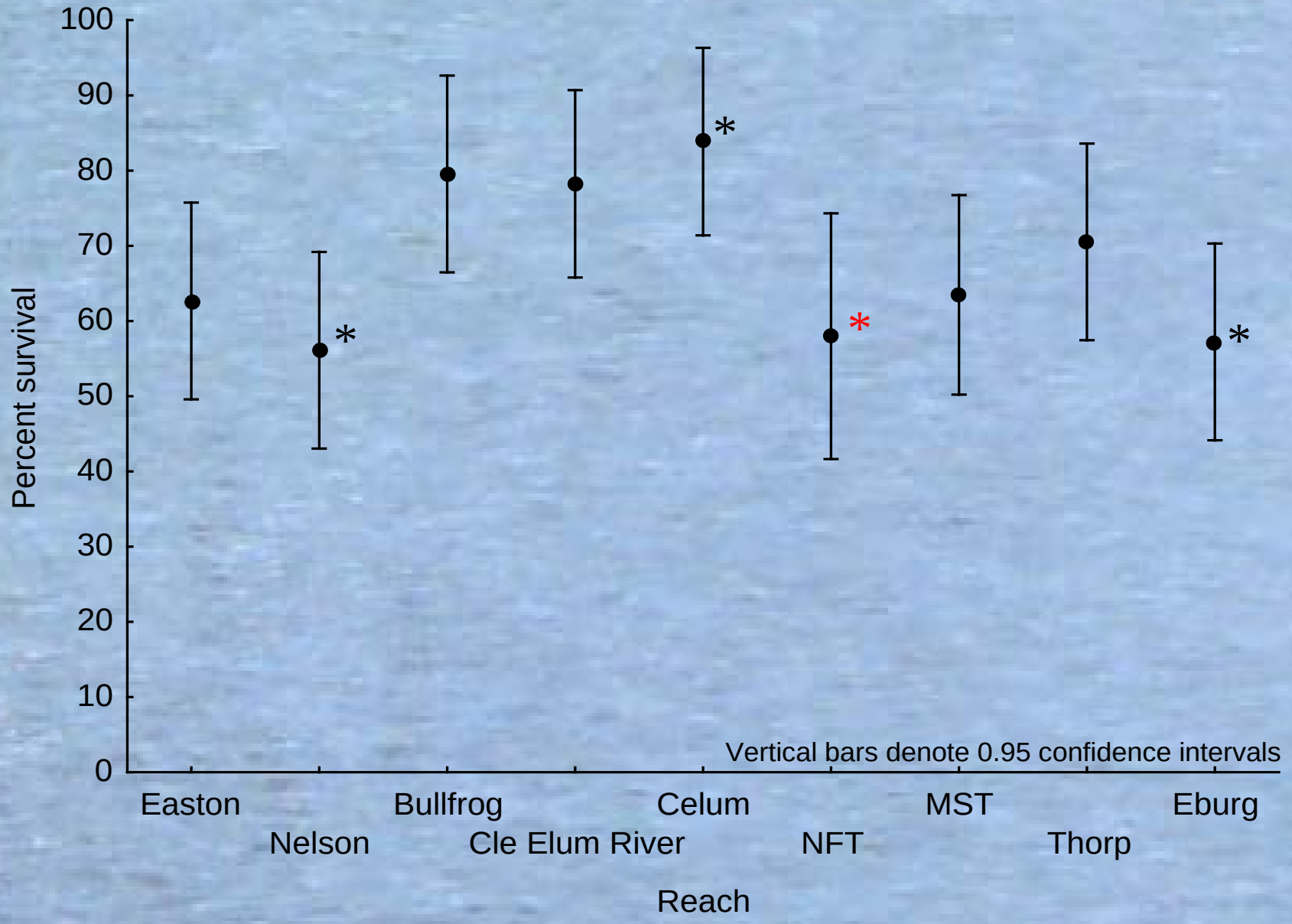
- Target 900 accumulated thermal units (deg.C)
- Counts of live fry, remaining eggs and any post-hatch mortalities
- All fine sediment retained



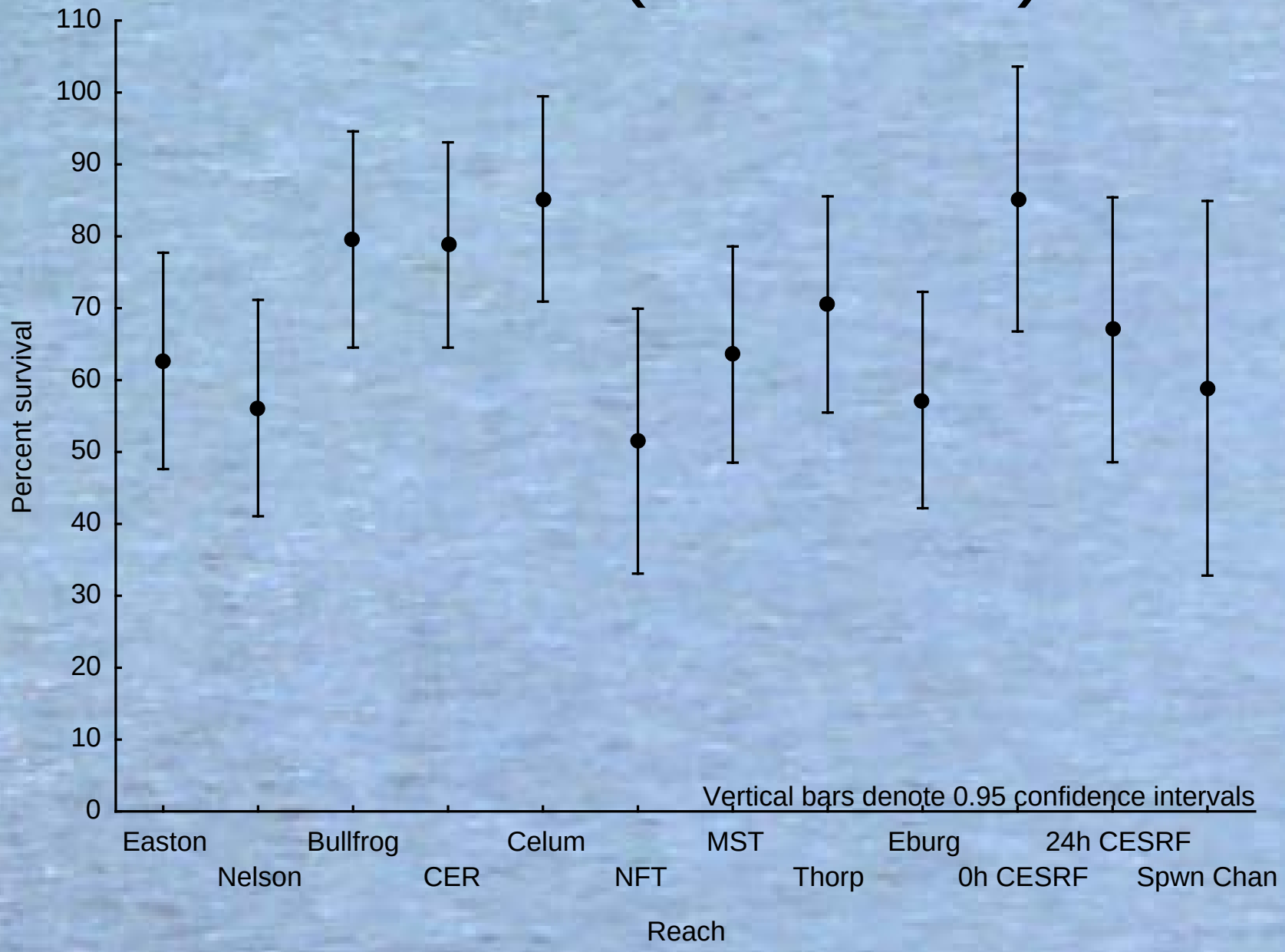

Temperature



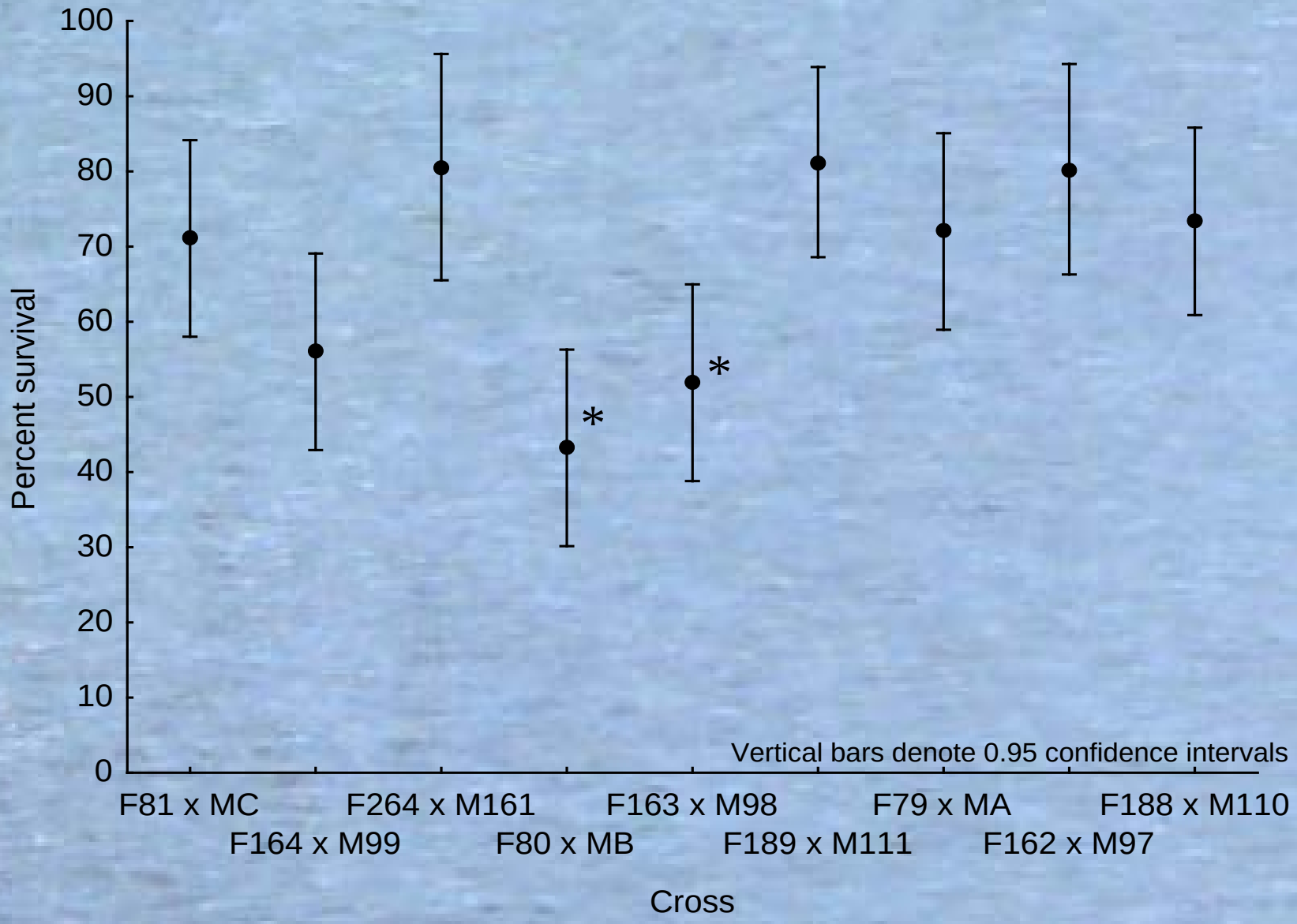
Survival by reach



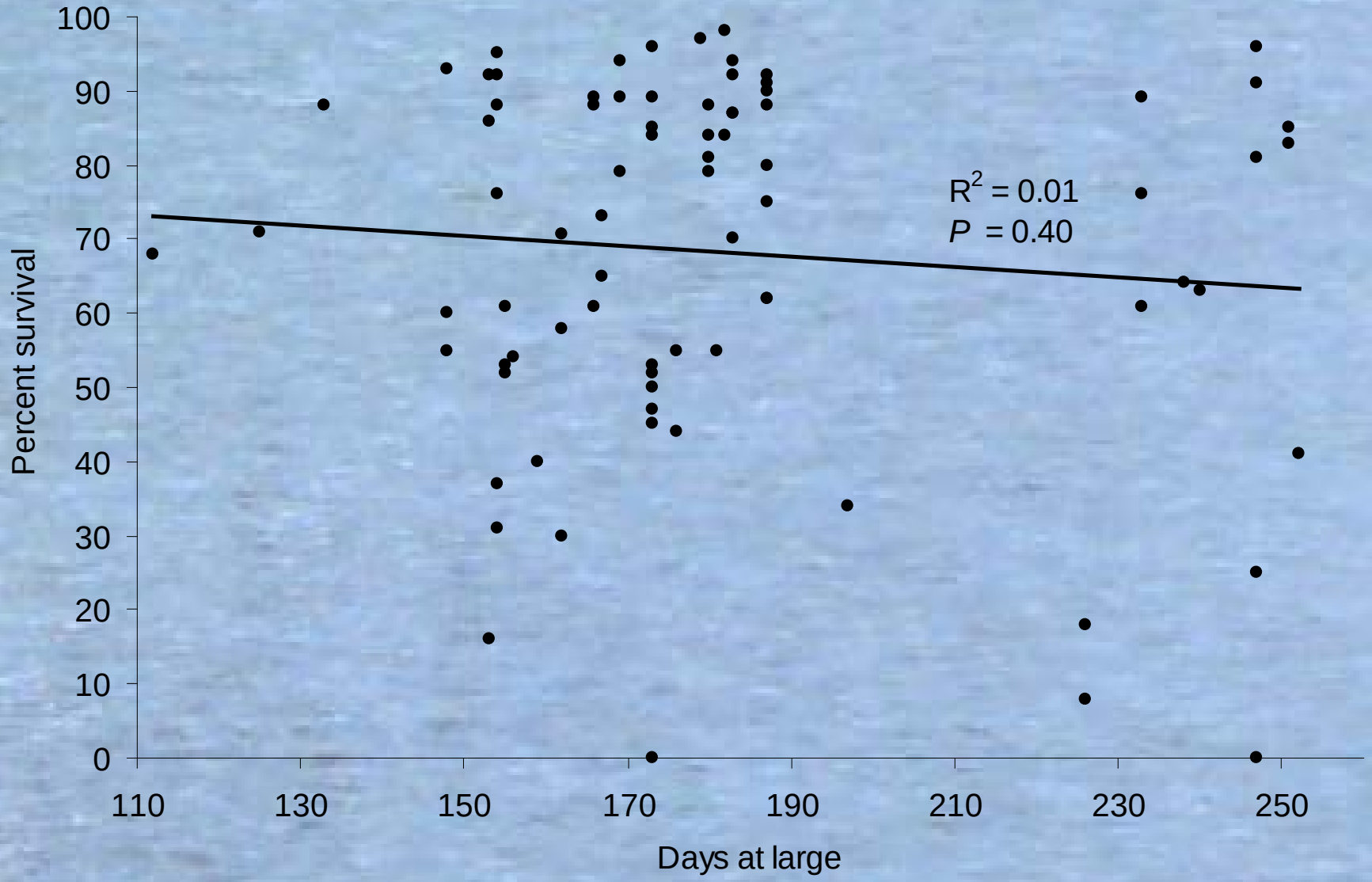
Survival (extended)



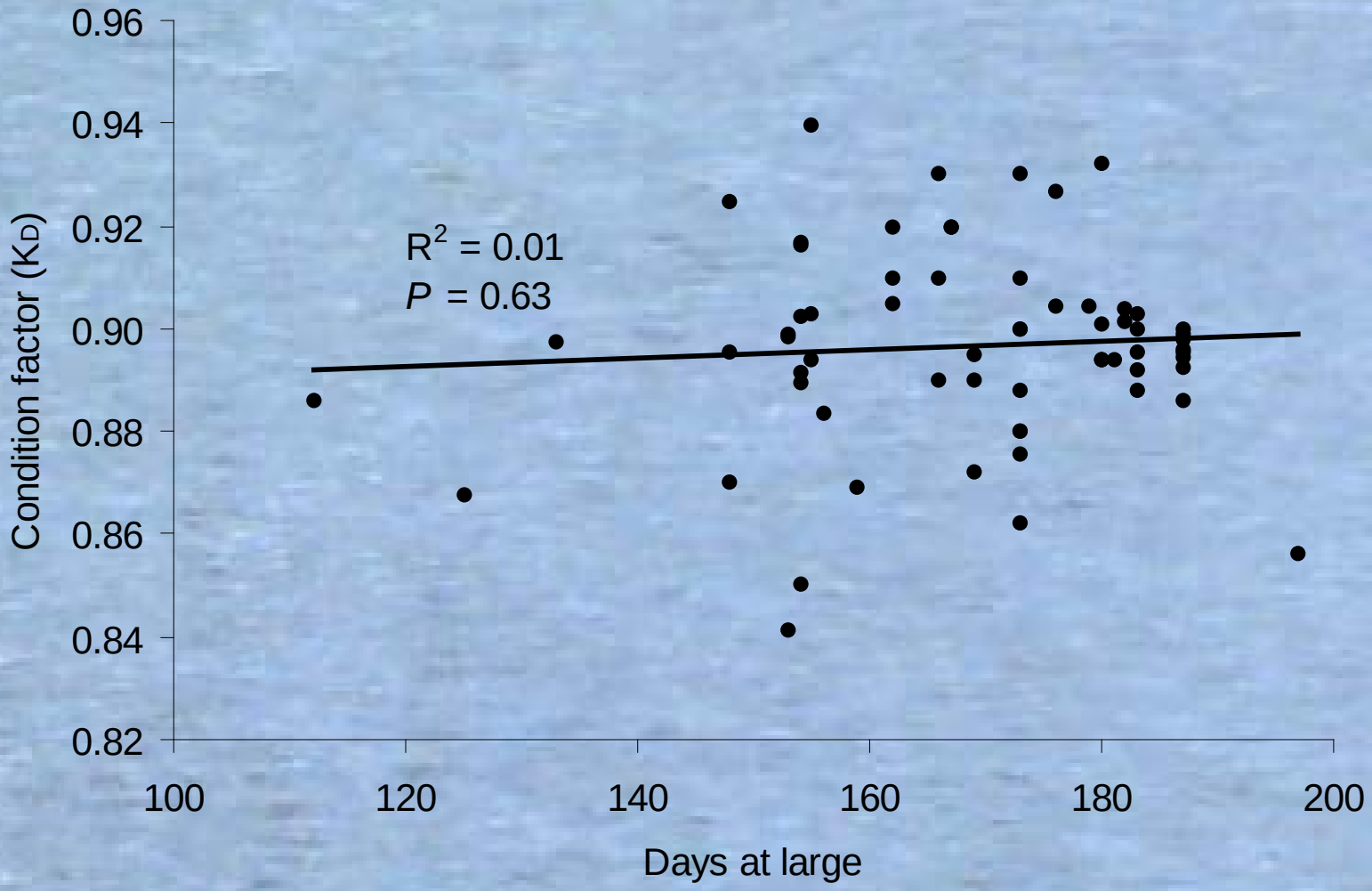
Survival by adult cross



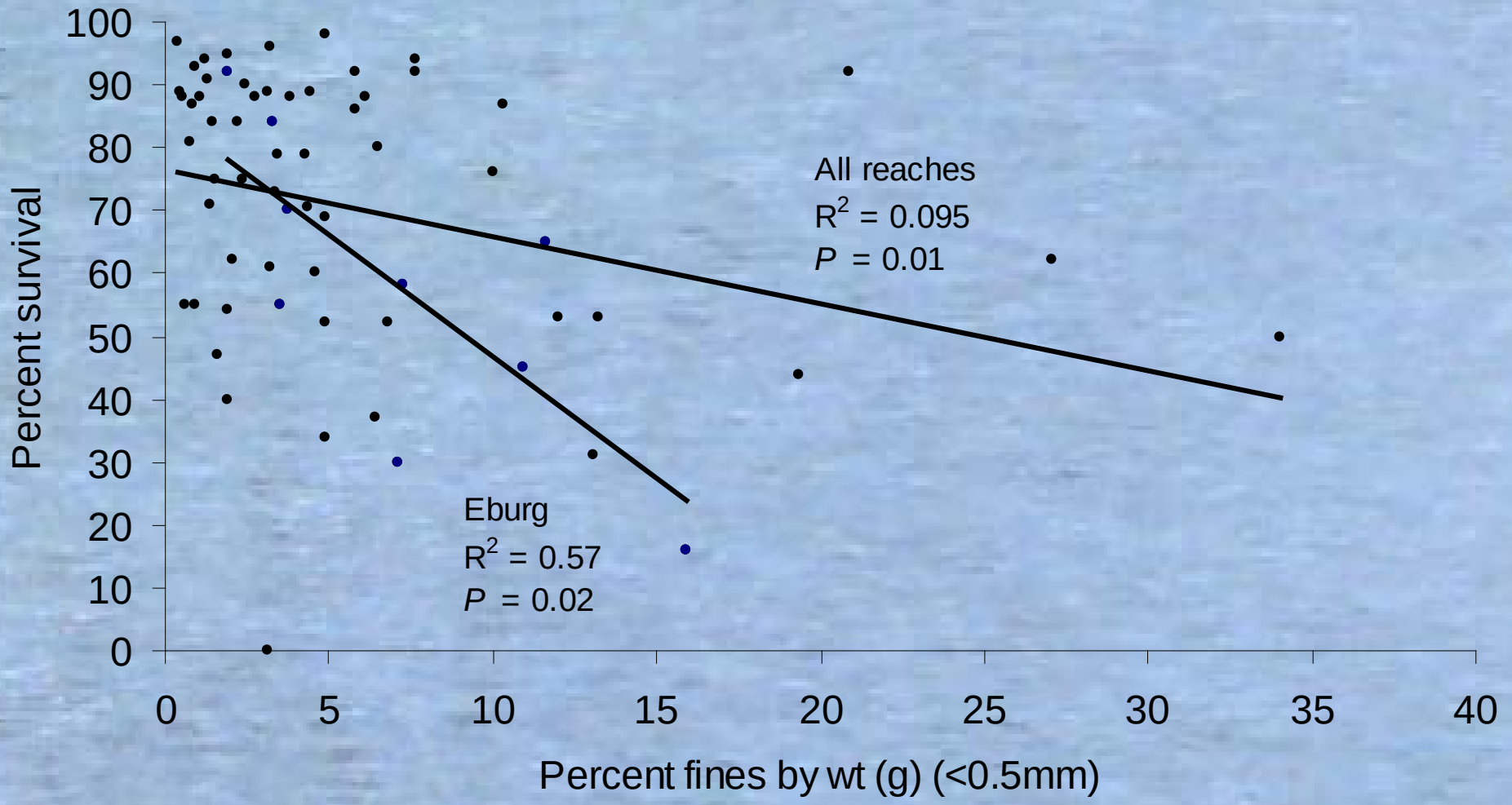
Survival by days-at-large



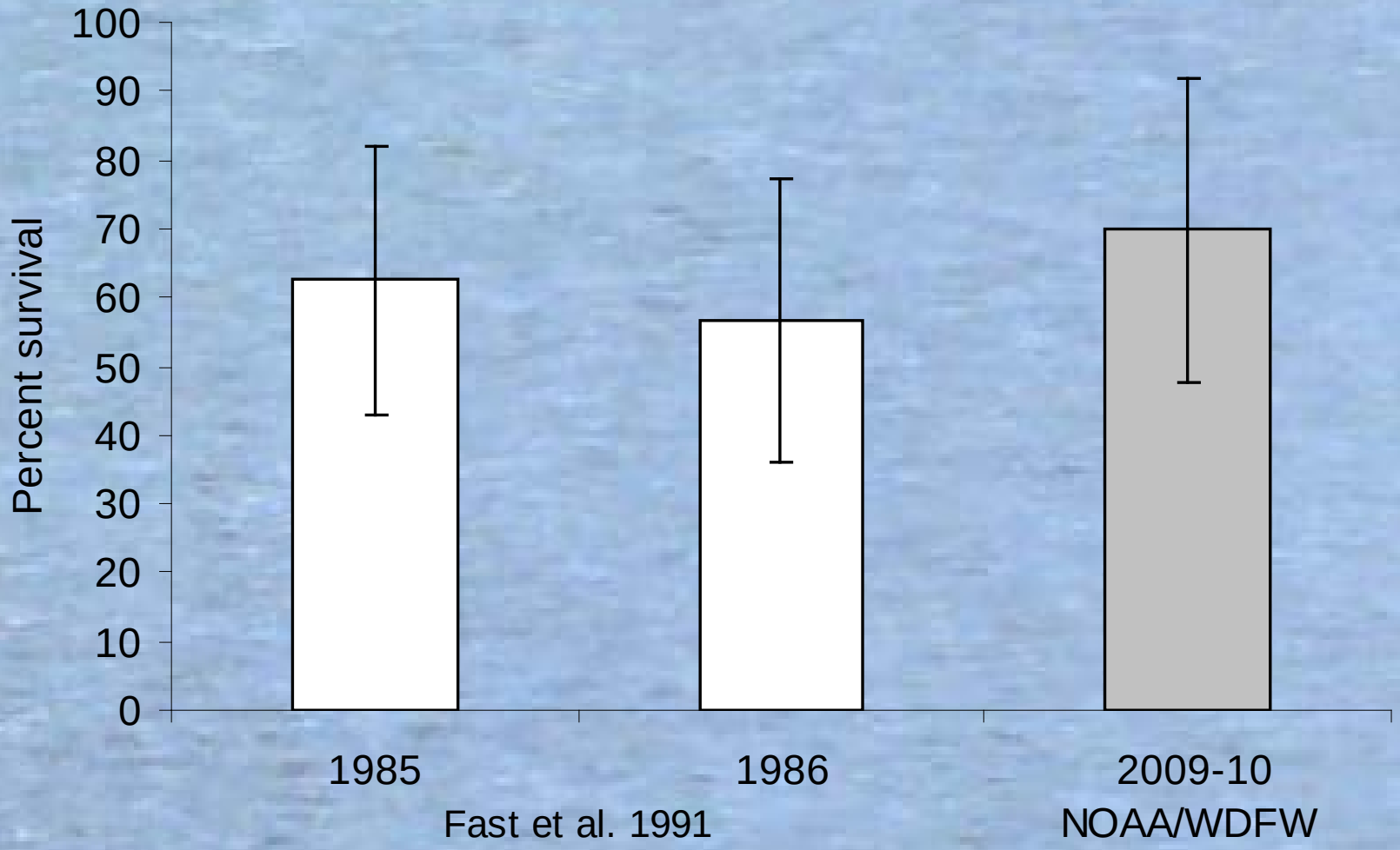
Condition factor (K_D)



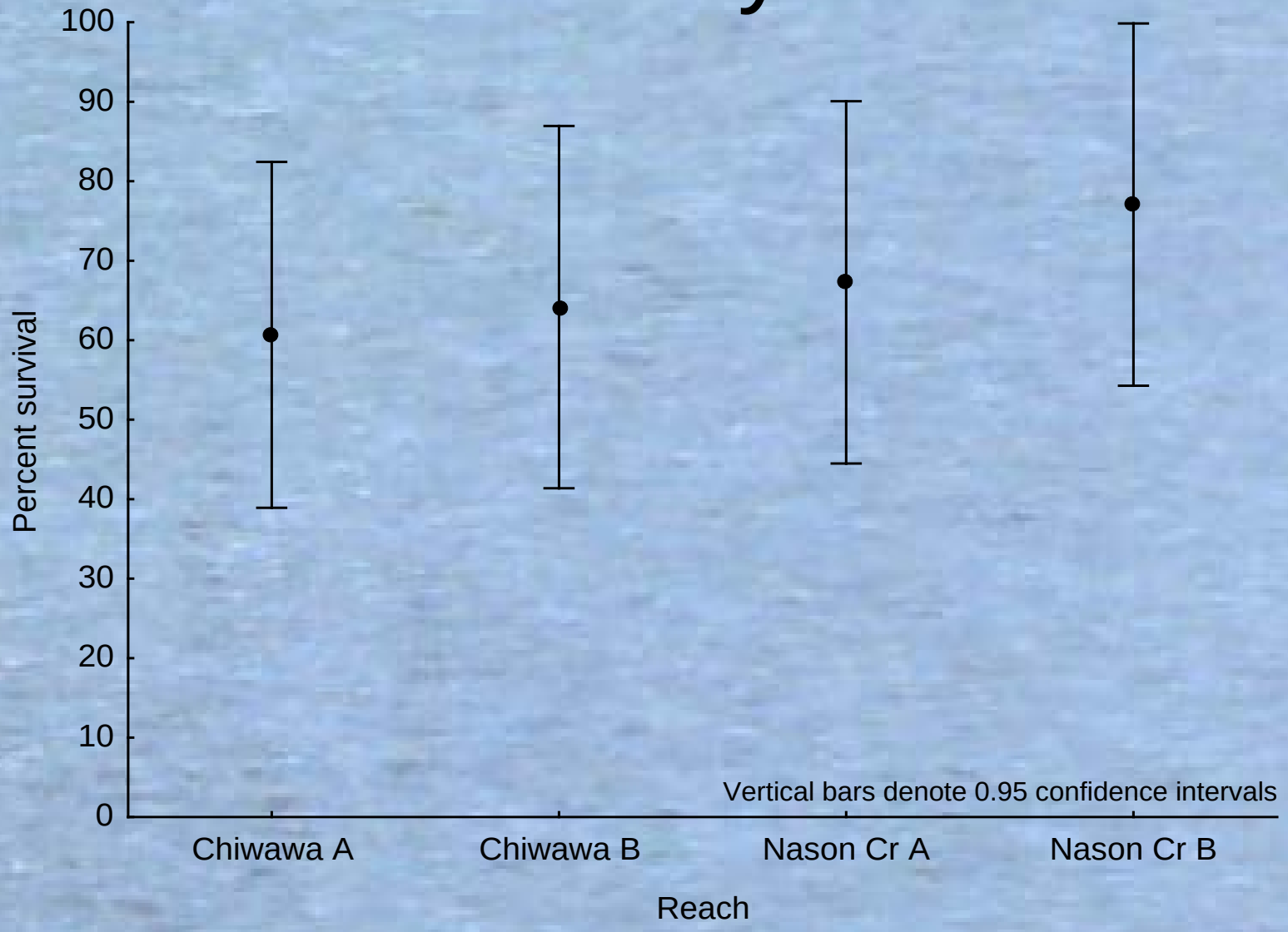
Percent fines and survival



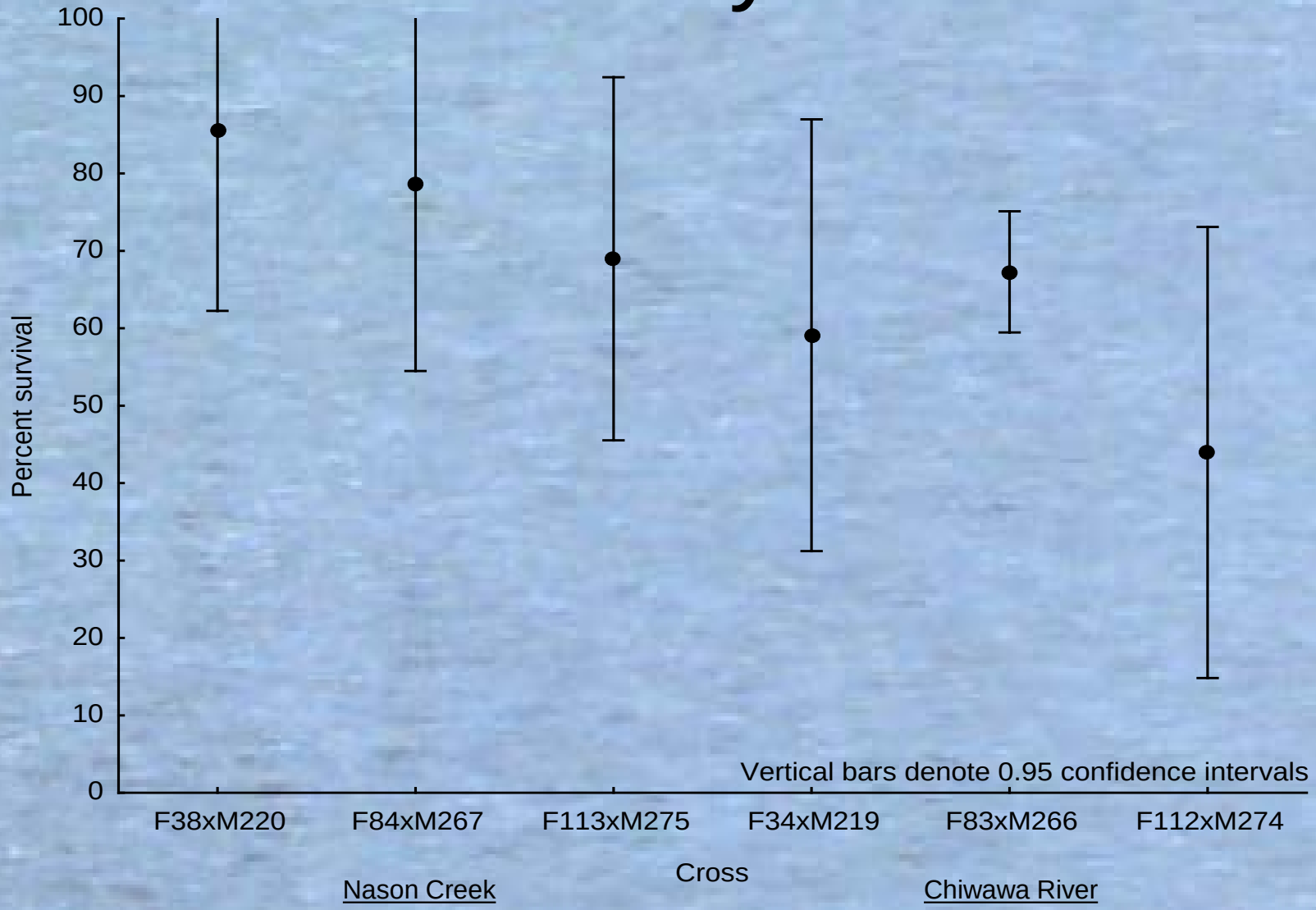
Comparative studies in the Yakima River basin



Wenatchee Basin pilot survival by reach



Wenatchee Basin pilot survival by cross



2009 Summary

- Methods appear to be feasible to assess egg-fry survival in the Yakima and Wenatchee (pilot scale) basins.
- Successfully detected differences in survival between reaches of the upper Yakima.
- Preliminary evidence suggests that fine sediment infiltration may affect egg survival in some areas of the upper Yakima.

2010-2011

- Second year at the same scale
- Initial assessments of emergence timing and emergence related mortality.
- Temperature loggers in 1/3 of the redds (dissolved oxygen and temperature relationship)
- Additional redds in the spawning channel to compare box survival to our best estimate of survival from naturally constructed redds

Acknowledgements

- NOAA:
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- WDFW:
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- Oncorh Consulting:
  - Curt Knudsen
- UW:
  - Ryan Klett
- Grant County PUD:
  - Todd Pearsons

Additional project updates

- Development and assessment of methods to measure (spring-summer) abundance and distribution of rearing spring Chinook salmon in the upper Yakima River basin
- Rearing spring Chinook abundance and meso/micro-scale habitat measures in the upper Yakima River Basin
- Abundance and distribution of hatchery and natural origin precociously mature male spring Chinook salmon in the Yakima River Basin

2009 report:

Spring Chinook salmon competition/capacity and residual/precocious male monitoring in the upper Yakima River Basin

Available (soon): www.bpa.gov