Idaho Supplementation Studies: Results and Recommendations

David A. Venditti
Ryan N. Kinzer
Timothy Copeland

Cooperators

Bonneville Power Administration

Objectives

Basin-level analyses

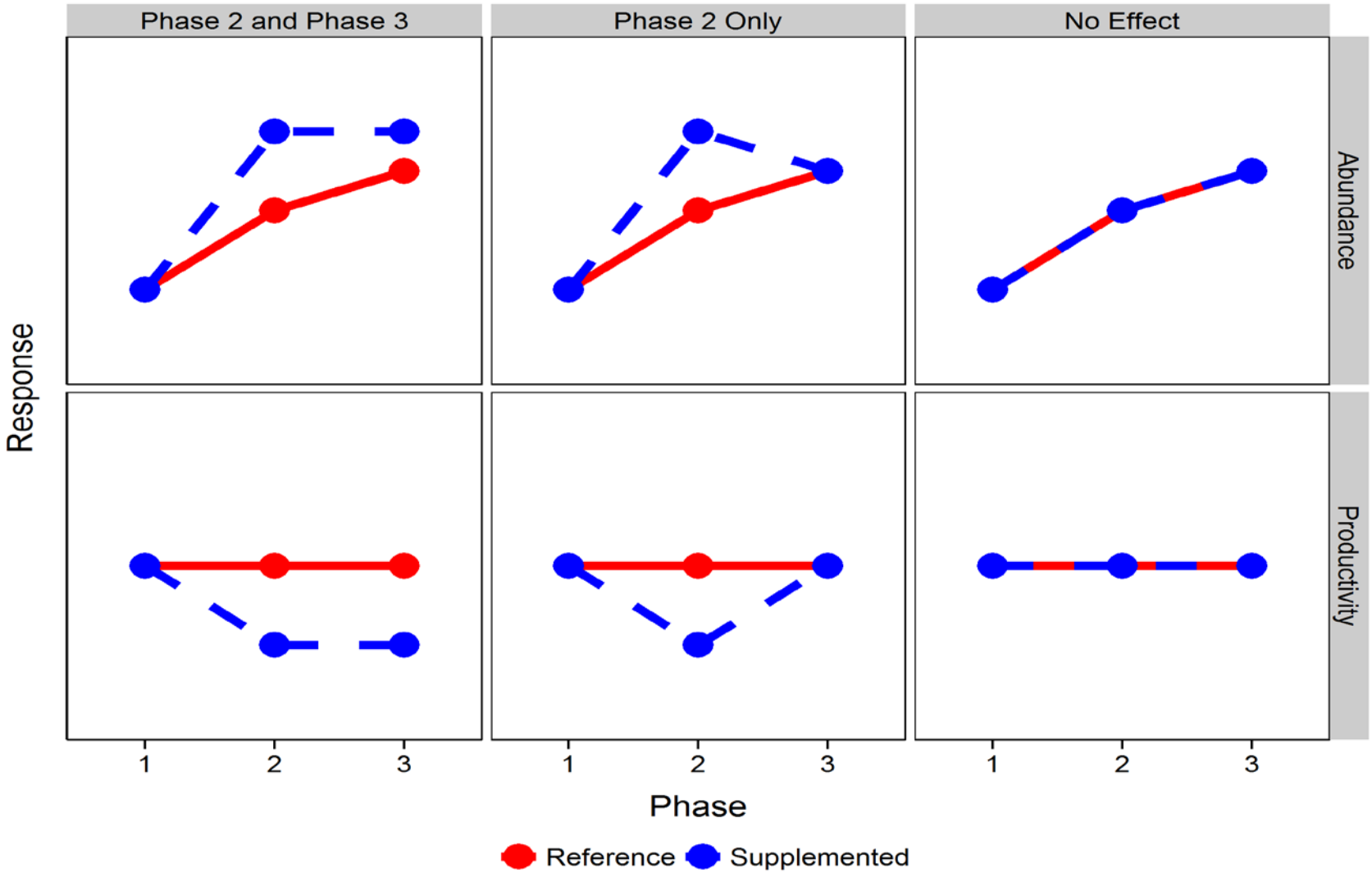
- Life cycle evaluation
- Abundance and productivity effects

Intensive analyses of streams with weirs

- Effectiveness of juvenile release strategies
- Origin effects on population abundance
  - Maintains the life cycle evaluation
- Translate results into guidance for managers

Recommendations

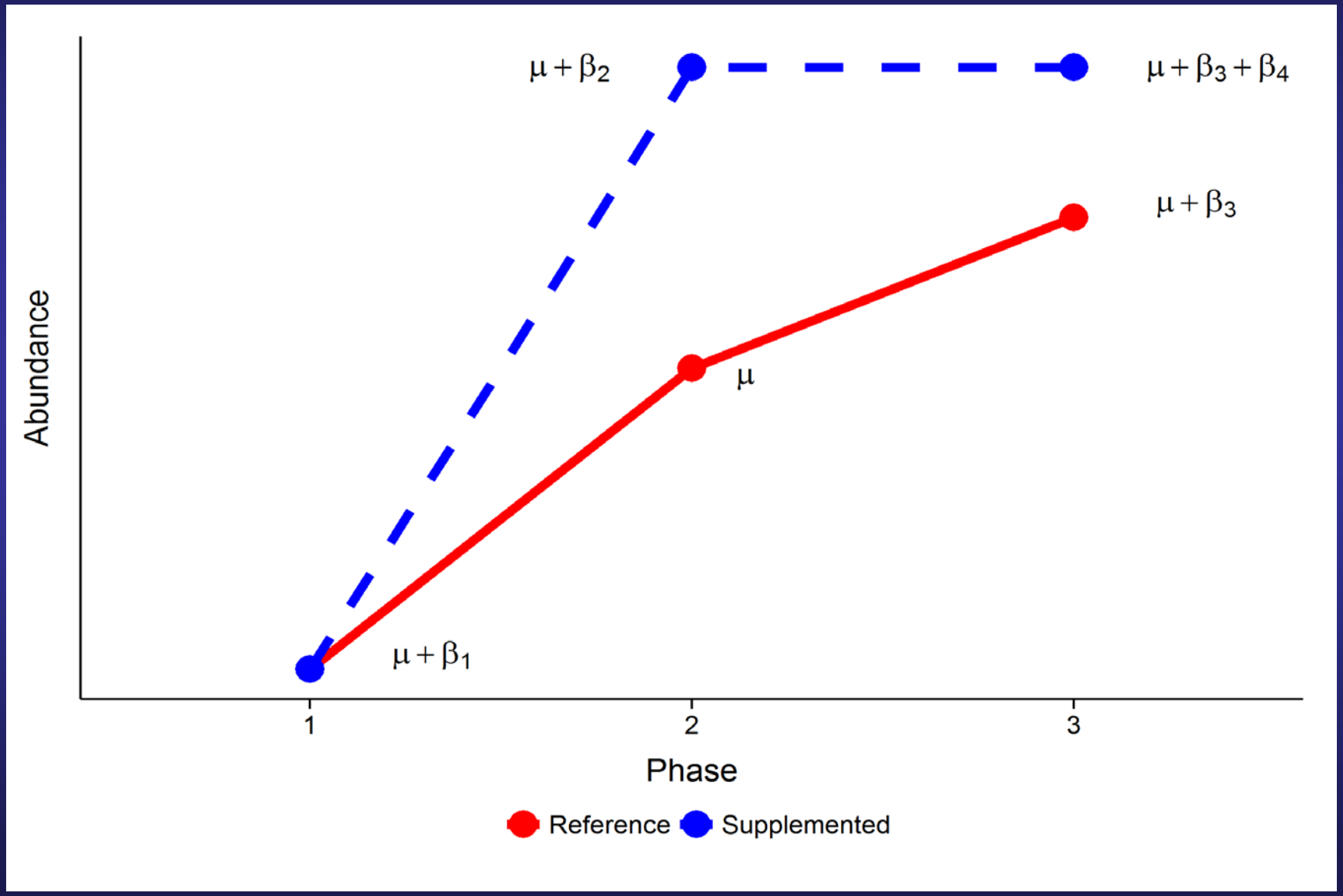
Possible Effects



Basin-level Analyses

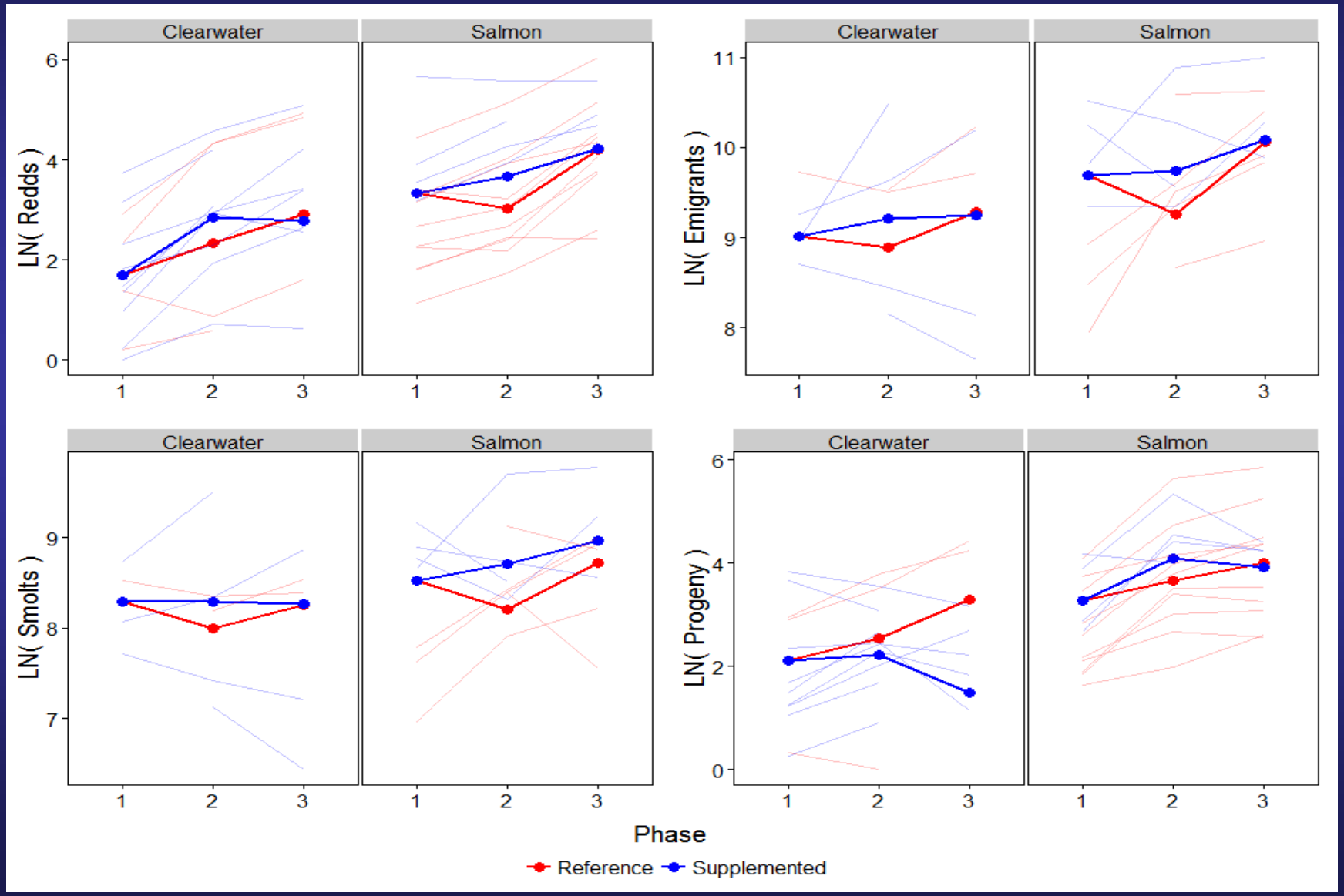
- Treatment was supplementation females
  - Non-treatment hatchery separately
- Mixed effects-model ranked by AIC_c
  - Fixed and random terms
- Model averaging for selection uncertainty

How the Model Works

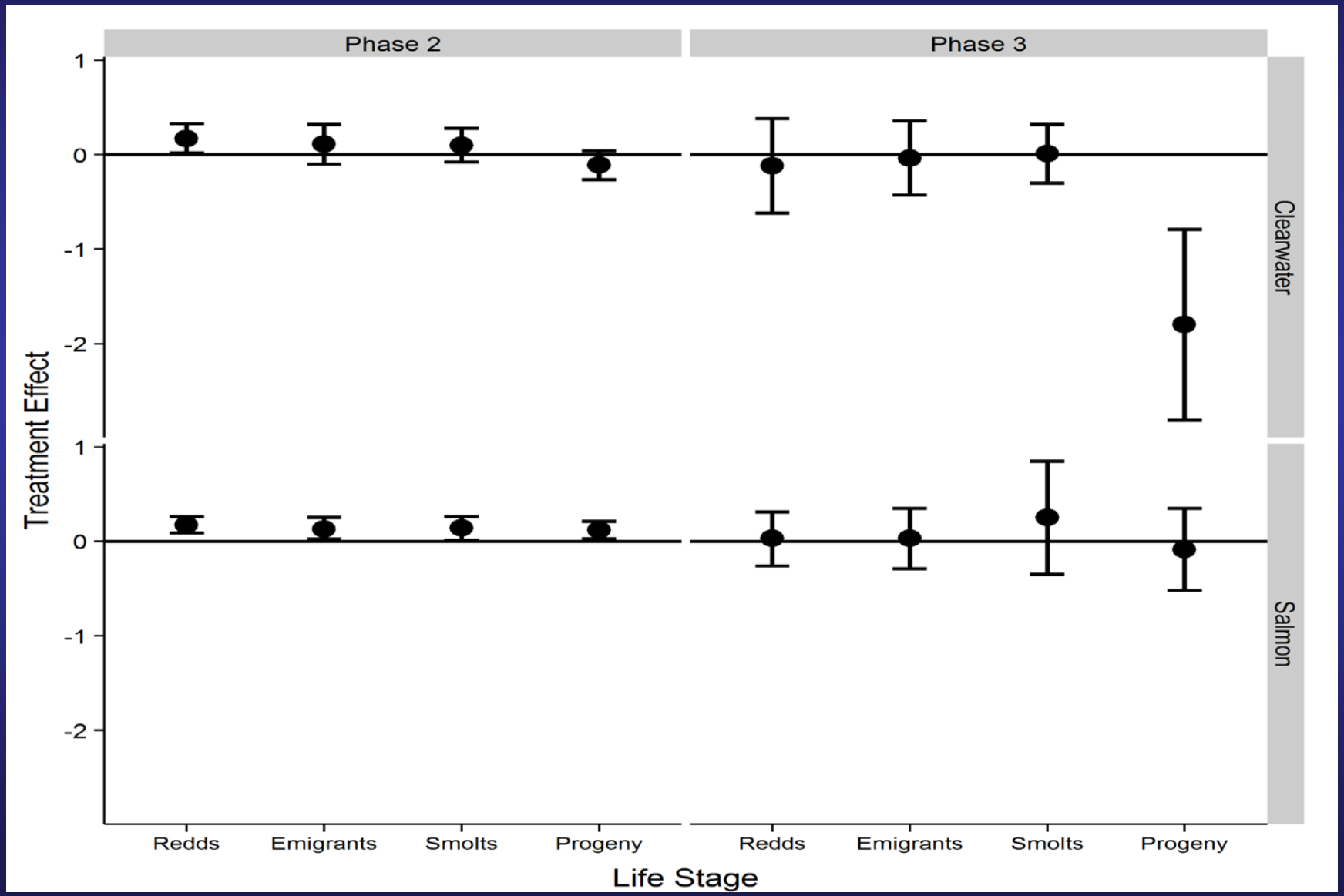


Basin-level Results

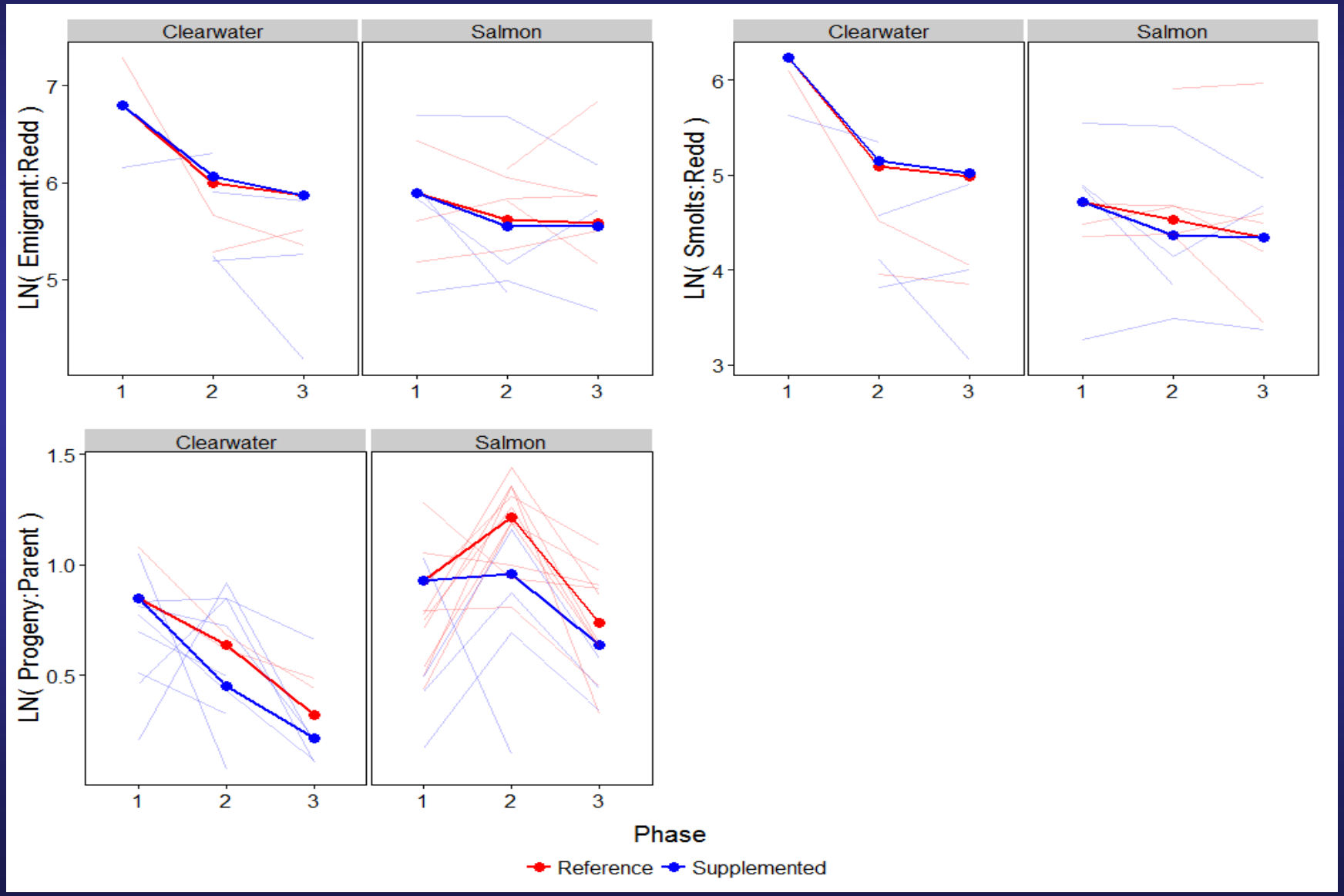
Expected Abundance



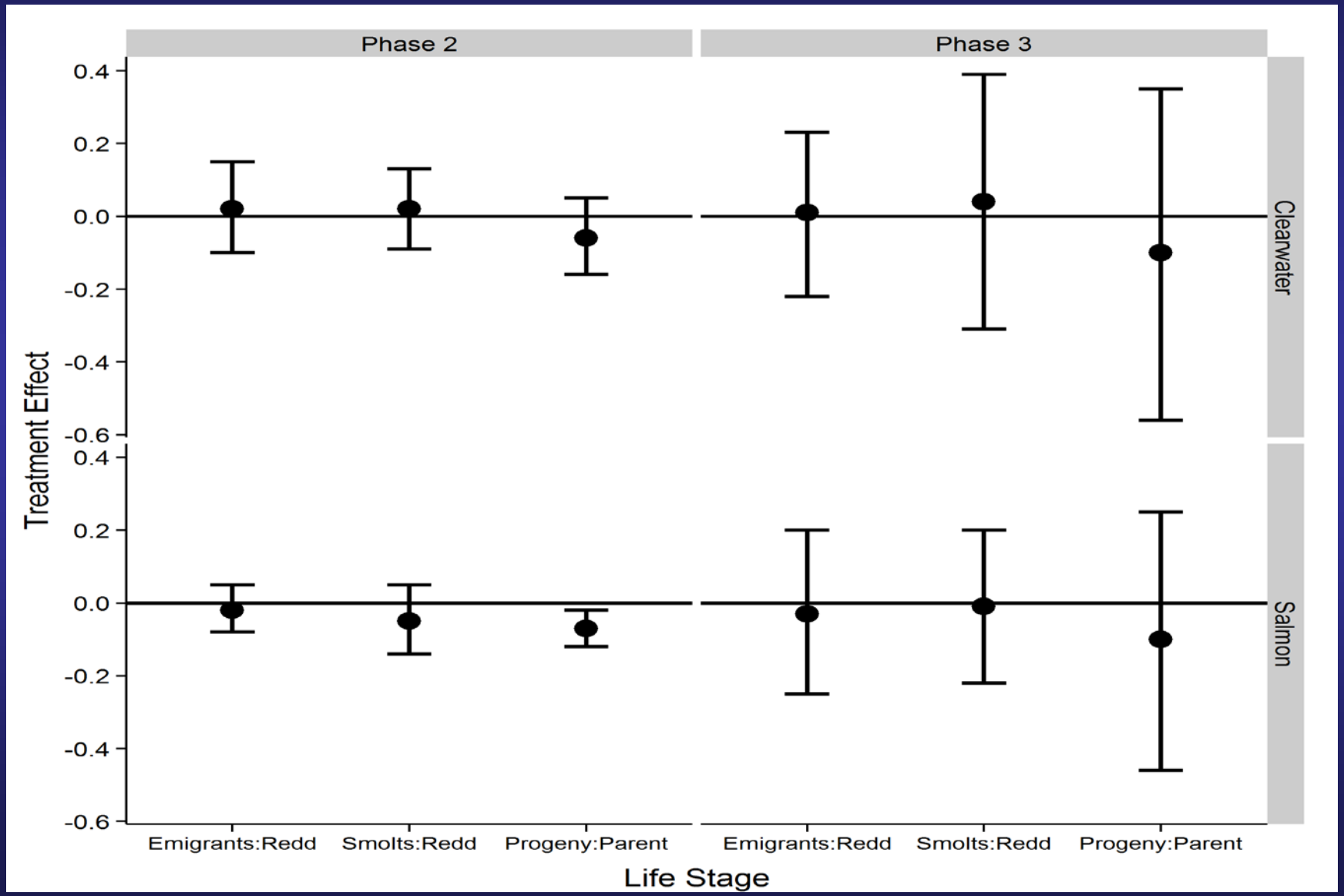
Abundance Coefficients



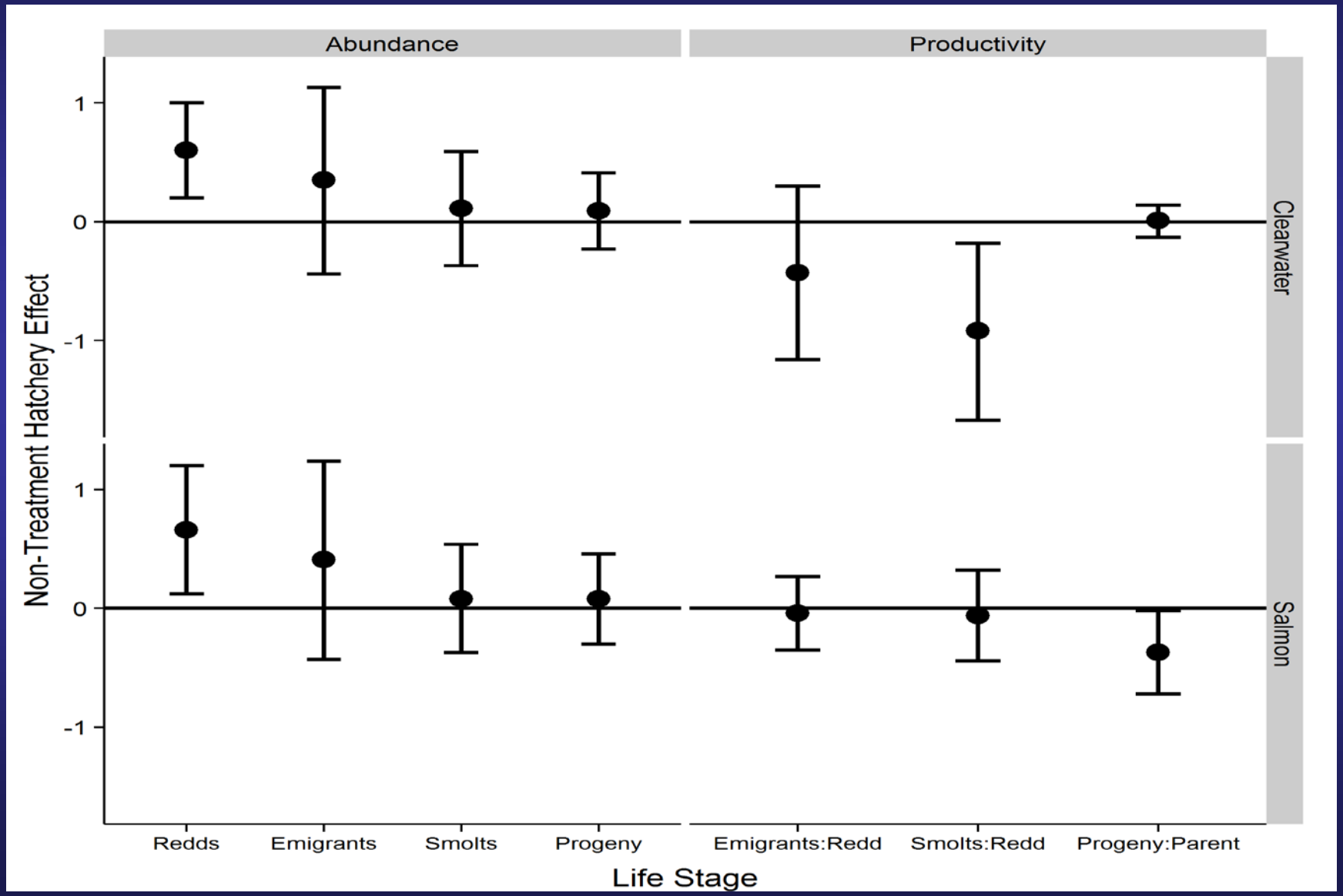
Expected Productivity



Productivity Coefficients



Non-treatment Hatchery Effects



Basin-level Synthesis

Treatment effects that did not persist

Results consistent in both basins

- Increase in abundance during treatment phase
- Decrease in productivity during treatment phase
  - Density or genetic effects?
- Returned to Phase 1 relationships in Phase 3

Non-treatment hatchery effects

- Positive for abundance and negative for productivity
- Stronger productivity effect in Clearwater

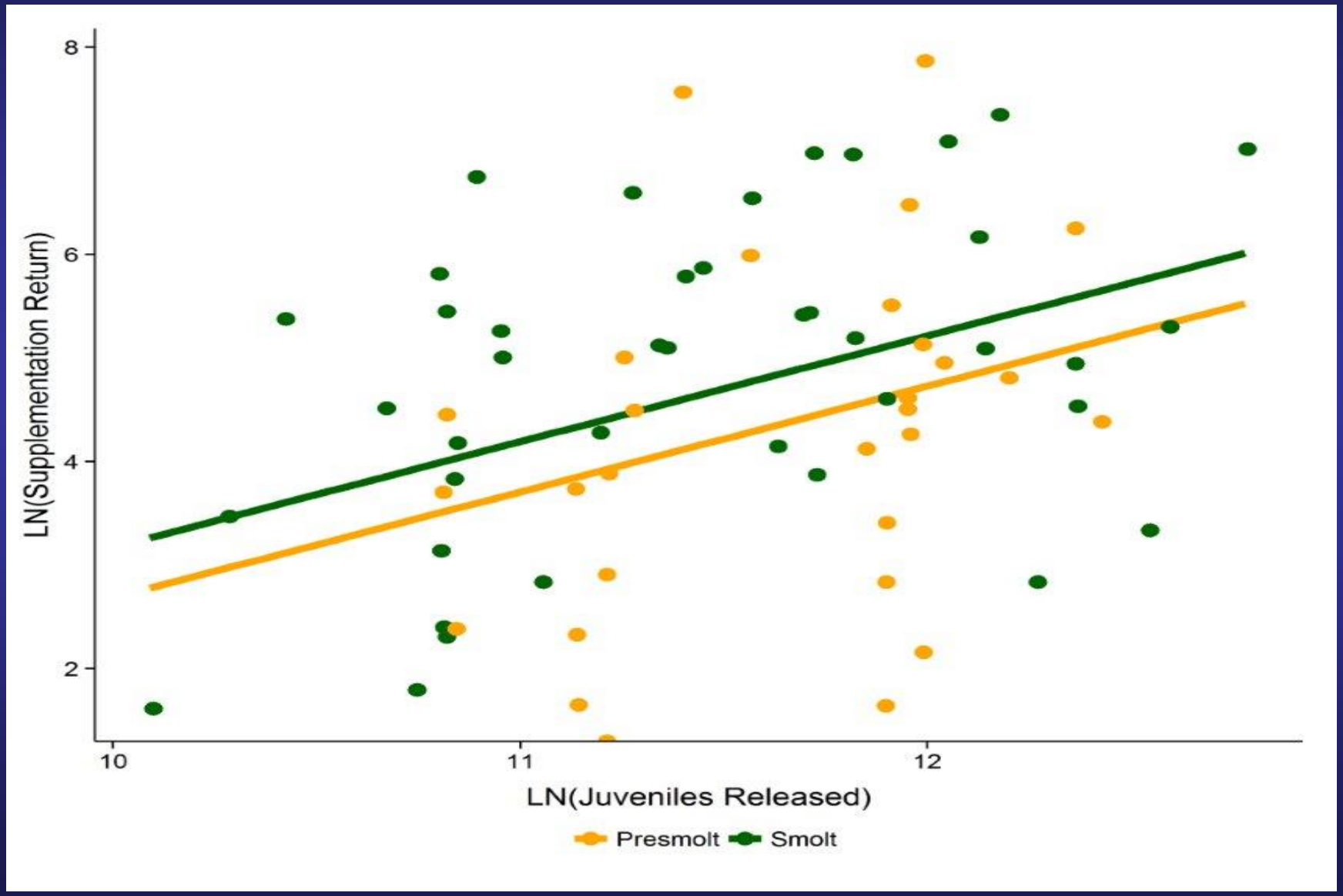
Intensive Analyses Results

Intensive Analyses

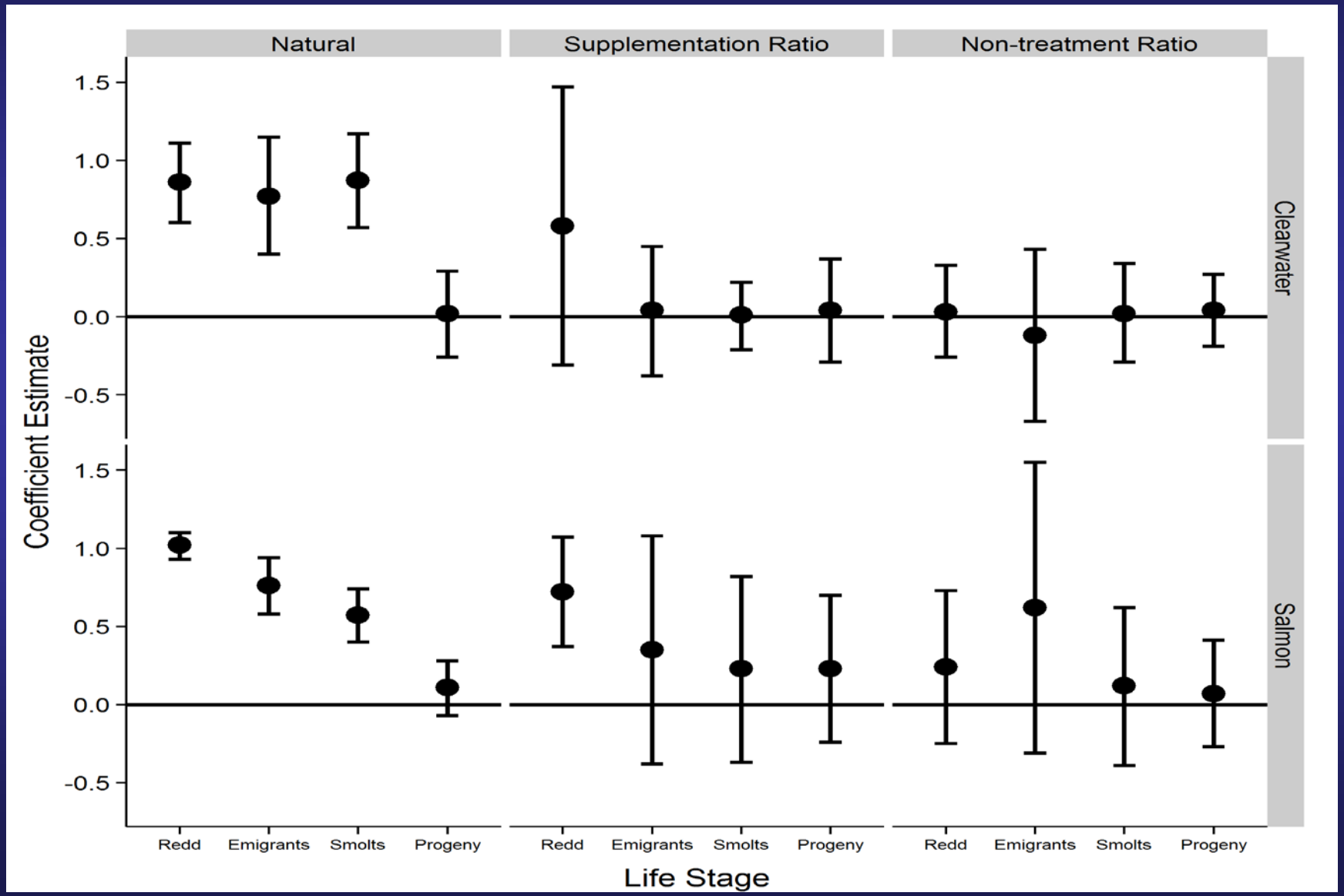
- Effect of sub-yearling or smolt release
- How female origin affects abundance
  - Maintains the life cycle approach

- Used similar mixed model approach
  - Along with model averaging
  - Assumes average year and stream effects

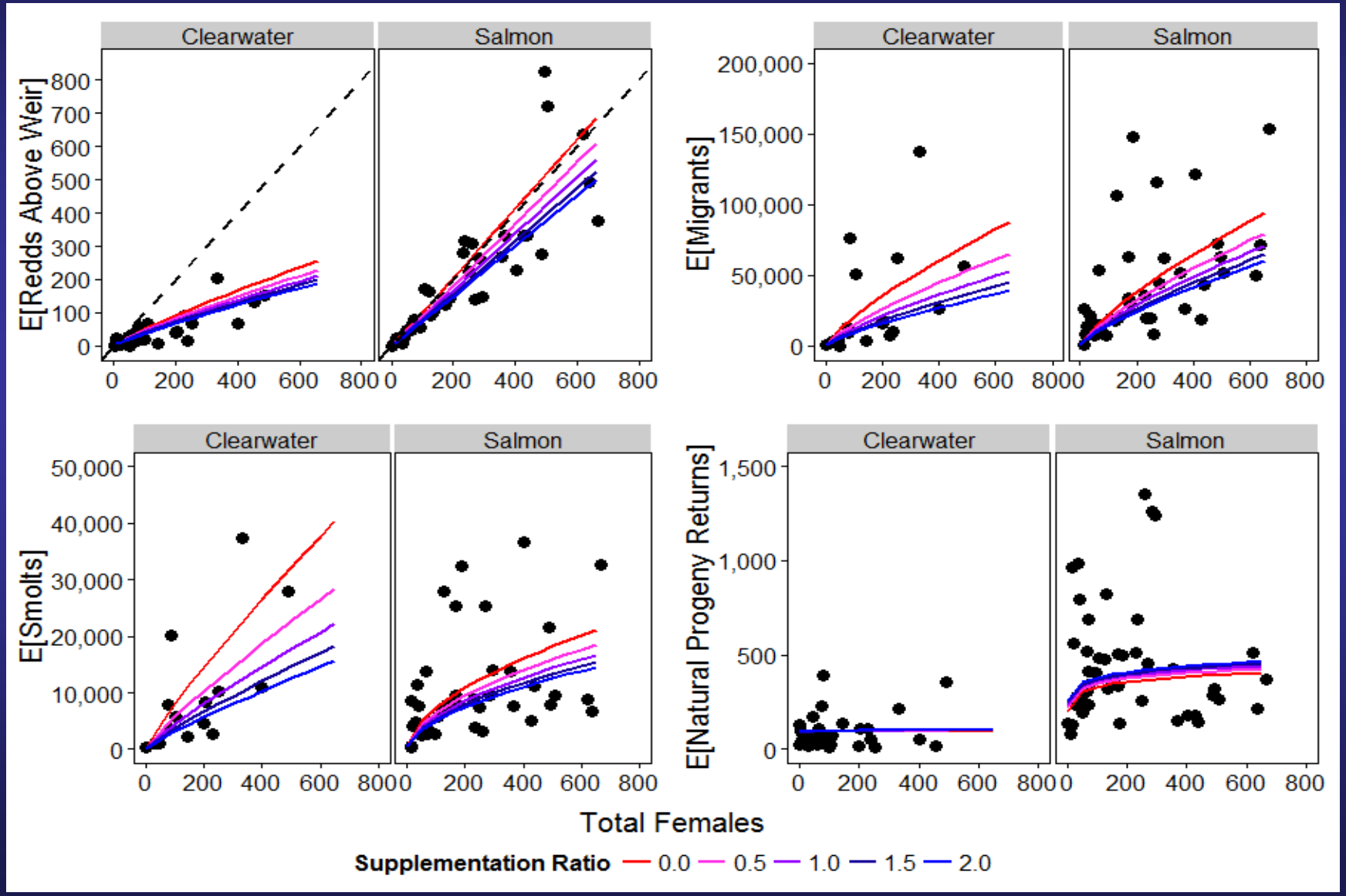
Juvenile Releases



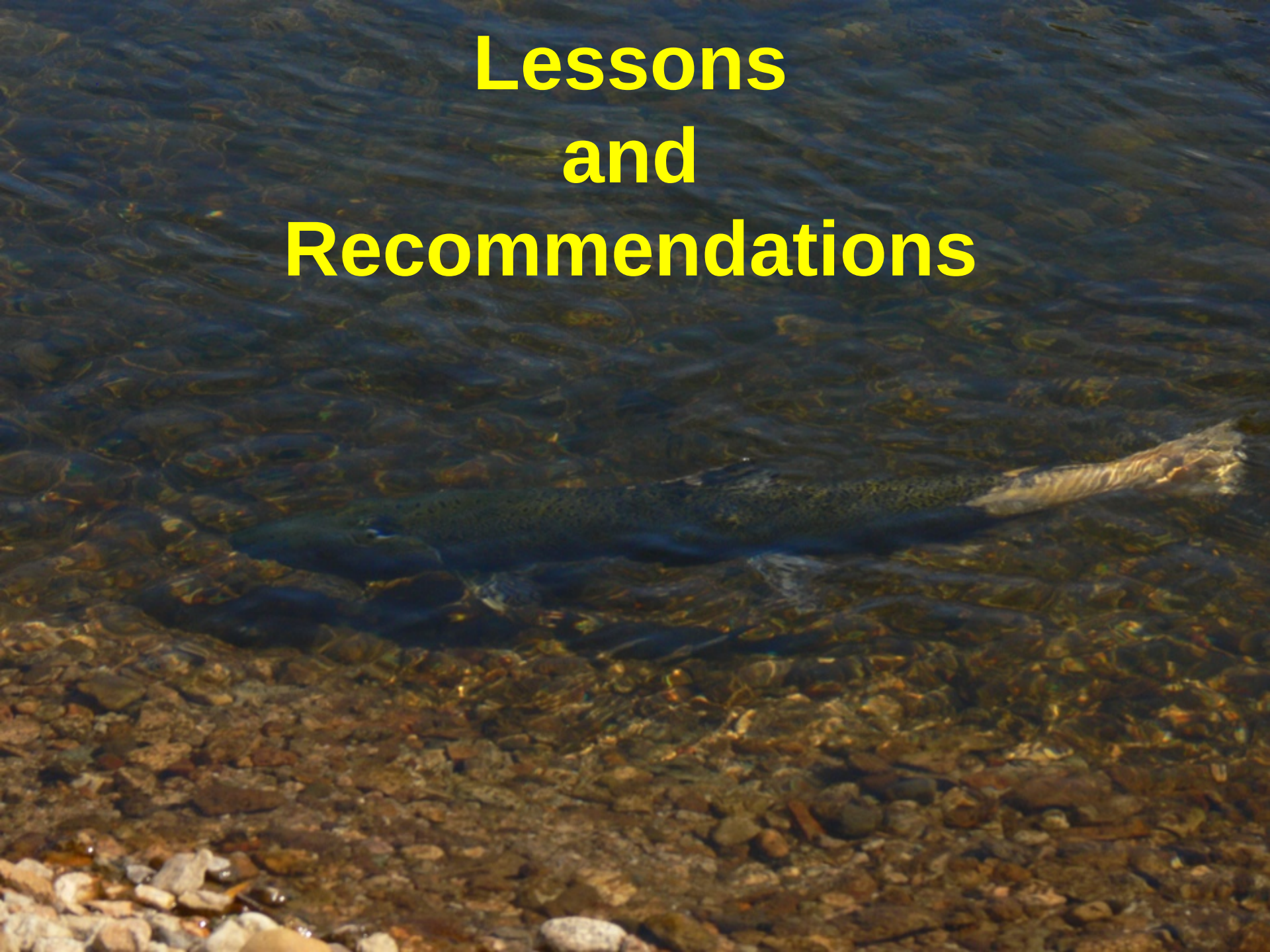
Origin Effects on Abundance



Supplementation Ratio



Lessons and Recommendations



Lessons

Supplementation can be useful as part of an integrated management approach to maintain population abundance

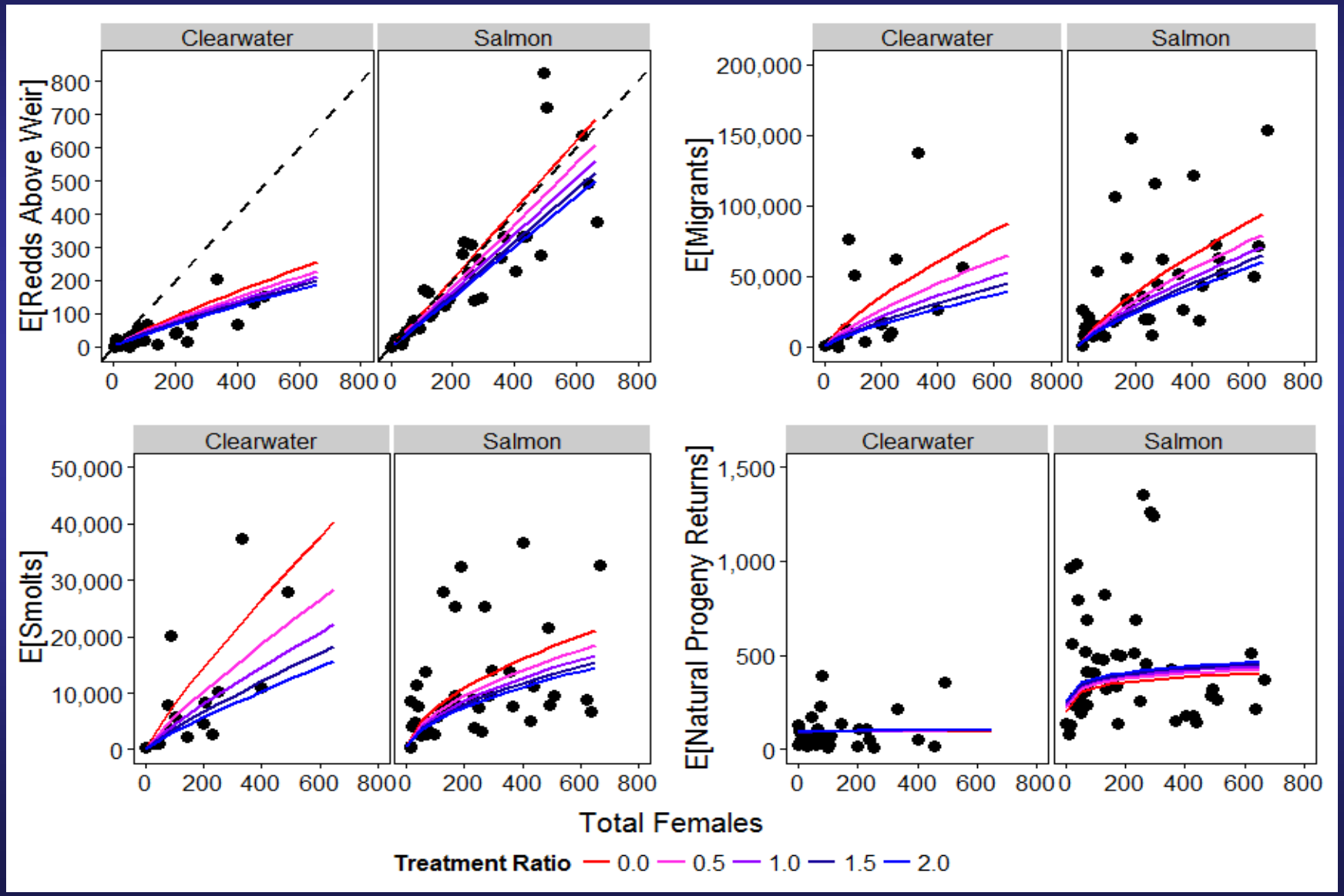
Post supplementation results show that temporary benefits can be achieved while keeping ecological costs low

However, it is not a panacea

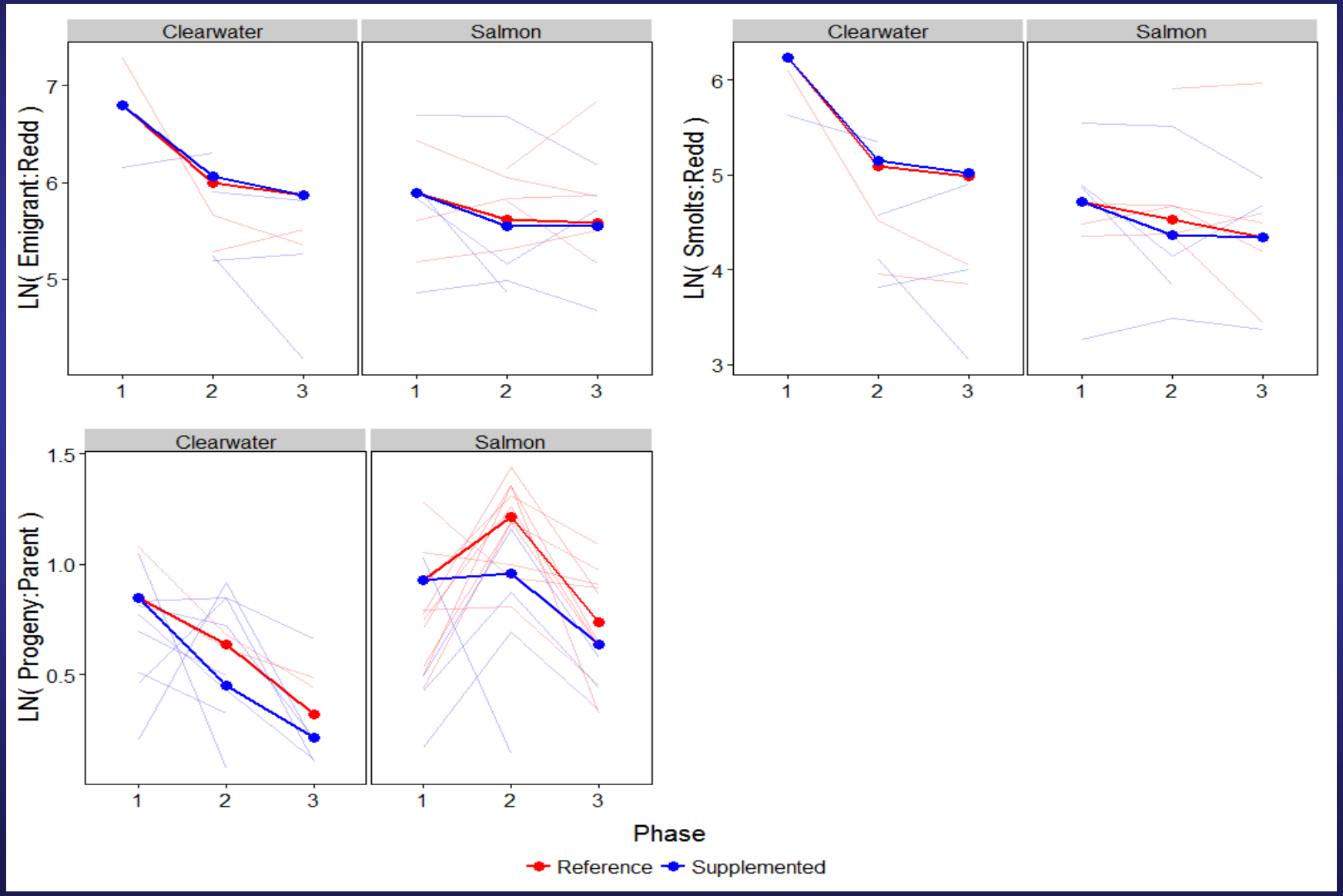
Important Notes

- Implementing supplementation is a policy decision
  - Our recommendations assume this decision has been made
- Do not deal with how easy a recommendation is
  - That comes from later discussions
  - Difficult things are often important and deserve consideration

Key Finding #1



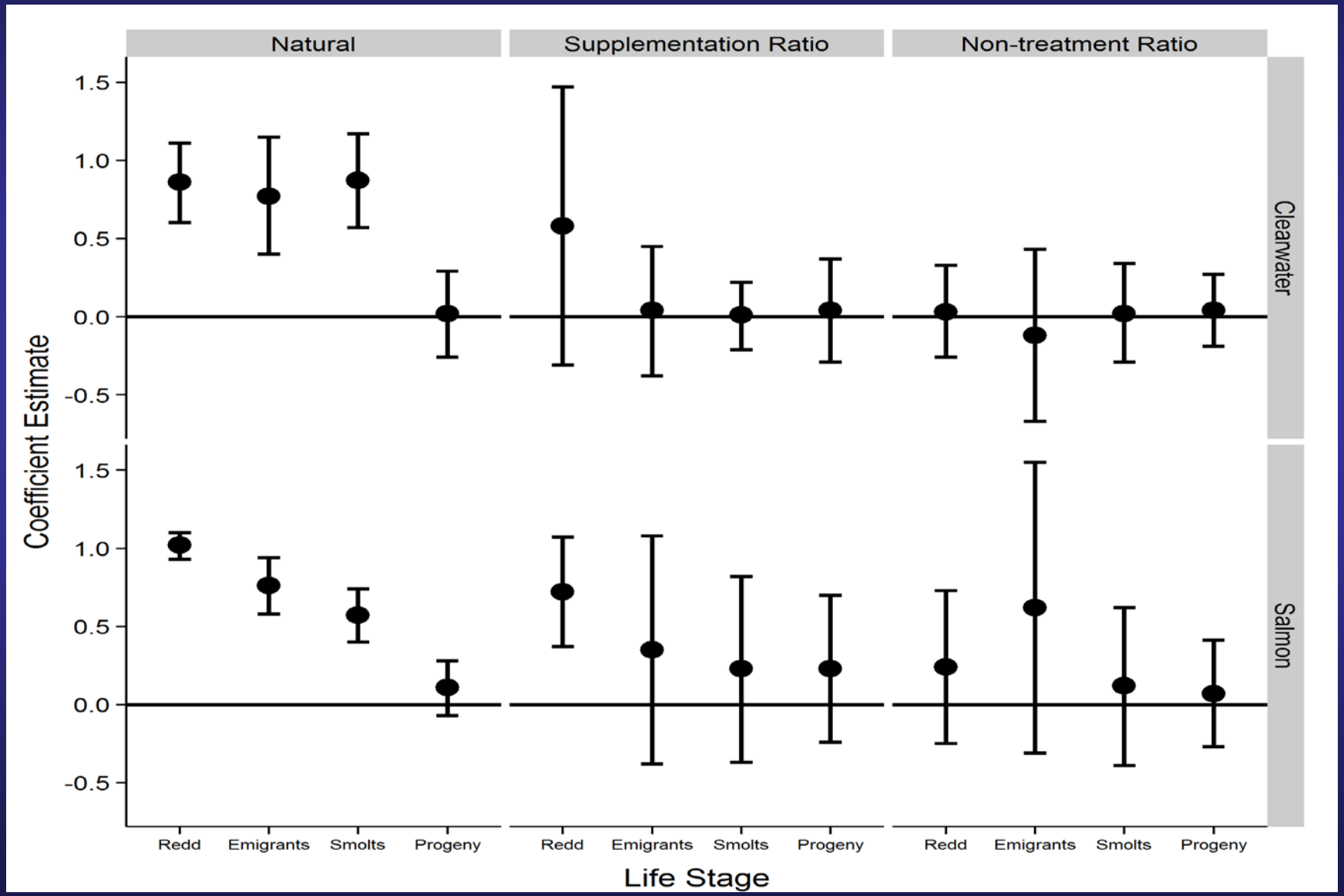
Key Finding #1 (Cont.)



Recommendations #1

- Supplementation should be based on risk of population failure.
- Reduce supplementation when natural populations increase and define when supplementation is no longer needed.
- Establish population-specific supplementation prescriptions.
- At higher abundances, there is an opportunity to seed available habitat.

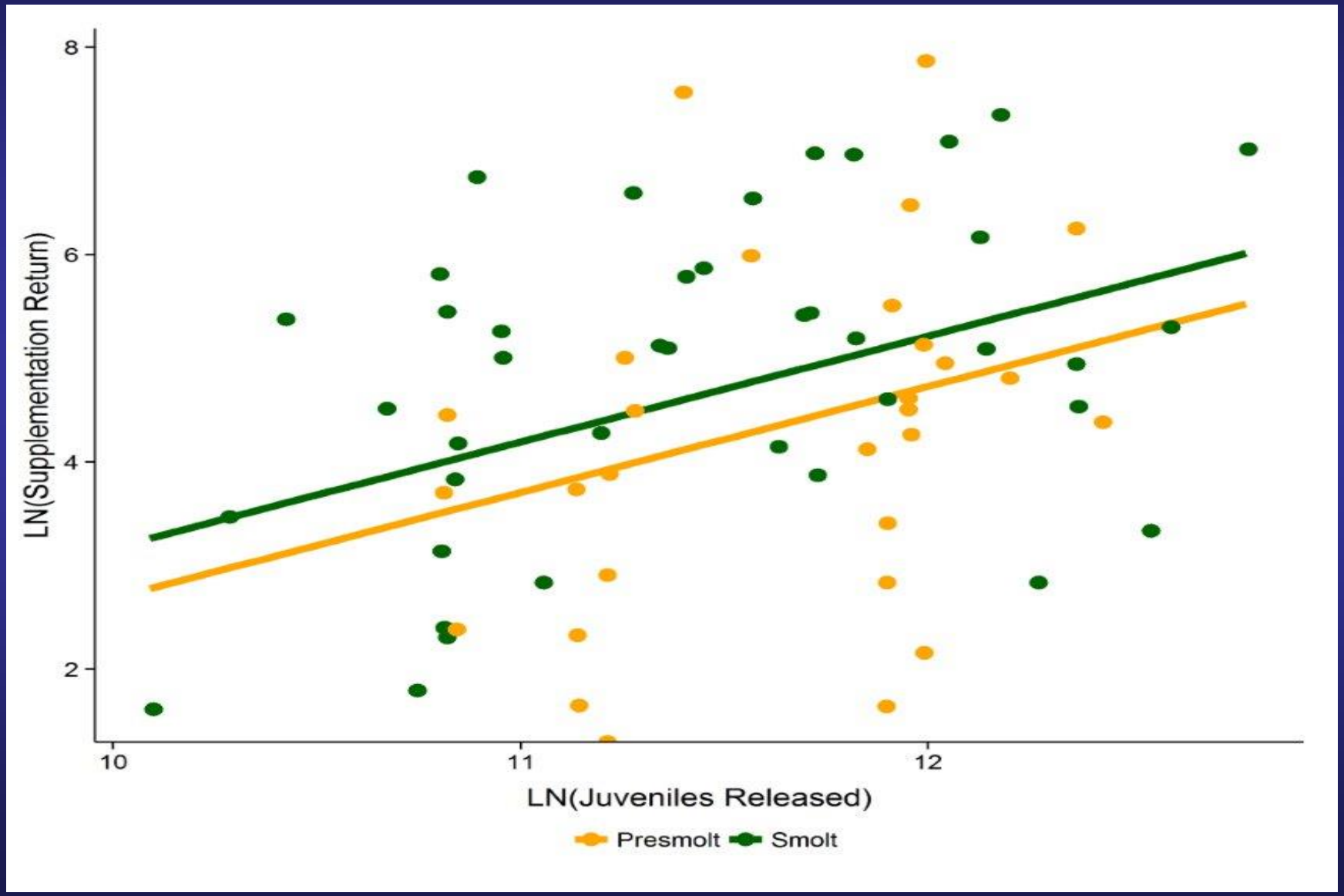
Key Finding #2



Recommendations #2

- Work in order of effectiveness: natural-origin > supplementation > non-treatment hatchery.
- Use integrated broodstocks.
- Mark integrated broodstock creatively
- Supplement with females first and rely on natural-origin males for fertilization.

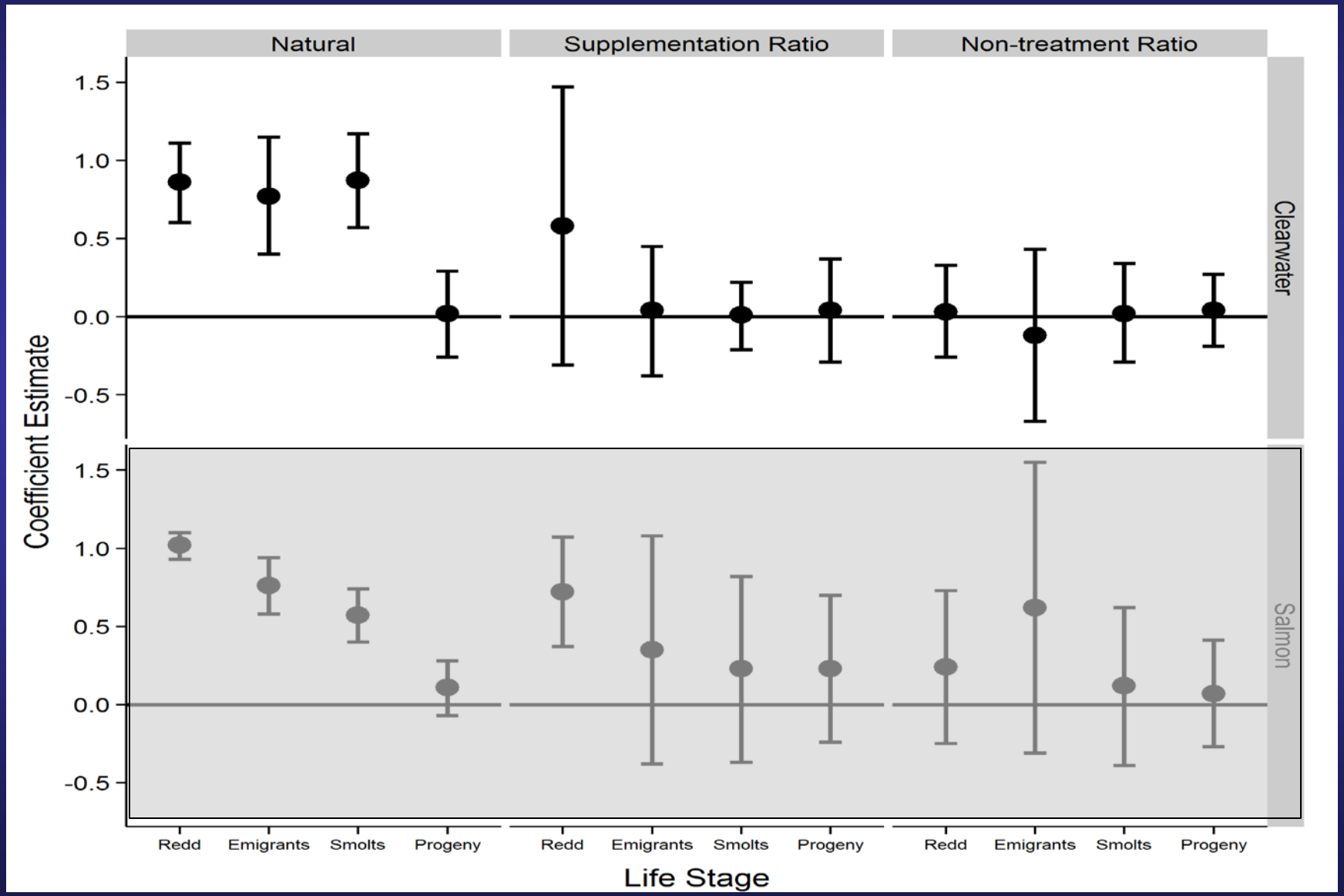
Key Finding #3



Recommendations #3

- **Use smolt releases**
- **Scale releases to produce sufficient adults for treatment *and* to maintain the broodstock.**

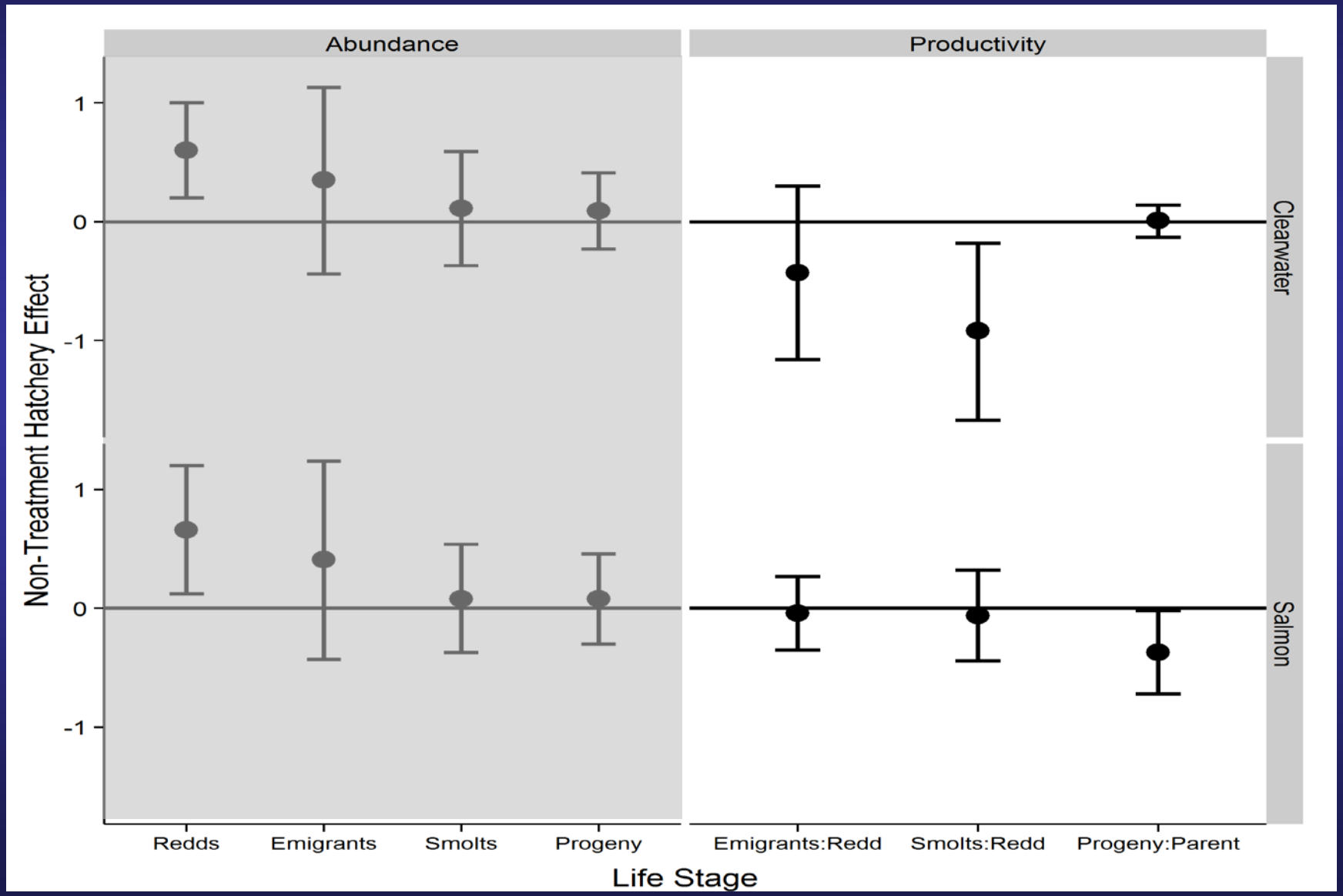
Key Finding #4



Recommendations #4

- Develop local broodstocks if possible.
- Minimize the use of out-of-basin stocks
- Conduct a local adaptation experiment in the Clearwater basin.

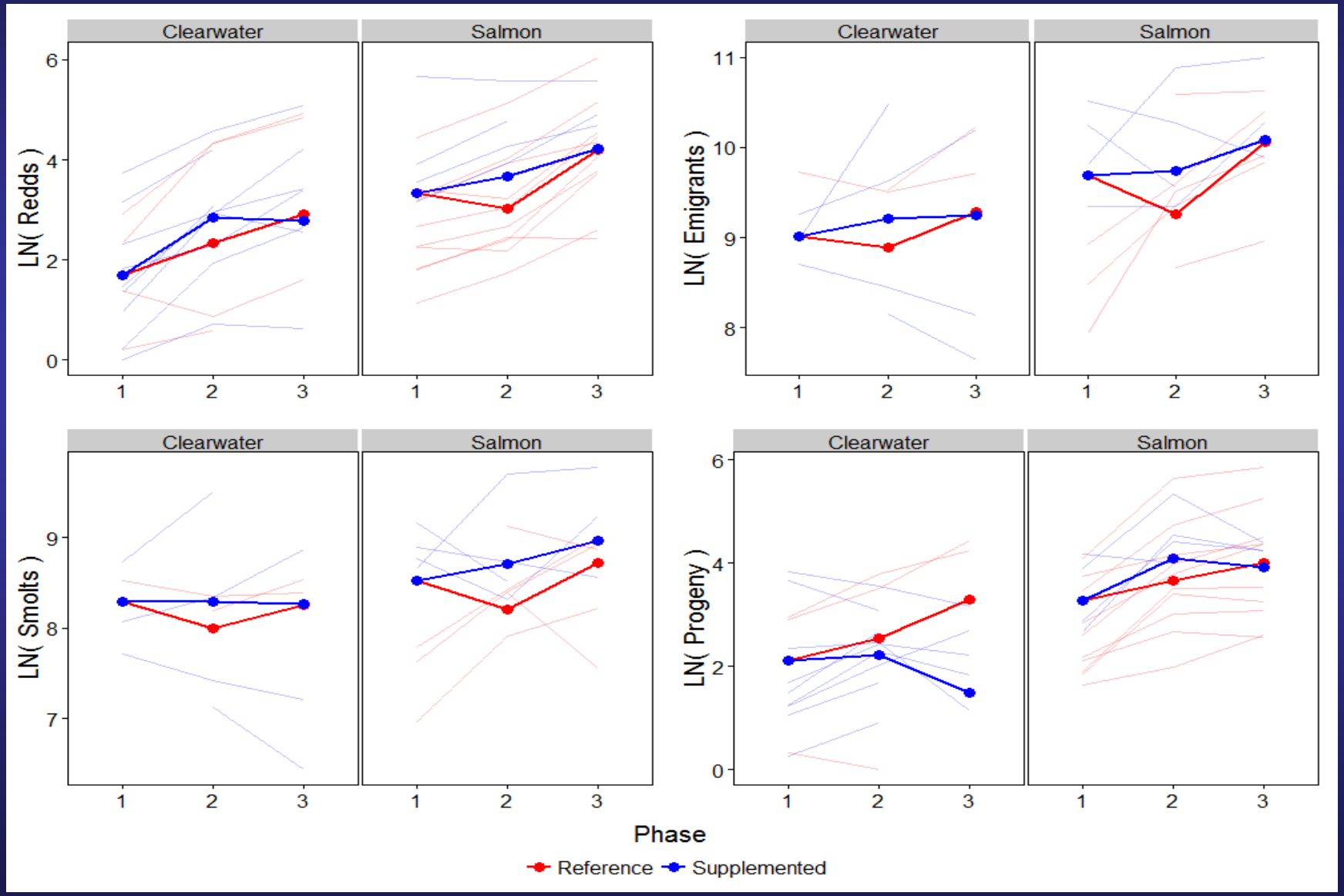
Key Finding #5



Recommendations #5

- Reduce the escapement of non-treatment hatchery fish into natural spawning areas.
- Continue carcass collections to assess their influence on the spawning ground.

Key Finding #6



Recommendations #6

- Evaluation requires reference streams across a range of intrinsic productivities
- Juvenile, hydrosystem, and adult monitoring should be fundamental components of supplementation programs

Key Finding #7

Recommendations #7

- Secure funding to perform adult-to-adult RRS analyses on samples from these locations.
- Use results to provide a baseline to guide integrated brood programs and future investigations.

Key Finding #8

Recommendations #8

- Where supplementation is appropriate, initiate an integrated broodstock program before it is needed.

Key Finding #9

Recommendations #9

- **Ensure collaboration among research, hatchery, management, and habitat restoration disciplines in all phases of design, implementation, and evaluation.**

Acknowledgements

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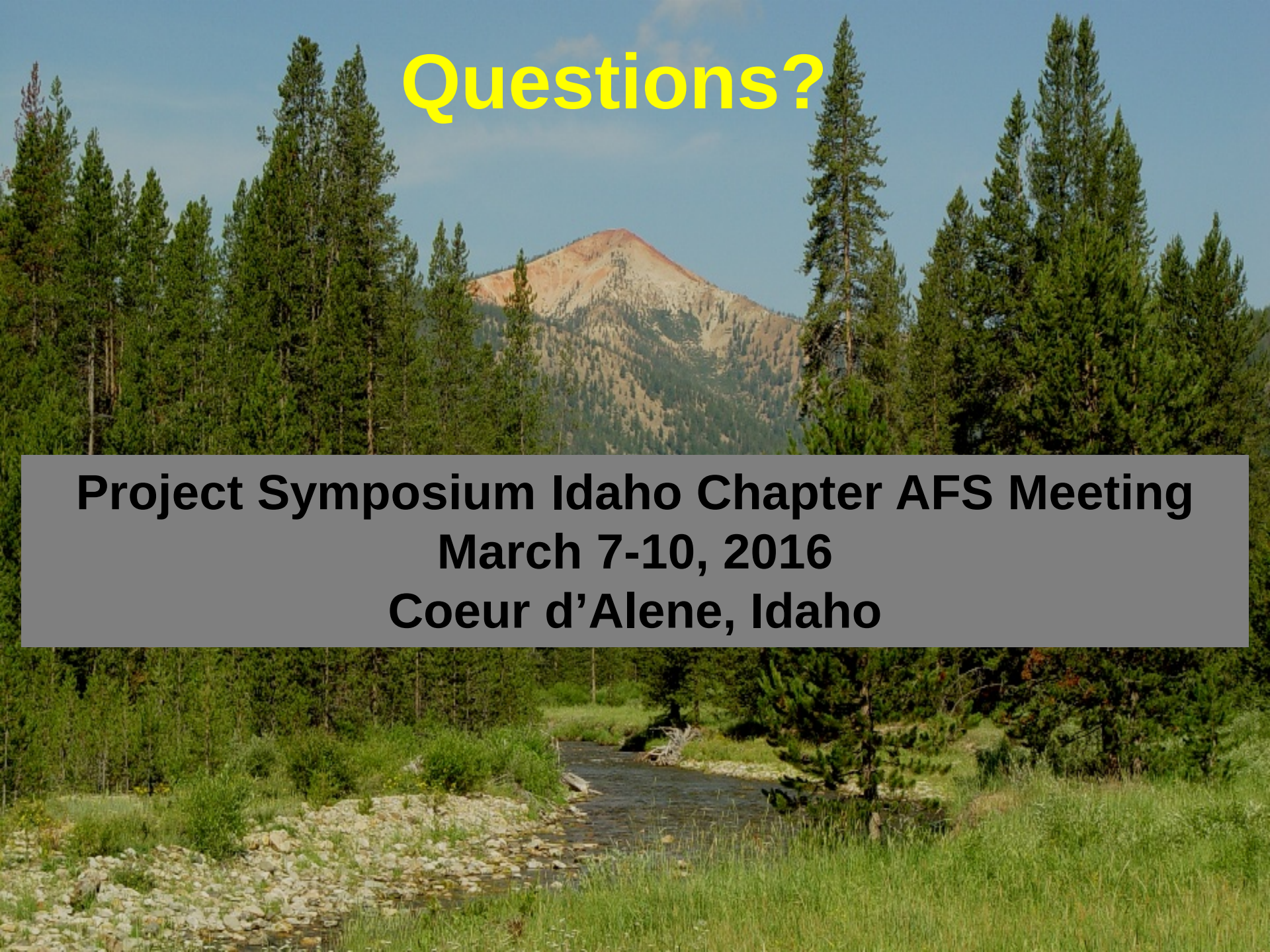

Questions?

Project Symposium Idaho Chapter AFS Meeting
March 7-10, 2016
Coeur d'Alene, Idaho