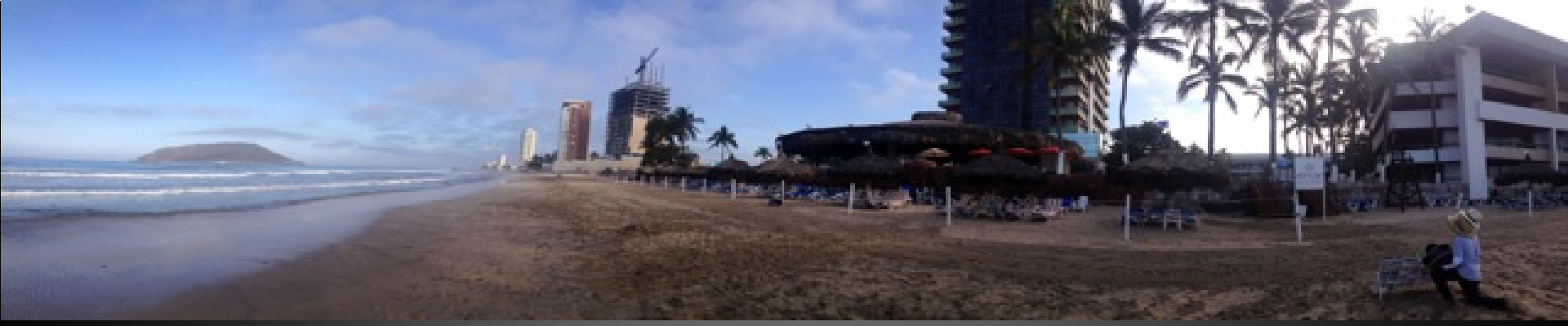


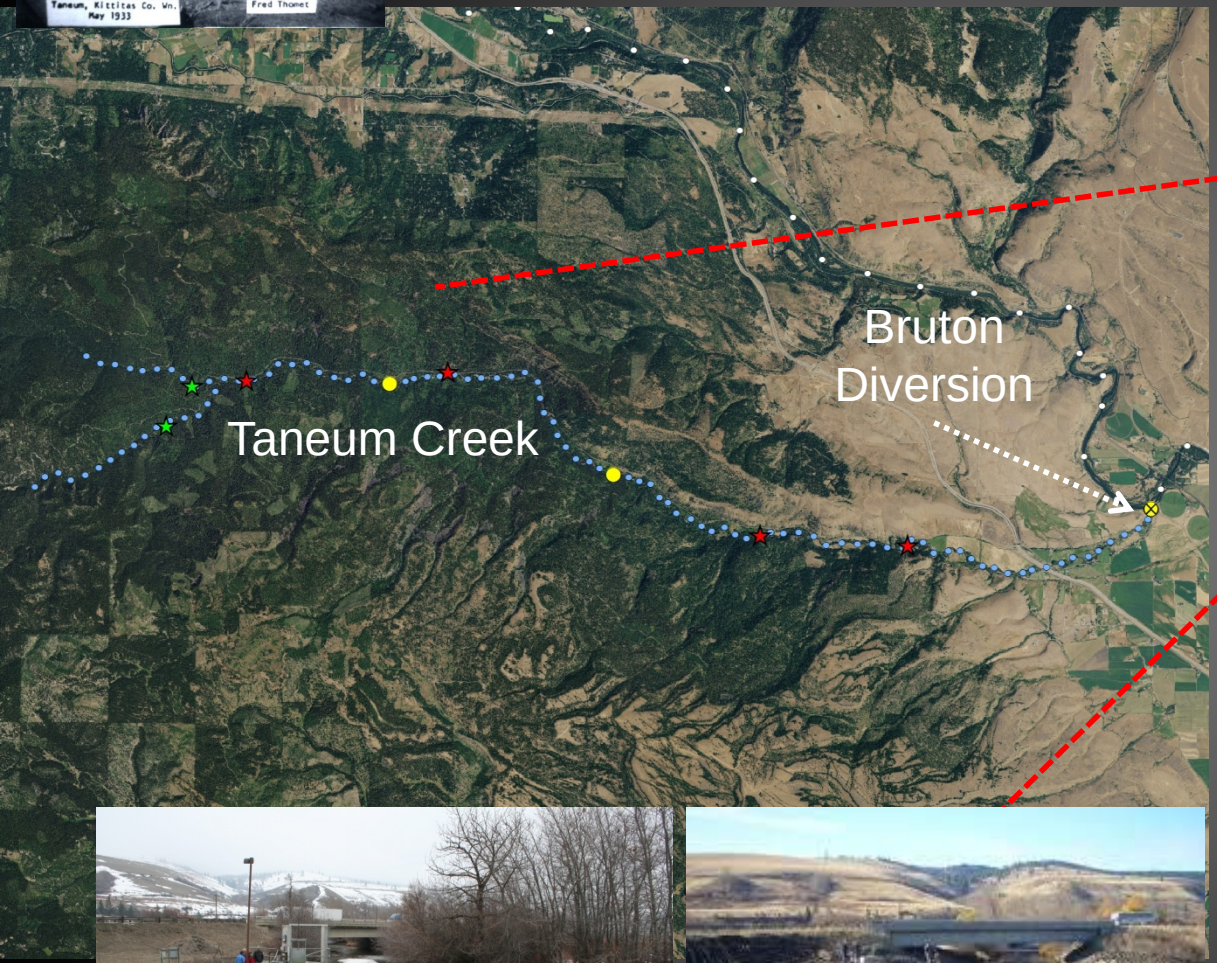
Rainbow Trout Abundance and Biomass Following Coho Salmon Reintroduction in Taneum Creek, WA

Gabriel Temple, Todd Newsome,

Timothy Webster, and Scott Coil

Yakima Basin Science and Management Conference:
Central Washington University
June 2014

Taneum Creek

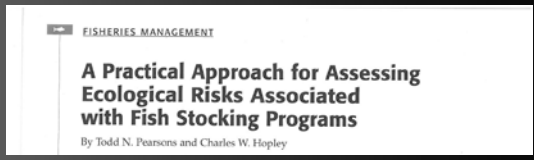


- First settled in 1863
- Irrigation infrastructure rapidly developed 1900's
- Coho extirpation 1910
- Logged in the 30's
- Bruton Dam Removal 2009
- Coho reintroduction 2007

Study Objectives

- Determine if coho salmon can be successful reintroduced in Taneum Creek
- If so, determine any adverse effects to native trout

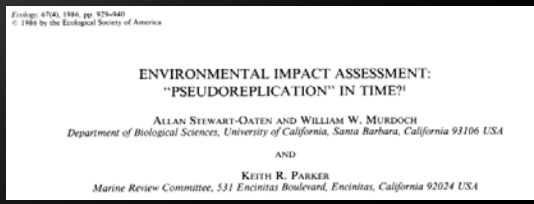
Methods


FISHERIES MANAGEMENT

A Practical Approach for Assessing Ecological Risks Associated with Fish Stocking Programs

By Todd N. Pearsons and Charles W. Hopley

- Reintroduce adult coho spawners into index sites (5 years)
- Monitor native rainbow trout population
- Use Before-After-Control-Impact (BACI) design to evaluate changes in rainbow trout monitoring variables (Δ values = T-C and indicate change in treatment sites relative to control sites during the reintroduction period


Ecology, 67(4), 1986, pp. 929–940
© 1986 by the Ecological Society of America

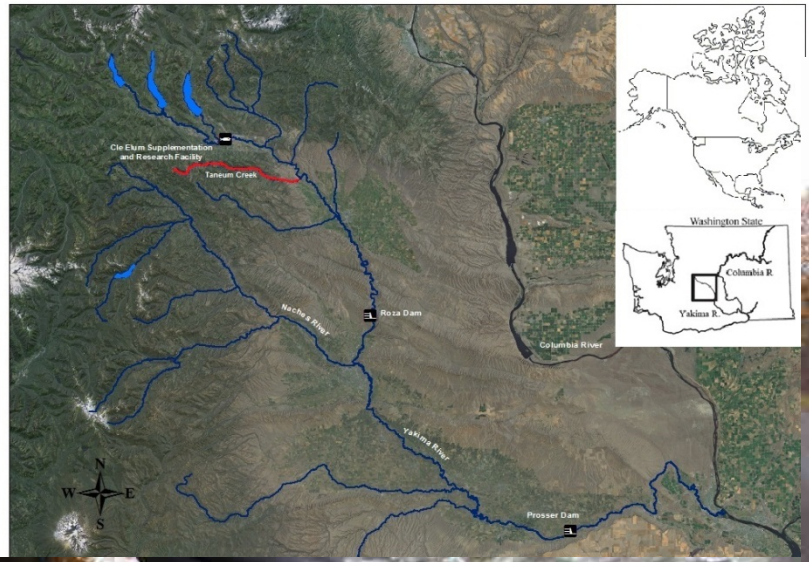
ENVIRONMENTAL IMPACT ASSESSMENT: "PSEUDOREPLICATION" IN TIME?[1]

ALLAN STEWART-OATEN AND WILLIAM W. MURDOCH
Department of Biological Sciences, University of California, Santa Barbara, California 93106 USA

AND

KEITH R. PARKER
Marine Review Committee, 531 Encinitas Boulevard, Encinitas, California 92024 USA

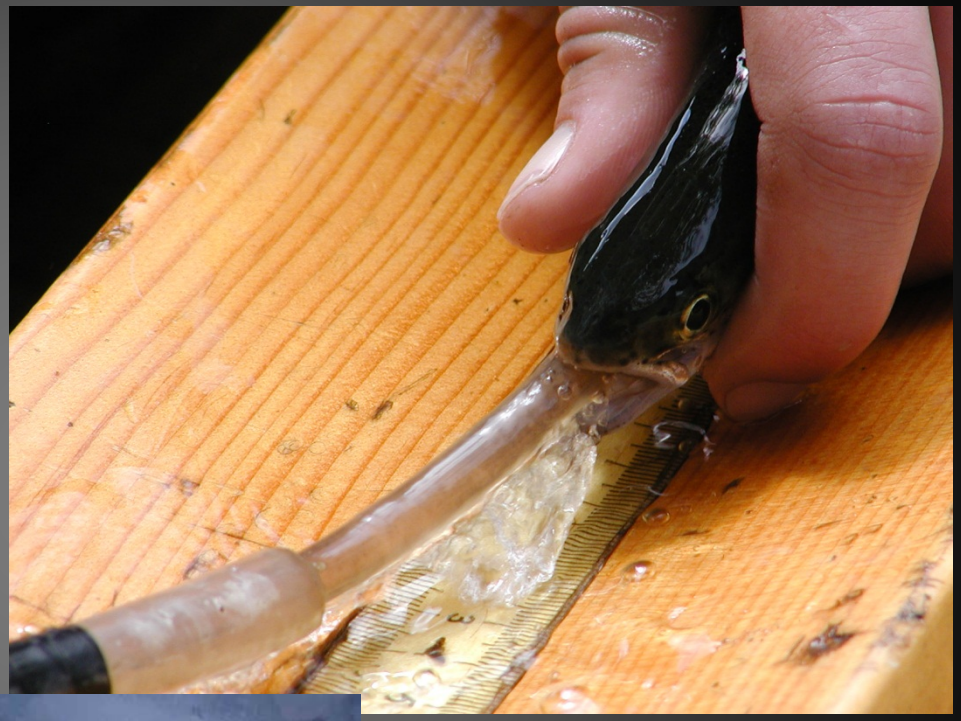
Coho Adult Out-planting



Coho Natural Production Monitoring

Brood Year	Redd
2007	100
2008	87*
2009	135
2010	135
2011	108

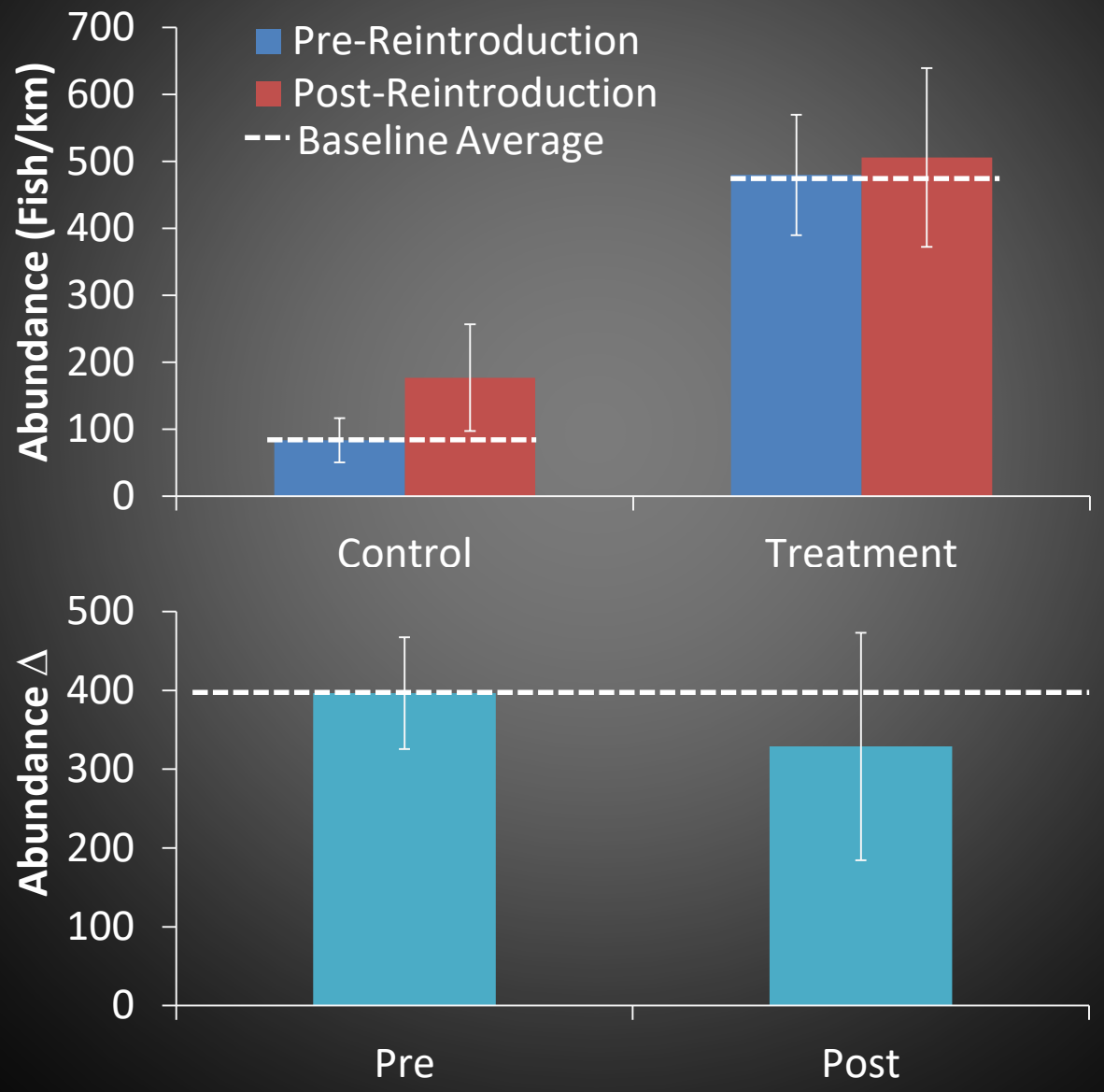
Ecological Benefits of Stocking



Rainbow Trout Monitoring

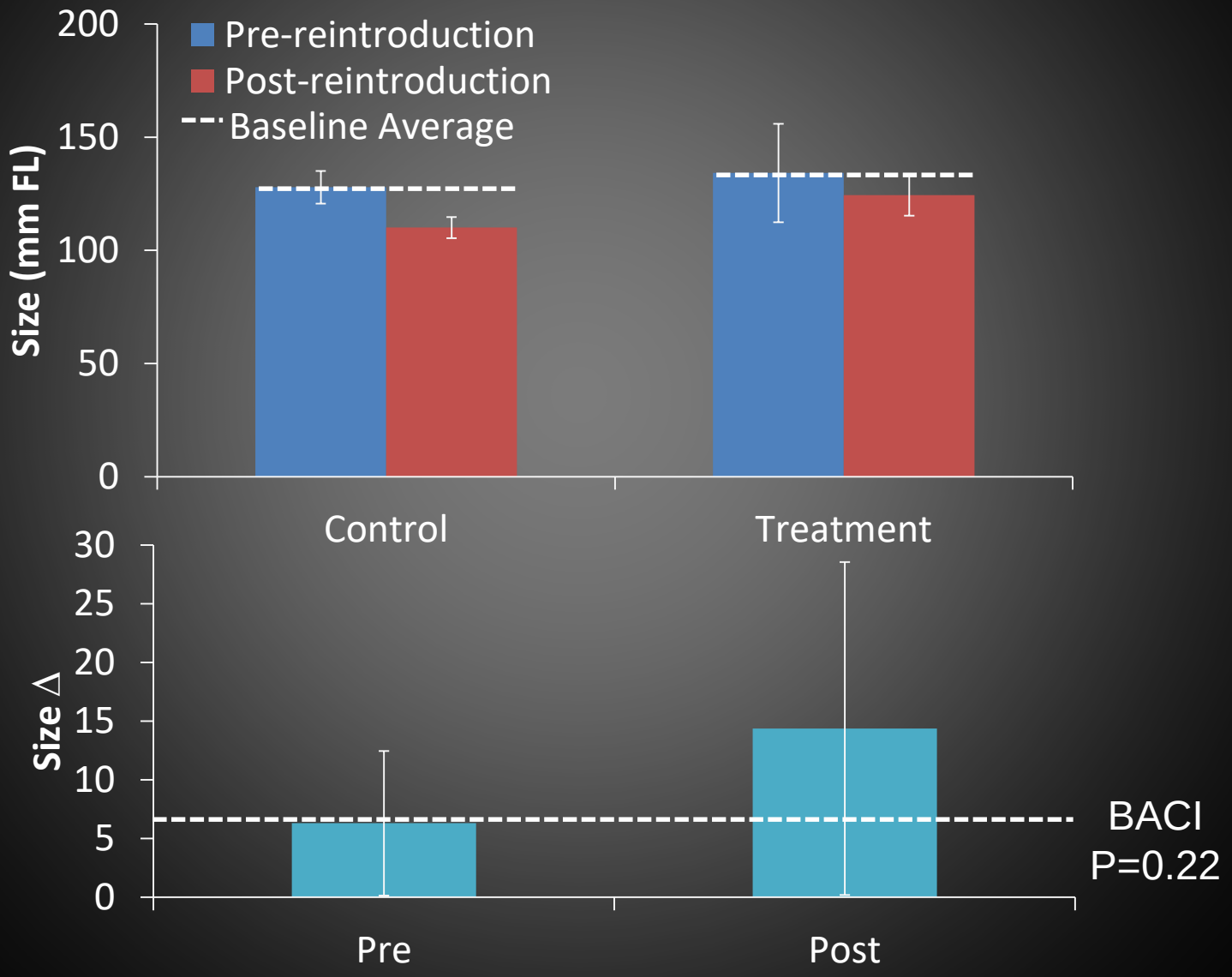
Temple and Pearsons 2007

Rainbow Trout Abundance

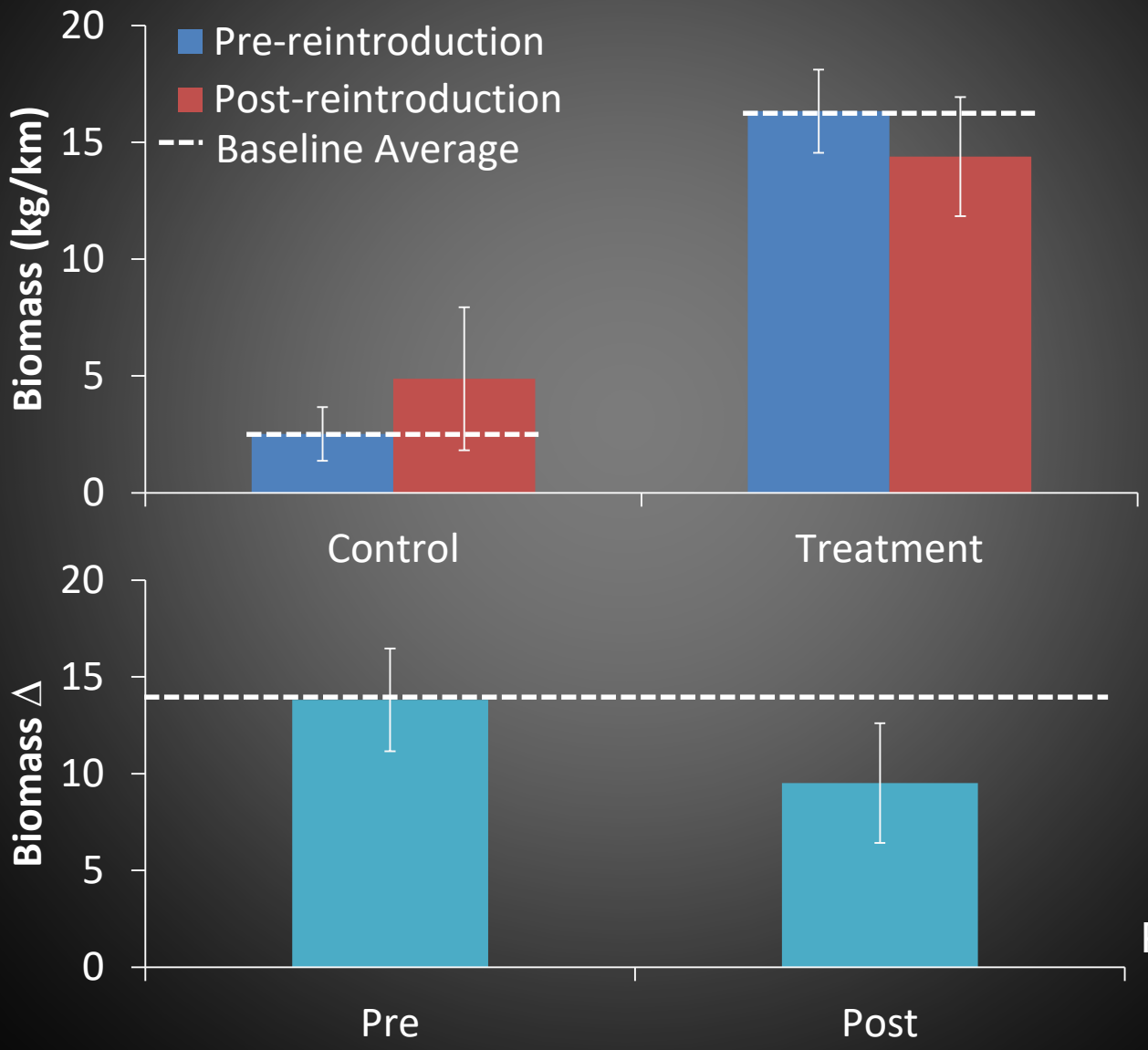


BACI
P=0.64

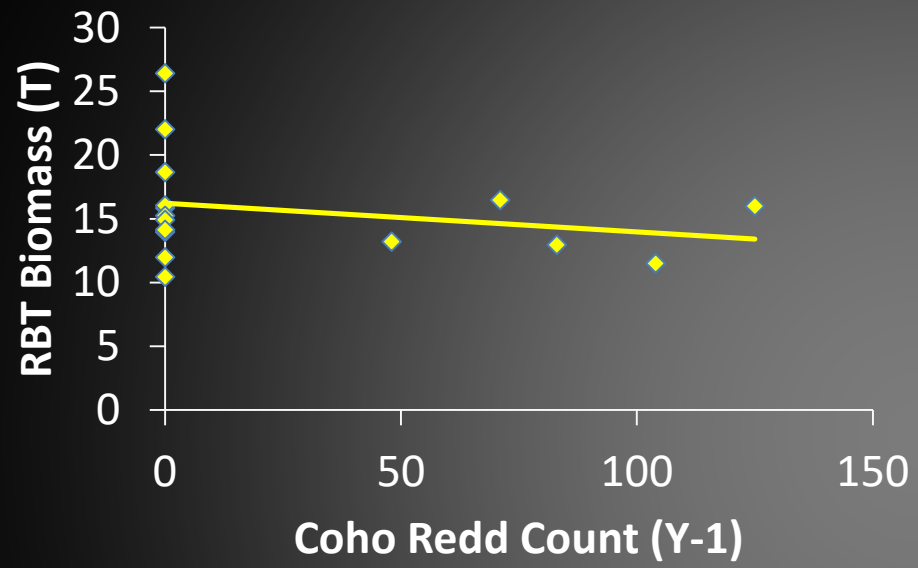
Rainbow Trout Size

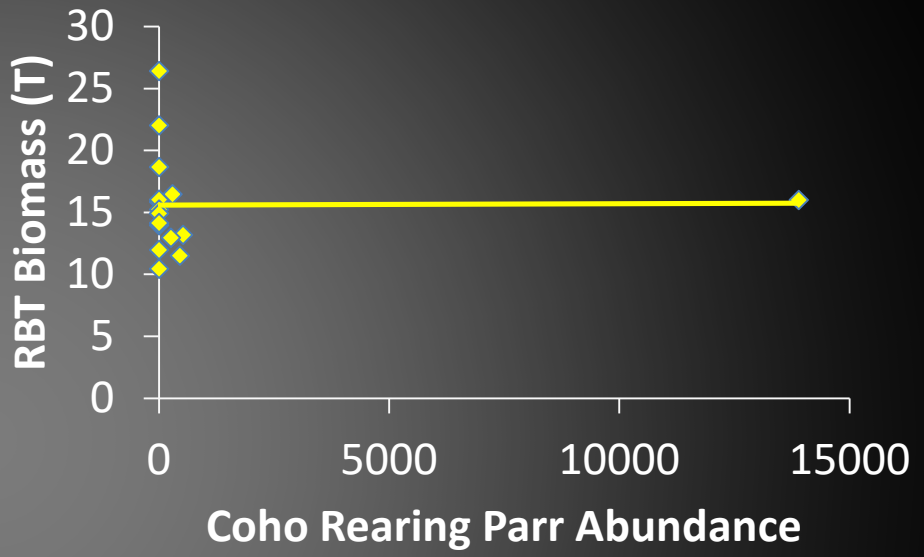


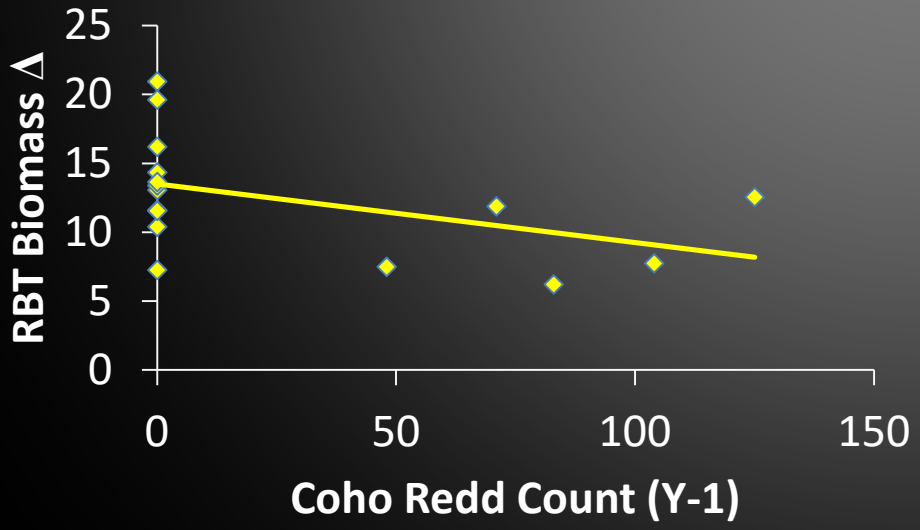
Rainbow Trout Biomass

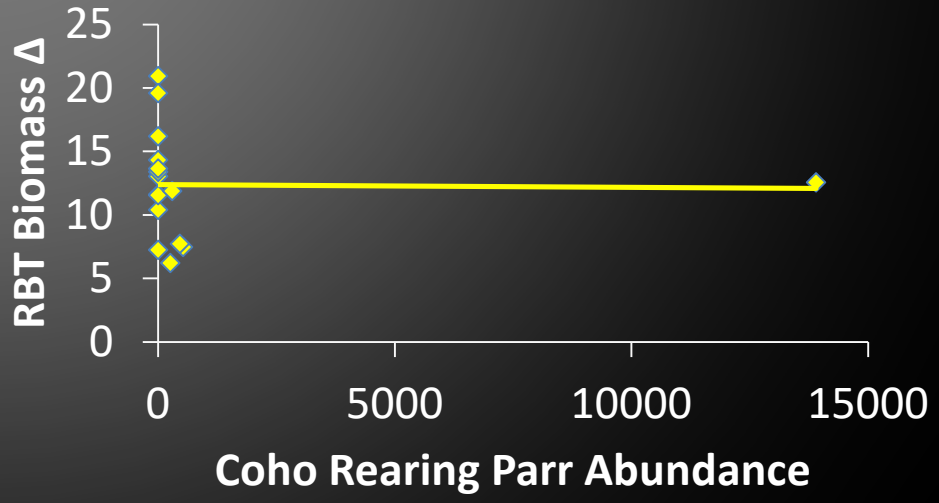


Causation-Biological



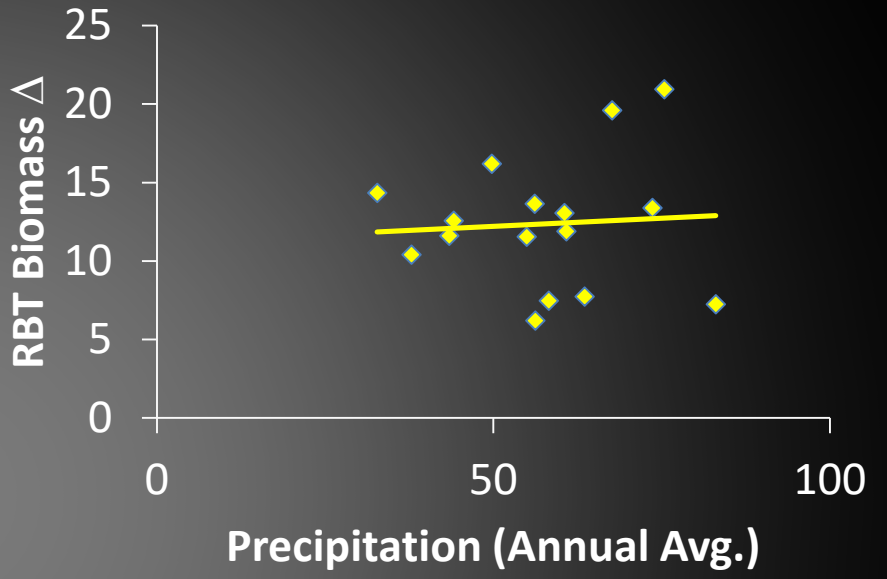


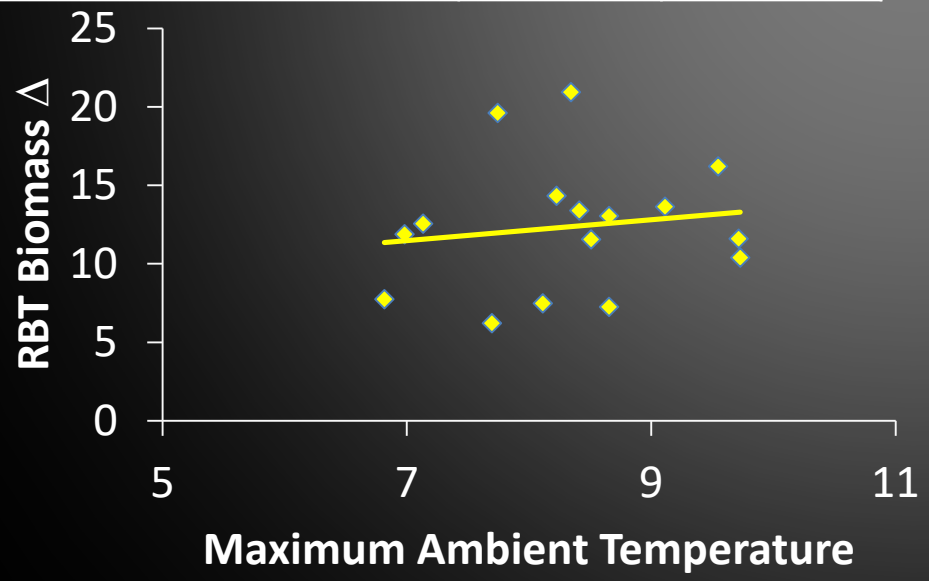


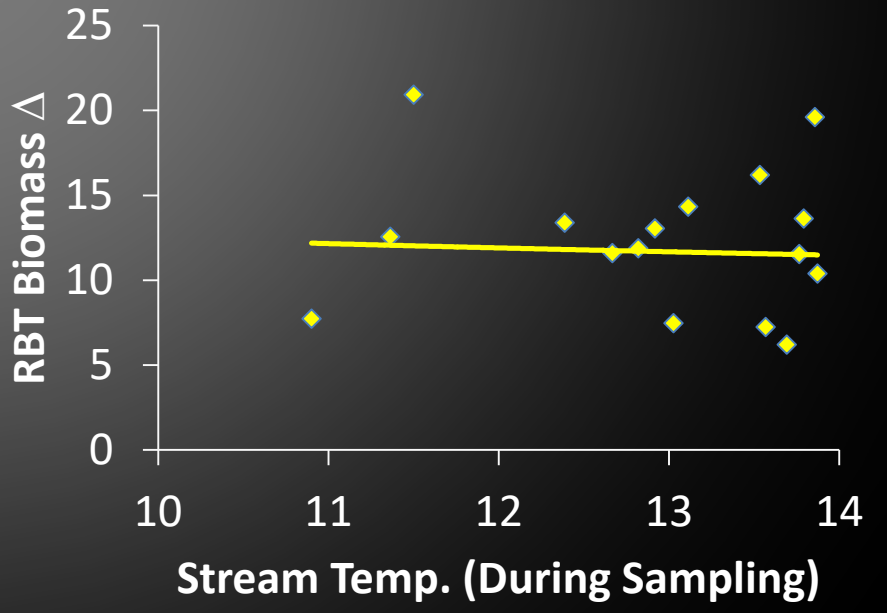


Causation-Environmental

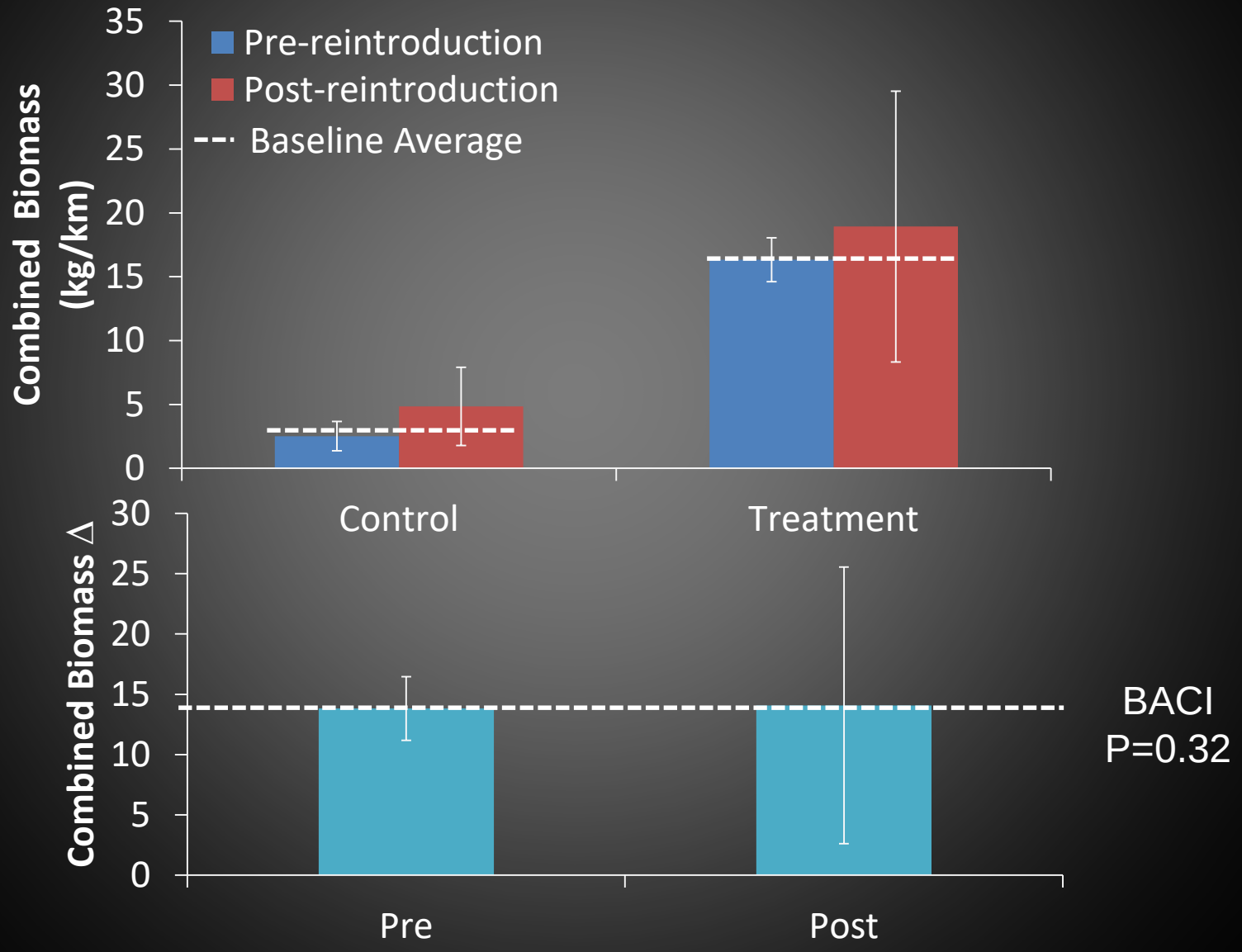
Parameter	R2	P value
Stream Discharge	0.02	0.62
Mean Wetted Width	0.14	0.15
Snow Water Equiv.	0.005	0.79
Mean Monthly Temp.	0.005	0.80
Habitat Complexity	0.54	0.01





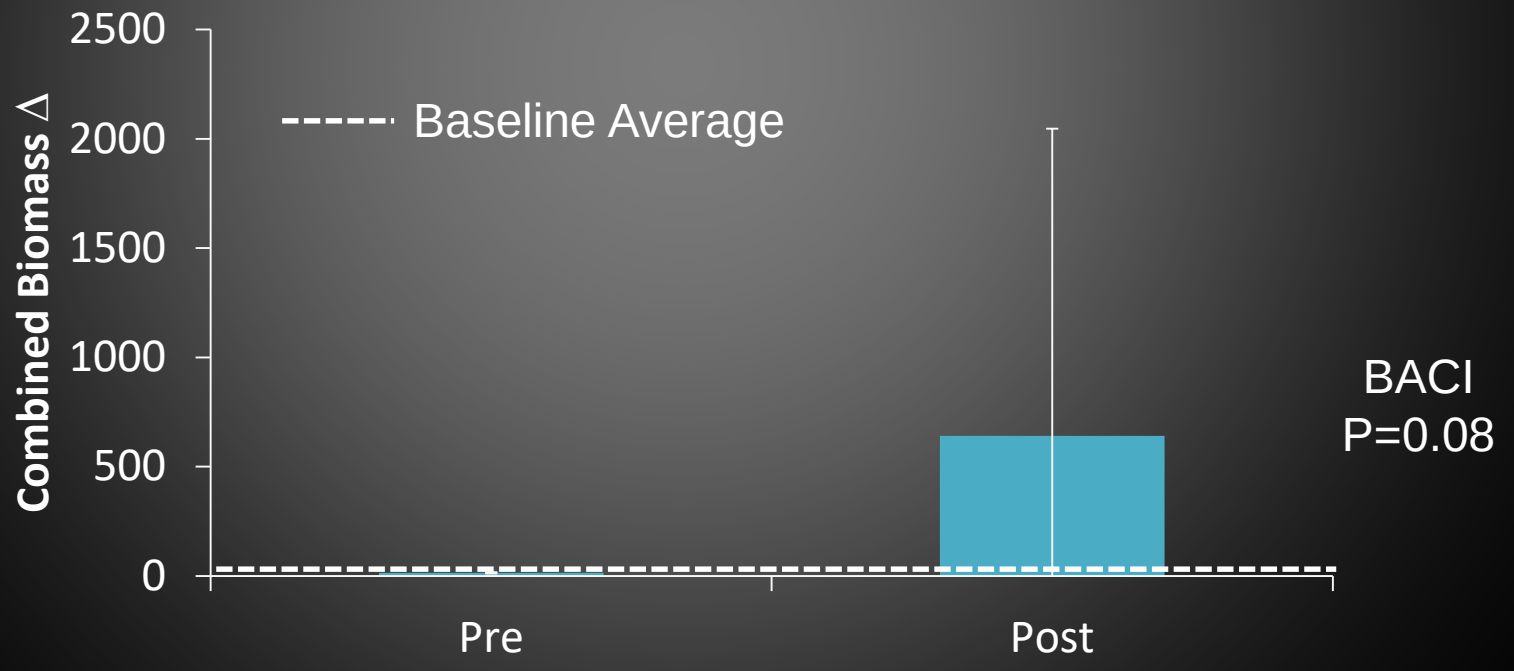


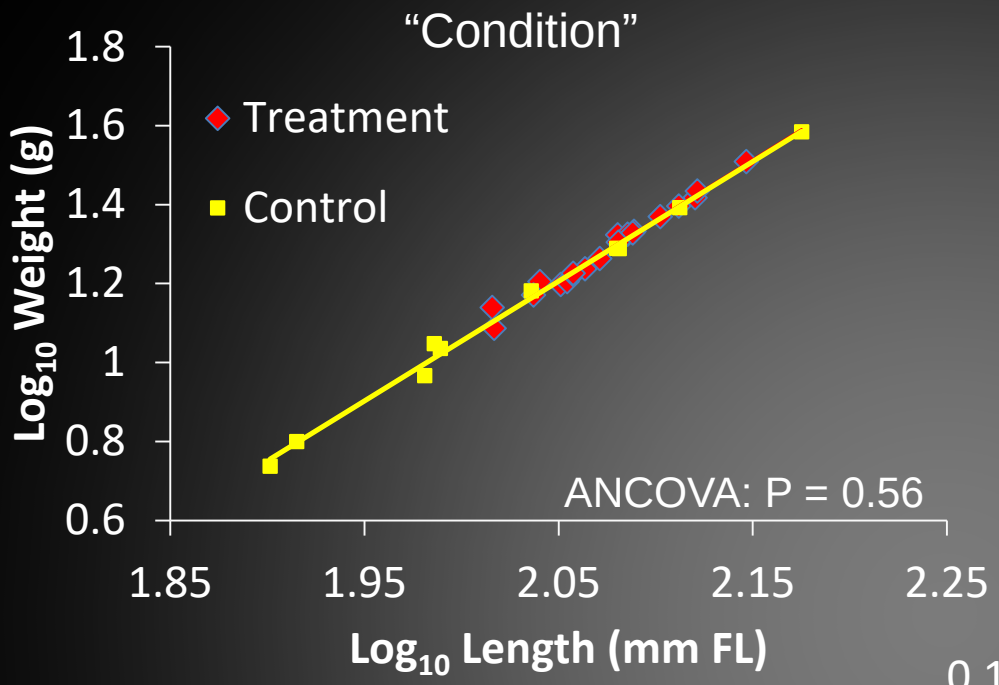
Combined Salmonid Biomass

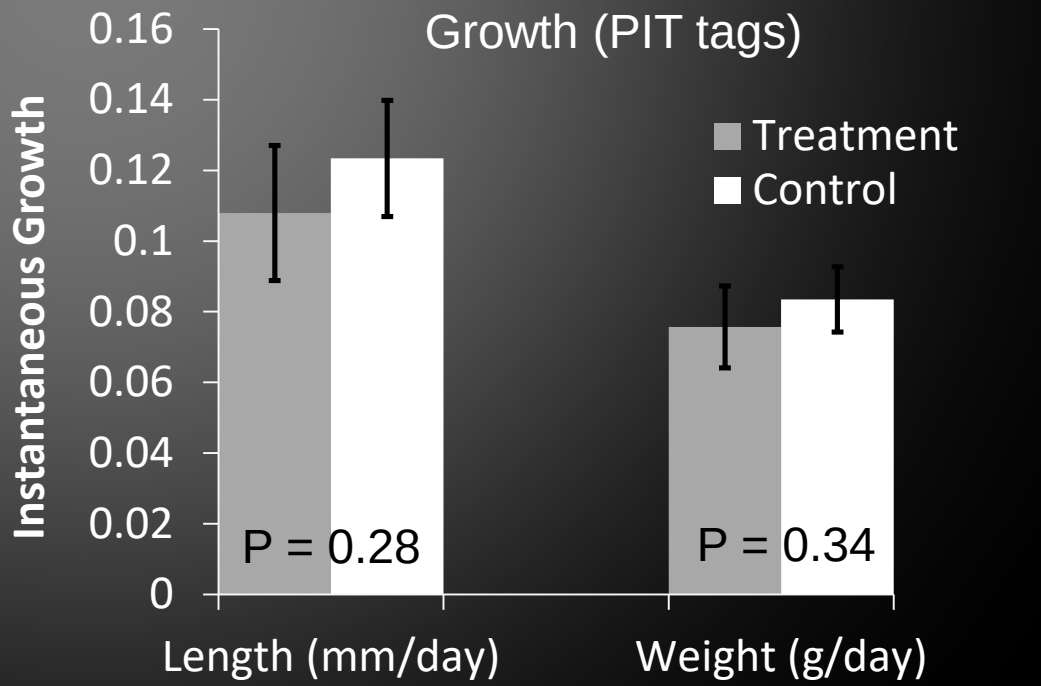


Combined Biomass - full story -

- Didn't include biomass lost as smolts prior to sampling
- Don't have estimate of steelhead smolt production in Pre-period, but if we make the assumption it's fairly constant-




"Condition"
Treatment
Control
ANCOVA: P = 0.56
Log10 Weight (g)
1.8
1.6
1.4
1.2
1
0.8
0.6
1.85
1.95
2.05
2.15
2.25
Log10 Length (mm FL)


Growth (PIT tags)
Instantaneous Growth
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Treatment
Control
P = 0.28
P = 0.34
Length (mm/day)
Weight (g/day)

Movement of Tagged Trout

- Median distance moved = 0km
- Number of recapped fish with 0 movement = 1160 with an average DAL of 342 days
- Number of recapped fish with some movement = 203 with an average DAL of 429
- Of fish that moved, the average was 3.48km
- Max distance moved was 20.7km (excluding smolts)

Summary

- Transplanted coho adults did successfully produce juveniles
- Rainbow trout did not appear to be substantially displaced following coho salmon reintroduction
- Coho natural production in treatment sites did not significantly impact rainbow trout abundance, size, or growth
- Rainbow trout biomass was reduced but did not appear correlated with coho natural production metrics
- Immediate nutrient benefits following stocking appeared marginal (*O. mykiss* direct consumption)
- Salmon carcasses provided benefits to terrestrial animals
- Recommend stream scale salmon reintroductions consider adult outplanting, particularly when valued species such as rainbow trout are present