

# Effects of Fight Time and Air Exposure on Reproductive Success of Hatchery Steelhead



Don W. Whitney, Kevin A. Meyer, Joshua L. McCormick, and Brett J. Bowersox

## Introduction

Fight time and air exposure are under scrutiny for having potential sub-lethal and lethal impacts on individual fish resulting from catch-and-release angling. We used an existing angler caught brood program to track individually marked fish and evaluate the potential impacts resulting from angler fight time and air exposure.

## Objectives

- Compare survival rates of angler caught brood and conventional hatchery trap (swim-in) brood
- Evaluate impacts of fight time and air exposure on success of hatchery progeny ponding (i.e., # fry / green eggs)

## Methods

### Fishery Data Collection



### Hatchery Data Collection



## Statistics

- Data analyzed using Mixed Effects Logistic Regression Models

## Results

- Prespawn survival of angler caught brood and conventional hatchery swim-in brood were 96% and 95% respectively
- Average fight duration was 165 seconds
  - Fight duration did not statistically reduce progeny ponding success
- Average angler air exposure was 22.6 seconds and tube air exposure was 26.3 seconds
  - Air exposure did not statistically reduce progeny ponding success

### Fight Duration

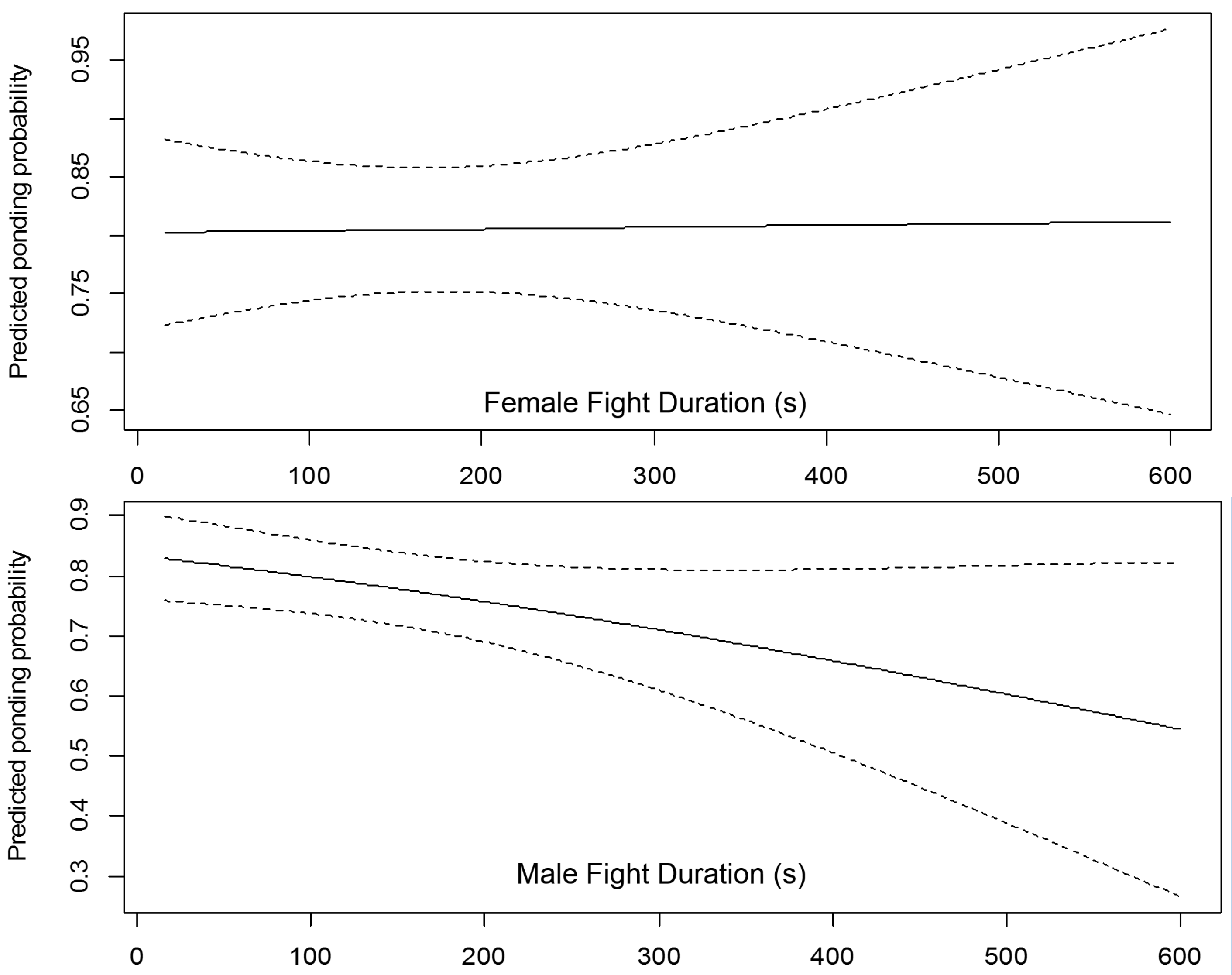


Figure 1. Odds of ponding success increased by slightly more than 1 time for females (top) and decreased by 0.998 times for males (bottom) as the fight time of each parent increased by one second.

### Air Exposure

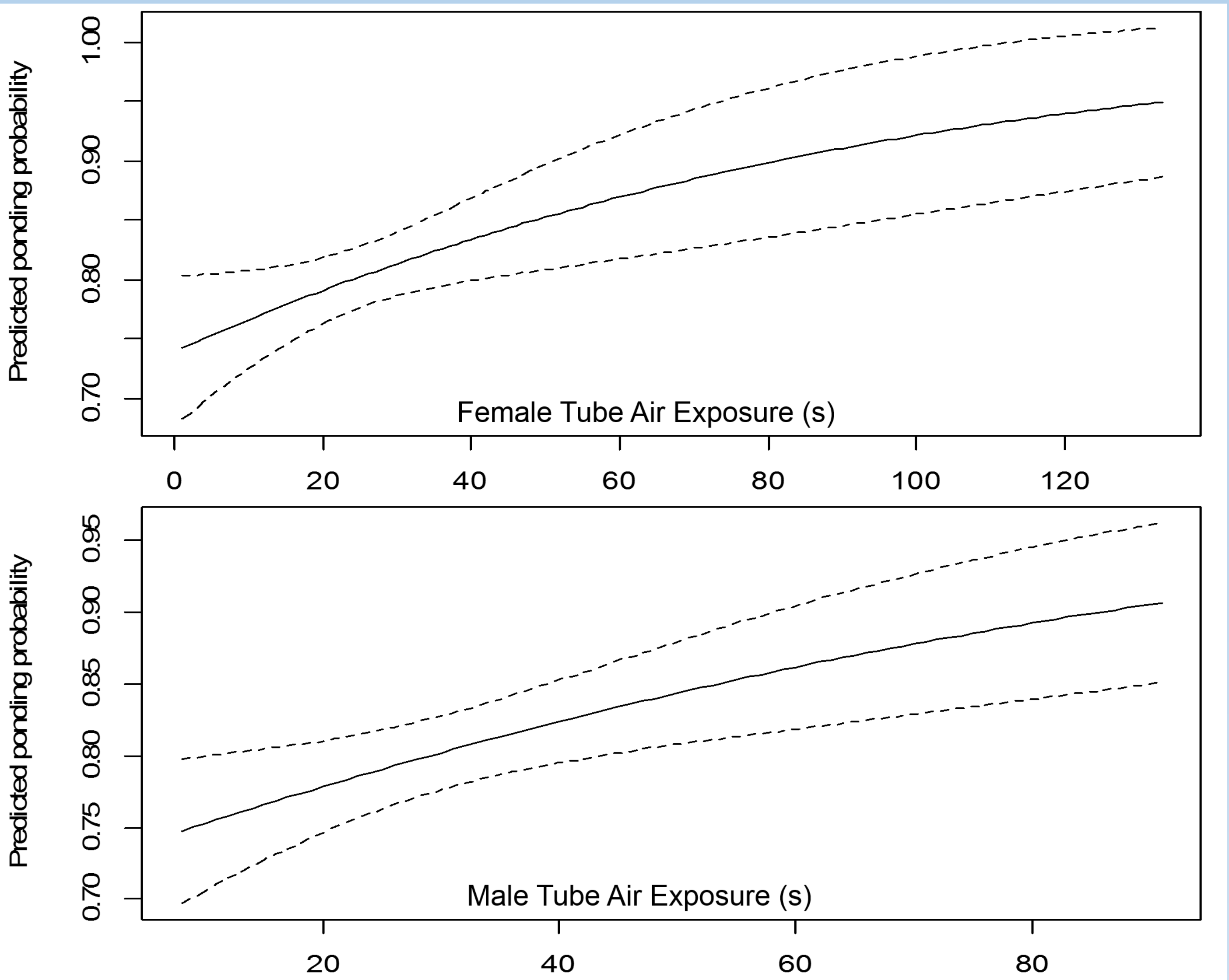


Figure 2. Odds of ponding success increased by 1.014 for both females (top) and males (bottom) with each additional second of air exposure.



## Discussion

- No increased prespawn mortality or significant reduction in progeny ponding associated with fight time and air exposure
- Results corroborate other work showing no reproductive impairment due to air or fight time
- Air exposures in this study were very similar to the general angling public (Lamansky and Meyer 2016, Chiaramonte et al. 2017)
- Average angler air exposure in this study was higher than the published 10 second maximum air exposure recommendation by Cook et al. (2015)
- Caution should be taken in applying these results to wild stocks



≠



- Proper care and handling during catch-and-release is an important best management practice and the observed angling practices in this brood collection program are not limiting hatchery progeny production



## Literature Cited

Lamansky, J. A., and K. A. Meyer. 2016. Air Exposure Time of Trout Released by Anglers during Catch and Release, *North American Journal of Fisheries Management*, 36:5, 1018-1023.

Chiaramonte, L. V., D. W. Whitney, J. L. McCormick, and K. A. Meyer. 2017. Air exposure and fight times for anadromous fisheries in Idaho. Pages 335-341 *in* R. F. Carline, editor. Proceedings of Wild Trout XII Symposium: Science, politics, and wild trout management - who's driving and where are we going? Bozeman, MT.

Cook, K. V., Lennox, R. J., Hinch, S. G., & Cooke, S. J. (2015). Fish out of water: how much air is too much? *Fisheries*, 40, 452–461.