

# REVIEW OF POTENTIAL EFFECTS OF ALTERNATIVE BARGING STRATEGIES ON PREDATION OF IN-RIVER SALMONIDS IN THE LOWER COLUMBIA RIVER.

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## ABSTRACT

Transporting juvenile fish from Lower Snake River collection points to below Bonneville Dam (BON) is a strategy to move migrating smolts downstream to avoid direct dam and reservoir effects experienced by in-river migrants. The ACOE is evaluating strategies to improve survival of transported fish by extending the release site of transported fish downstream nearer saltwater. The number of transported smolts (Chinook and steelhead) has ranged from 5.0 million to nearly 24 million from 1999 to 2007. Estimates of in-river migrants indicate that transported smolts are more than 50% of the smolt migrants immediately below BON. This percentage declines rapidly downstream as smolts from lower river populations enter the Columbia River.

The purpose of this project is to better understand the predator-prey interactions in the Lower Columbia River specific to the alternate release strategy. While the proposed release strategy could increase overall survival of transported migrants it could also result in greater predation risks to in-river migrants below BON. The analysis will study alternative hypotheses in light of existing predator-prey theory and current knowledge of predator dynamics below BON. The study will provide a better perspective on possible outcomes of the alternate release site and, more importantly, suggest studies to test key hypotheses affecting the outcome.

We present a conceptual model to help us understand possible effects of the alternative release strategy on the survival of in-river migrants (fish originating from upstream and downstream of BON) due to predation effects. This concept will be further developed into a quantitative analysis to predict outcomes for a variety of hypotheses specific to predator-prey interactions.

We identify a variety of hypotheses that would affect the outcome of the transportation strategy on survival of in-river migrants. Our predictions will be very much dependent on how we consider prey preference, predator behavior, and the effect of environmental conditions on predator-prey interactions in the lower river. The purpose of our presentation is to review these hypotheses with the Columbia River scientific community and invite constructive input before developing the analytical model.