**Abstract**

**Dispersal, survival and mortality mechanisms of steelhead kelts in the Northeast Pacific**

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Persistent low marine survival is a dominant mechanism for chronically low steelhead trout returns in southern BC, and particularly Vancouver Island. Predation, competition, climate change and fishing mortality are hypotheses for poor marine survival but the relative contributions of each are uncertain. Indeed, marine survival is frequently referred to as a ‘black box’ with limited data to delineate between causal mechanisms. Here, we use MiniPat pop-up satellite tags on steelhead kelts to identify and quantify mortality mechanisms of adult steelhead at-sea. Both rapid mortality (< 1 day) and long ocean migrations were observed with the maximum track being 2993 km in length (89 days). Using a North / South Vancouver Island experimental design, we were able to identify tag ingestion by ecothermic fish in approximately 39% of released steelhead. We were unable to reliably identify cause of mortality in 52% of tagged steelhead as no tag ingestion occurred which may be indicative of marine mammal predation. Two tags (9%), underwent slow deep dives prior to tag release. Limited sample sizes limited our ability to differential between survival time, track length and mortality mechanisms between release locations.