***Using individual life history modeling to inform management***

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**Abstract:**

**Understanding the population dynamics and the processes driving them is imperative to facilitate the recovery efforts of steelhead (*Oncorhynchus mykiss)*.  In order to better describe the observed dynamics of a particular population we must better understand the dynamics of the individual constituents of that population. It is broadly accepted that individual conditions (among other factors) is of high importance to the determination of an individual’s life history.  Here we develop a framework that accounts for individual growth, partial migration strategies, ocean survival and in-stream temperature in order to make predictions of the number of returning adults.  We then apply our framework for historical data from the Carmel River on the Central California Coast. Our results provide insight onto the relative importance of juvenile abundance and individual condition.  Namely, our modeling framework predicts that while juvenile abundances have remained relatively stable, a decreasing trend in mean individual length may account for the lower than expected adult returns.  Our results also suggest that there has been a shift in composition of returning adults from one that is primarily produced from wild in-stream reared individuals to one that is heavily reliant on individuals that are partially reared in the Sleepy Hollow Steelhead Rearing Facility (a facility designed to hold individuals during periods in which the river’s quality is inadequate for survival due to dewatering).   While a number of assumptions had to be made about some life history attributes, a sensitivity analysis suggests that our results are relatively robust to these assumptions.**