Presentation

Abstract: Morphometric variation between four distinct population segments of California steelhead trout

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Salmonid morphology can vary due to many factors including phenotypic expression in response to immediate environment, anthropogenic influences such as artificial propagation, and difficulty and distance of spawning migration. Because reproductive homing minimizes genetic interchange and promotes the maintenance of local adaptations, morphology of adult steelhead trout (*Oncorhynchus mykiss*) should be distinguishable between geographically isolated populations. The objective of this study was to compare adult steelhead trout morphometrics among four distinct population segments in California, including both coastal and inland populations groups. While population genetic structure of steelhead trout has been assessed on a regional scale in California, this study was the first to examine morphometric variation on a similar scale. We predicted that means of each morphometric response variable - body depth, fork length, and weight - would differ statistically by distinct population segment, sex, origin, and by the interactions of these factors. Adult steelhead trout were sampled at 11 locations in four distinct population segments over two sampling seasons, yielding a sample size of 4,986 steelhead trout. We found significant trends among distinct population segments, including a clear morphological distinction between coastal and inland populations, where, on average, steelhead trout in coastal populations were significantly larger and more robust morphologically than steelhead trout in inland populations. The Nimbus Hatchery stock within the Central Valley Distinct Population Segment was a notable exception that included, on average, the largest and most robust steelhead trout observed in this study. It is important to understand how adult steelhead trout morphology not only varies among and within geographically isolated populations, but also how morphology functions as a locally adapted life history trait. Doing so will aid fishery managers in establishing instream flow requirements that accommodate passage of larger bodied individuals, and may also aid in the successful replacement of out-of-basin broodstocks with others exhibiting morphological traits in agreement with local environmental conditions, an example being the Nimbus Hatchery stock on the lower American River.