Developing and delivering surrogate wild Chinook and steelhead

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Many Pacific salmon and steelhead populations are listed under the Endangered Species Act. As a result, studies that investigate fish passage through Upper Willamette River projects have relied on hatchery-origin fish. However, differences exist between hatchery-origin and wild fish in terms of morphology, behavior, and physiology. These differences could confound estimates of dam passage efficiencies and survival. In this ongoing project, we are using alternative rearing strategies to produce hatchery-origin juvenile Chinook and steelhead to be used as wild surrogates for tagging studies that will reflect the migratory and fitness phenotypes of their wild counterparts. To date, we have delivered BY2010 – BY2013 juvenile Chinook salmon and BY2013 steelhead to researchers for evaluation of reservoir behavior and dam passage in the Upper Willamette River. We are currently rearing BY2013 and BY2014 juveniles for future tagging studies. Because of the nature of the studies requiring wild fish surrogates, our goal is to provide a downstream migrating juvenile phenotype during the requested timeframe (fall and spring migrants). When delivered, all evidence suggests that our wild fish surrogates were smolting; therefore their movement patterns have met the requirements of the studies. Previously, we evaluated the effects of temperature, rearing density, diet formulation, and substrate type on the development of wild fish surrogate juveniles. Our wild fish surrogates exhibited growth patterns and body condition consistent with project goals. We also showed that morphological variation is predictive of migratory phenotype and that this differentiation between migrants likely occurs early in life. Our current research is investigating morphological and behavioral differences between juveniles with different early life history experiences. Results of these studies will help differentiate fall and spring migrants at an early stage so that they can be appropriately reared based on their natural migrant life history.