

## **Evaluation of yearly and geographic variation in early male maturation in hatchery and wild spring Chinook salmon from the Yakima River, Washington**

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Over the past decade our research has revealed that approximately 10-50% (depending population and brood year) of the male fish from several Columbia River hatchery programs mature precociously at age-2 (commonly referred to as minijacks) rather than the more typical age 3-5 for this species. Instead of migrating to the ocean for long-term rearing and growth, minijacks remain in headwater streams or undertake a short-term migration downstream, turn around, and attempt to migrate back upstream to complete the maturation process within the same year. Age of maturation in salmon is influenced by genetic, biotic, and abiotic factors including energy stores, size and/or growth rate at specific times of year. In the Yakima River basin we have conducted a six year monitoring effort to enumerate minijack rates of hatchery spring Chinook salmon released from acclimation sites in upper Yakima basin and corresponding minijack rates of wild and hatchery fish migrating through the Chandler smolt by-pass facility in the lower Yakima River during the spring smolt migration. Minijack rates of hatchery fish at release have ranged from approximately 30-60% under the programs conventional rearing regime and over all years combined there have been no significant differences in rates between the acclimation sites (avg. 40%). Minijack rates are highly correlated with both release length ( $R^2 = 0.74$ ) and weight ( $R^2 = 0.71$ ). At Chandler, minijack rates ranged from 15-25% among hatchery males and 0-4% among wild males. Hatchery fish were significantly heavier than wild fish, but fork lengths were comparable. Finally, the proportion of minijacks at release from the acclimation sites was positively correlated with the proportion of hatchery minijacks collected at Chandler ( $R^2 = 0.71$ ).

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