

## **Evidence of hatchery-wild introgression in a winter steelhead population in the Green River, WA.**

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In Puget Sound, WDFW's segregated steelhead hatchery programs support important recreational and tribal fisheries, provide cultural and economic benefits, but also present risks to wild populations listed as *threatened* under the U.S. Endangered Species Act. In order to ensure that these hatchery programs do not impede recovery of wild steelhead, WDFW is collaborating with tribal co-managers to pursue a monitoring program designed to quantify ecological and genetic interactions between hatchery and wild steelhead. Here we present initial results from genetic monitoring in the Green River, WA, which had a segregated early winter hatchery program (EWH) through 2014, and which currently has a segregated early summer hatchery program (ESH). We employed a life-cycle monitoring approach in the Green River and measured genetic introgression in pre-smolt juveniles, smolts, and adults to test the hypothesis that naturally spawned steelhead with recent hatchery ancestry suffer a survival deficit relative to naturally spawned steelhead with recent wild ancestry. To measure introgressive hybridization between hatchery and wild steelhead, we conducted genetic analysis of tissue samples collected from naturally-spawned steelhead and evaluated proportion effective hatchery contribution (PEHC).

Across all collection years and life stages, the majority of introgression was from the EWH program. In general, adult collections showed the highest levels of introgression from the EWH program, followed by smolt collections, and then pre-smolt collections. PEHC estimates ranged from 0.027 (0.00 – 0.133) to 0.126 (0.003 – 0.361) for adult collections, from 0.00 (0.000 – 0.112) to 0.100 (0.017 – 0.291) for smolts, and from 0.00 (0.00 – 0.04) to 0.05 (0.02 – 0.12) for pre-smolt collections. Across all life stages the majority of EWH introgression came from pure EWH parents. Minimal introgression was seen from the ESH program. All point estimates of PEHC from the ESH were below 0.02 with lower 90% CIs at 0.00 except for the 2019 smolt collection (0.12, 0.02 - 0.298). Although PEHC points estimates were low the upper 90% CIs intervals ranged from 0.034 (2018 smolts) to 0.298 (2019 smolts).