

Migration and survival of a new line of summer steelhead derived from hatchery parents collected in the Grande Ronde River

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Adult summer steelhead from a hatchery program in the Grande Ronde River basin in northeast Oregon stray at high rates into the Deschutes River. Migrating adult steelhead use cool Deschutes River flows as thermal refuge from warm summer flows in the Columbia River, a behavior that may encourage straying. We hypothesized that adults returning to the Grande Ronde River in autumn encounter cooler Columbia River water temperatures and stray less than individuals returning later in the migration season. To test this hypothesis we created a line of F1 offspring from hatchery steelhead collected by hook and line in the Grande Ronde River in autumn (hereafter referred to as the Autumn Line) and we compared their post-release performance to standard hatchery progeny released at the same location. Although stray rate data are not available, we estimated survival and migration timing using passive integrated transponder (PIT) tags. Outmigration travel time ranged widely between 10 and 33 d, but the averages for the two broodstock lines differed by only about 1 d. Juvenile survival to Lower Granite Dam ranged between 72% and 84%, but the average survival difference was less than 1%. Upstream migrating adults from the Autumn Line arrived at Bonneville Dam about one week earlier than standard hatchery adults, and the difference in arrival date to upstream dams grew progressively larger. Average smolt-to-adult survival to Bonneville Dam was 29% higher for the Autumn Line than for standard hatchery groups, a difference that was statistically significant. Our results suggest that steelhead progeny from the Autumn Line return earlier as adults and survive to Bonneville Dam at a higher rate than standard hatchery progeny. Future evaluations, through the F2 generation, will also compare adult stray rates and contribution to fisheries from the two broodstock lines.