The Influence of Streamflow Reductions on Salmonids in Small Streams

Bret C. Harvey, U.S.F.S. Redwood Sciences Lab, 1700 Bayview Drive, Arcata, CA 95521; (707) 825-2926, bch3@humboldt.edu

Coauthors: Rodney J. Nakamoto and Jason L. White (U.S.F.S. Redwood Sciences Lab)

Reduced streamflow can alter a variety of processes that affect fish populations. While some empirical data suggest large dry-season streamflow reductions in small streams can affect the growth of salmonids, some population modeling suggests small reductions in dry-season streamflow will not detectably affect fish population dynamics. Empirical observations addressing the effects of moderate changes in streamflow seem desirable. To address this issue, we contrasted the retention and growth of tagged fish in 350-m-long study reaches above and below a diversion on West Weaver Creek in northwestern California. The diversion reduced dry-season streamflow by 15 - 25%. We PIT tagged a total of 298 steelhead >70 mm fork length in June 2007 and re-sampled them in October. Minimum retention of fish in the upper (control) reach as indicated by recapture of tagged fish exceeded minimum retention of fish in the lower (treatment) reach, 50% v 34%. Both % change in length (5% versus 3%) and specific growth (0.01 versus -0.05) of recaptured fish were higher in the control reach compared to the reach below the diversion (t tests, both with sample sizes of 83 (upper reach) and 50 (lower reach), $P < 0.01$). The observed difference in growth raises concerns about the consequences of moderately reduced streamflows for population dynamics and highlights some uncertainties in salmonid population modeling.

Use of Benthic Prey by Salmonids Under Turbid Conditions in a Laboratory Stream

Jason L. White, U.S.F.S. Redwood Sciences Lab, 1700 Bayview Drive, Arcata, CA 95521; (707) 825-2934, jwhite01@fs.fed.us

Coauthors: Bret C. Harvey (U.S.F.S. Redwood Sciences Lab)

The negative effect of turbidity on the reactive distance of salmonids has been well established. However, determining the consequences of this relationship for overall feeding success remains problematic: successful foraging by salmonids across a broad range in turbidity has been observed under a variety of conditions. Previous laboratory and field observations suggest that benthic feeding by salmonids in flowing water may affect the turbidity-dependence of foraging