Effectiveness of alternative broodstock, rearing and release practices - Methow River Summer Steelhead

William Gale and Mathew Cooper. US Fish and Wildlife Service, Mid- Columbia River Fishery Resource Office, Leavenworth, WA.

Chris Pasley, US Fish and Wildlife Service, Winthrop National Fish Hatchery, Winthrop, WA.

In an effort to contribute to the recovery of Threatened upper Columbia River summer steelhead, Winthrop NFH is developing a locally adapted Methow River summer steelhead program. This program spawns and rears the progeny of within basin origin wild and hatchery brood stock using a two year production cycle that seeks to partially mimic the predominate age at smolting seen in naturally reared steelhead. The later collection date required for using within basin brood combined with the cold temperatures seen in the Methow river basin precludes the ability to produce smolts under a standard one year rearing program. The focus of this presentation is to compare the characteristics and performance of both one and two-year smolt rearing programs. This research is a component of a broader collaborative project to investigate the genetic, physiological, behavioral and environmental mechanisms that determine the various life history fates of steelhead.

Wells steelhead stock (of mixed Methow and Okanogan origin) were reared using a standard one year rearing program (S1) and the progeny of local Methow river stock were reared using a two year rearing program (S2). Ration was adjusted (increased for S1, constrained for S2) to rear S1 and S2 fish of a similar size at release. A subset (≈15K/group) of each rearing program was PIT tagged and downstream detections monitored using the PTAGIS website. Post release survival was examined using Cormack Jolly Seber mark –recapture models for open populations. Residual steelhead from both rearing programs were collected in the fall following release using a variety of techniques and examined for size, age at release, and gender. Preliminary results from the 2010 and 2011 release groups are presented here.

Final mean FL at release of S2 fish was significantly larger than S1 fish (t-test, p<0.05) though the length frequencies show a considerable amount of overlap. Mark recapture modeling revealed significant difference in apparent survival to downstream interrogation sites with S1 fish surviving at a lower rate than S2 fish between release and Rocky Reach Dam, survival was similar between the groups in lower reaches (e.g. Rocky Reach to McNary Dam).

The estimate for apparent survival between release and Rocky Reach is a combination of mortality and residualism suggesting that there may be a difference in the rate of S1 and S2 residualism. The length frequency for S1 fish suggests the presence of two putative residual life history types, smaller parr and larger maturing male residuals. Conversely the S2 program appears to be largely limited to only maturing male residuals. Residual sampling in the fall supports this contention with S2 residuals largely absent compared to S1’s and exhibiting significantly greater size and a sex ratio with a greater bias towards males than S1 residuals.