

Entrainment of Fish From Rimrock Reservoir

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Rimrock Reservoir operates on a >flip-flop= water delivery schedule in September each year that is known to entrain various species of fish, primarily kokanee salmon (*Oncorhynchus nerka*). There is also evidence that a small number of the threatened bull trout (*Salvelinus confluentus*) are entrained from the reservoir during large water delivery operations.

Over the past 3 years during “flip-flop” operations, intensive fish entrainment sampling has been performed within 300 yards of the discharge. Entrainment was estimated using paired fyke type nets fished in 24 standardized effort periods with hourly (sometimes half-hourly) net checks for 20 and 45 days in the three years. Over 5500 fish were collected during each annual effort with kokanee salmon making up the majority (avg =97%) of fish collected, with highest entrainment occurring immediately before, during, and/or immediately after the peak discharge flow. Nine bull trout (.17 %) were collected in 2002, and 6 (0.08%) were collected in 2003. Netting efficiency was performed during 2002 and 2003 to estimate total fish entrainment.

The majority of kokanee were captured in the late evening or early morning (2100 hrs - 0700 hrs) with these diel differences in distribution and abundance observed near the outlet tower during hydroacoustic surveys performed during “flip-flop”. In 2002, both discharge (cfs) and forebay elevation (ft) were statistically significant factors for kokanee entrainment ($r^2 = 30.9\%$, $P < 0.01$, $Df = 1, 36$ for flow and $r^2 = 14.2\%$, $P = 0.05$, $Df = 1, 36$ for forebay elevation) but only discharge showed a moderately strong contribution relationship based on a .55 correlation coefficient.

Entrainment reduction techniques are being examined and tested for Rimrock Reservoir and include both positive barrier and behavioral barrier technologies.