

**Title:**

Entrainment of Fish at Rimrock Reservoir

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**Summary of Presentation:**

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

This project quantifies fish entrainment at Rimrock Reservoir, below Tieton Dam from August 31 to October 16, 2002, and measure fish distribution and abundance near the intake tower of the reservoir with hydroacoustic surveys. Entrainment was estimated using paired fyke type nets fished in 24 hour standardized effort periods. Of the 5057 fish collected in the nets, (n = 4923) 97.35 % were kokanee salmon. Nine bull trout (.17 %) were collected. Seven fish species were collected during the sample period, with suckers and sculpins pooled to respective species. Efficiency tests are presented for the nets, with overall entrainment of kokanee estimated at 88,445 (range: 536300 - 36732) and bull trout entrainment estimated at 145 (range: 900 - 60). The majority of kokanee were captured in the late evening or early morning (2100 hrs - 0700 hrs) during the beginning of the high discharge period. Diel differences in distribution and abundance were observed near the intake tower. Both flow (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 flow showed a moderately strong contribution relationship based on a .55 correlation coefficient (.37 for forebay elevation). Comparisons with the 2001 entrainment data, using a standardized catch per unit of effort, were performed with similar trends observed.

Entrainment reduction techniques are discussed and include both positive and behavioral techniques. Computerized flow dynamic models have indicated the highest water velocities are at the base of the intake tower. Bimodal fish size distribution, similar to netting results, was observed with hydroacoustic fish surveys analyzing fish in the bottom 10 meters of the reservoir near the inlet tower. Recommendations for 2003 entrainment netting are discussed and that will allow continuity of data analysis between years.