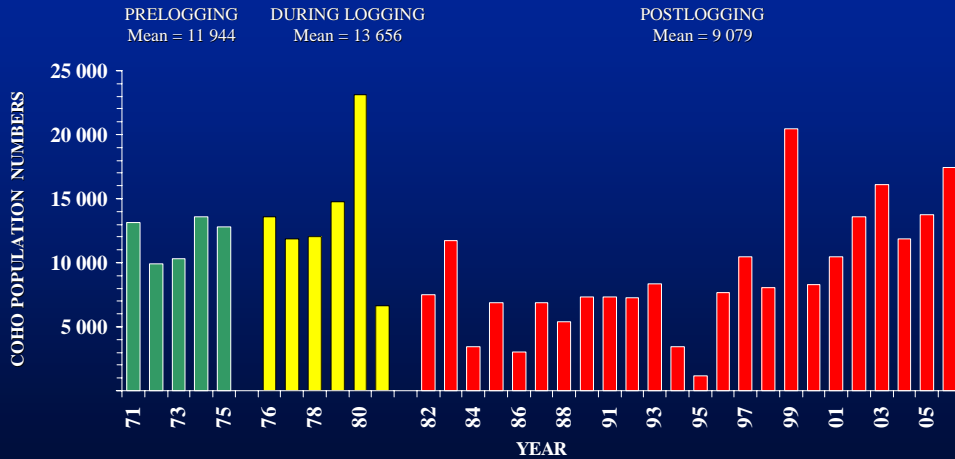
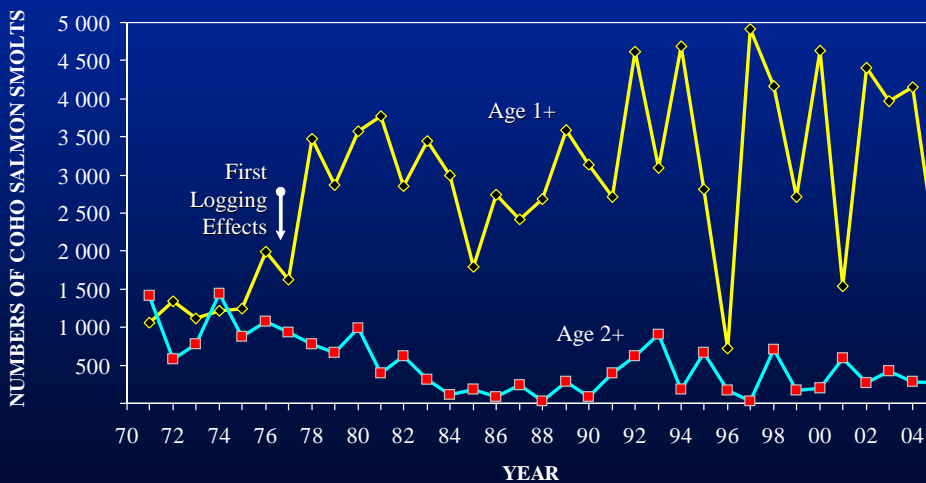


Late-Summer Coho Populations in Carnation Creek: 1971 - 2006



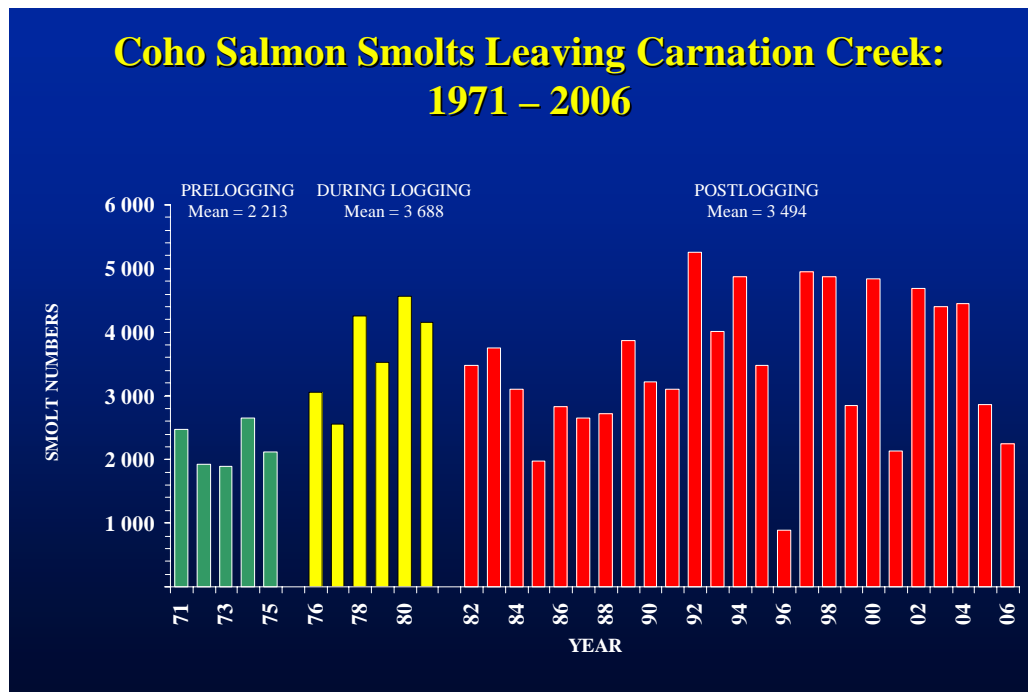
The creek sustained fewer fry after logging except for several years after 1998 when coho fishery restrictions and closures allowed more spawners to return to the stream. However, increased fry numbers after 1998 resulted in density-dependent reductions in fish growth. Many of the additional fry consequently do not survive the winter.

Comparing One-Year-Old vs. Two-Year-Old Coho Smolts Produced in Carnation Creek: 1971 - 2005



Smolt size and biomass also increased. These counter-intuitive relationships are further examples of several temperature-related effects upon coho juveniles at least partially attributable

to logging. Increased water temperatures also radically changed the age structure of coho smolt populations. Prior to logging, approximately one-third to one-half of all Carnation Creek coho required 2 years to grow large enough to transform into smolts and migrate seaward. Increased seasonal growth due to earlier emergence during and after riparian logging has resulted in most coho reaching smolt size and emigrating seaward after just 1 year in fresh water. Age-2 smolts have become relatively rare after logging.



Although the stream can sustain fewer fry after logging, increased water temperatures after riparian harvesting have allowed these fry to produce 1.6-fold more smolts than in the pre-logging period. Warmer temperatures have allowed faster egg development in winter, earlier fry emergence in spring, larger fry due to a longer summer growing season, better overwinter survival, and consequently, more smolts.