

**Title:**

Comparing the Reproductive Success of Hatchery- and Wild-Origin Spring Chinook

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**Summary of Presentation:**

Previous studies have shown that exposure to hatchery environments often reduces the reproductive competence of salmonids when they spawn under natural conditions. Most of the spring chinook produced by the Yakima Spring Chinook Supplementation Project are destined to reproduce under natural conditions. Consequently, a key concern is whether the reproductive competence of the fish produced by the project has been impaired.

In 2000, an observation stream was built to provide a setting where the reproductive success of hatchery- and wild-origin spring chinook could be compared. Comparisons began in 2001 when the first 4-yr-old hatchery fish returned to the Yakima River. Behavioral, morphological, and physiological measurements were made on the fish before, during, and after spawning. These data showed that: 1) males tended to live longer than females, 2) wild females tended to be more competent in depositing their eggs, 3) in one out of four possible cases, wild males depleted their testes to a greater extent than hatchery males, and 4) gonad depletion in hatchery and wild males was largely independent of body size.

Fry originating from the fish placed into the observation stream were captured and counted. Moreover, DNA was analyzed from a sub-sample of these fish to estimate the number of offspring produced by each adult fish. The pedigree analyses showed that

males that were aggressive and dominated opponents produced large numbers of offspring. These analyses also showed that precocial males, jacks and subordinate males were able to produce offspring by using alternative reproductive tactics. Furthermore, reproductive success in males was found to be more variable than in females. Pedigree analyses on the fry produced from the 2001 adults are almost complete. These data will be used to assess the capacity of hatchery and wild fish to produce offspring in a quasi-natural environment.