

Title:

Spring Chinook Interactions Indices

Authors:

Todd N. Pearsons, Brenda Ben James, Christopher L. Johnson,
Anthony L. Fritts, and Gabriel M. Temple

Washington Department of Fish and Wildlife
201 N. Pearl Street
Ellensburg, WA 98926
(509) 925-4467, pearstnp@dfw.wa.gov

Summary of Presentation:

Competition for food and space is one of many factors that can limit the production of spring Chinook salmon. We investigated intra- and inter-specific competition for food and space using indices. An index of prey availability was calculated by dividing the observed dry weight of stomach contents by the maximum estimated weight for a particular length of fish. Average stomach fullness for wild spring chinook during the day has been relatively low since 1998, which suggests low food availability. Competition for food with wild spring chinook salmon is indexed by multiplying a per capita competition index by a population consumption index. Mountain whitefish have consistently had the highest population food competition index. An index of space competition was calculated by multiplying a spatial overlap index by an index of competitor abundance. The index was highest for spring chinook salmon (intraspecific competition) between 1994 and 2002 with the exception of 1996. Another index of intraspecific competition for space was estimated using microhabitat data. Microhabitats of spring chinook salmon were identified by snorkelers and then subsequently measured. We estimated the proportion of microhabitat measurements that exceeded the normal range and compared that value to annual abundance. Contrary to our initial hypothesis, total depths, focal depths, and focal velocities exceeding the normal range were negatively related to abundance. Negative correlations between abundance of mountain whitefish and spring chinook salmon, and spring Chinook salmon size, survival, or condition suggest that inter- and intra-specific competition is having detectable population level effects.