Title:
Spring Chinook Interactions Indices

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Summary of Presentation: Studying an indirect interaction such as competition is very challenging and yet extremely important because of the impact that competition can have in structuring fish communities. Two competition indices were developed to assess the competition strength upon juvenile spring chinook salmon: a food competition index to detect the effects of interference and exploitative competition; and a space competition index to detect the effect of interference competition. The main factors in the food competition index were food availability, food overlap, and competitor food consumption. The main factors in the space competition index were spatial overlap and abundance of sympatric competitors. We evaluated the utility of the indices by collecting data on stream fishes that have the potential to compete with juvenile chinook salmon. Data was collected during the summer and fall, 1998-2004 in the upper Yakima Basin. The space and food competition indices were highest for spring chinook salmon. Preliminary analyses revealed that food competition indices for spring chinook salmon were the only indices that correlated well with spring chinook growth or survival.

The carrying capacity of a watershed is one of the main factors in determining whether supplementation is a viable technique of increasing natural production. We measured the core microhabitat values for age-0 spring chinook salmon and other species and life-stages of fishes that occupy similar habitats in four areas in the upper Yakima River Basin. We measured spring chinook salmon microhabitat variables during the summers of 1998 to 2004 in an effort to index the carrying capacity of rearing space. If supplementation activities succeed in increasing the density of age-0 spring chinook salmon and the resulting population exceeds the

carrying capacity of the habitat, we expected to see an increase in the proportion of fish using suboptimal microhabitats and a leveling off of the number of fish in optimal habitats. Contrary to our expectations, the proportion of spring chinook salmon in sub optimal habitats decreased with increasing abundance of spring chinook, and the number of fish occupying optimal habitats increased with increasing abundance. Our data may indicate that space is not limiting chinook growth or survival in the upper Yakima basin or that chinook decrease their territorial behavior in response to increasing abundance of conspecifics. We will continue to measure microhabitat use and, along with the food and space competition indices, monitor any changes that may be associated with supplementation activities.