**Title:**
Do Salmon Carcass Analogs Mimic Food Pathways Provided by Salmon Carcasses?

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**Summary of Presentation:**
There is a growing interest among resource managers to restore nutrients to food-limited streams containing salmonids. All of the approaches to restore nutrients to streams have some shortcomings, such as spreading pathogens, unwieldy storage and distribution, and inopportunity for direct consumption. Therefore we endeavored to develop an innovative product that would reduce or eliminate the problems associated with previously attempted methods. The objective of our work was to develop a pathogen free product that would simulate the food pathways historically provided by salmon carcasses. The product, termed analog, was developed using spring Chinook salmon carcasses from Spring Creek Hatchery. These fish were ground into a fishmeal, pasteurized, and made into a large pellet. The pasteurization process is believed to kill most pathogens and subsequent tests supported this assumption. Approximately 50% of the analog had dissolved or been eaten two weeks after stocking, and was nearly gone after four weeks.

Salmon carcasses primarily provide food to salmonids through two pathways; direct consumption of the carcass and eggs, and consumption of increased numbers of invertebrates whose productivity increased from carcasses. The goal of this study was to determine if carcass analogs mimicked food pathways provided by salmon carcasses. Additionally, we wanted to determine if it could be done with minimal risk to aquatic species. We used a before-after-control-impact-paired design in six tributaries of the upper Yakima basin, Washington to determine the utility of stocking carcass analogs. The analogs reproduced both of the major food pathways that salmon carcasses produce: direct consumption and food chain enhancement. Trout and salmon fed directly on the

carcass analogs during the late summer, and stable isotopes analysis revealed that nutrients passed from periphyton and to invertebrates. The risks of using carcass analogs also appear to be low. Fish exposed to the analogs did not have higher incidences of pathogens than fish that were not exposed to analogs. The water quality was also not degraded by the analog additions with the exception of a temporary surface film. Our results suggest that the introduction of carcass analogs, into food-limited streams, can be used to restore food pathways previously provided by anadromous salmon.

Rainbow trout growth was measured during three periods; 30-45 days after initial analog stocking 2001, one year after analog stocking (2002), and one year after a second stocking of analogs (2003). Growth was measured on individual fish using PIT tags. In addition, the average size of fish was compared before and one year after analogs were stocked. Trout abundance was estimated before analog addition and one year after (2002) by multiple removal electrofishing methods. Except for an initial increase in growth approximately 6 weeks after analogs were stocked, we detected no effect of analogs on either growth or abundance of trout. The lack of detectable increases in growth and density may have been due to a number of factors including: food was not limiting, stocking density was too low, and duration of experiment was too short.