Title:
Restoring Nutrients to Streams Using Recycled Salmon Carcass Analogs

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Summary of Presentation:
The benefits that marine derived nutrients from adult salmon carcasses provide to juvenile salmonids are increasingly being recognized. Current estimates suggest that only 6-7% of marine-derived nitrogen and phosphorous that were historically available to salmonids in the Pacific Northwest are currently available. Food limitation may be a major constraint limiting the restoration of salmonids. A variety of methods have been proposed to offset this nutrient deficit including: allowing greater salmon spawning escapement, stocking hatchery salmon carcasses, and stocking inorganic nutrients. Unfortunately, each of these methods has some ecological or socio-economic shortcoming. We intend to overcome many of these shortcomings by making and evaluating a pathogen free product that simulates a salmon carcass (analog).

Abundant sources of marine derived nutrients are available such as fish offal from commercial fishing and salmon carcasses from hatcheries. However, a method for recycling these nutrients into a pathogen free analog that degrades at a similar rate as a natural salmon carcass has never been developed. We endeavored to 1) develop a salmon carcass analog that will increase the food available to salmonids, 2) determine the pathways that salmonids use to acquire food from analogs, and 3) determine the benefits to salmonids and the potential for application to salmonid restoration. We used a before-after-control-impact-paired design in six tributaries of the upper Yakima basin to determine the utility of stocking carcass analogs.

Our preliminary results suggest that the introduction of carcass analogs into food-limited sreams can be used to restore food pathways previously provided by anadromous salmon. The analogs probably 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 presumably benefited from the increased invertebrate biomass later in the year. Future reports will analyze whether any benefits are statistically detectable. The risk of using carcass analogs also appears to be low. Pathogens appear to be killed in the manufacturing process of the analogs. In addition, preliminary results suggest that fish exposed to the analogs did not have higher incidences of pathogens. The water quality was also not degraded by the analog additions with the exception of a temporary surface film. Finally, our anecdotal observations, suggested that there was not an increase in the number of predators during the first year of analog distribution. In summary, the risks of analog placement appear to be low but the benefits appear to be high.