Evaluate Steelhead (*Oncorhynchus mykiss*) Kelt Downstream Migration From Lower Granite Dam to Bonneville Dam and Investigate Methods to Increase Returns of Repeat Spawners to the Snake River Basin

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ABSTRACT

A field study was conducted at Lower Granite Dam located on the lower Snake River, Washington in 2002. This was the third year of research investigating steelhead kelt identification, abundance, and survival. This year's kelt identification and abundance estimations were based on pioneering experiments performed by CRITFC in previous years. These studies focused on distinguishing steelhead kelts from pre-spawners collected at the juvenile bypass separator using ultra-sound interrogations of individual specimens during the approximate 11-week long kelt outmigration beginning in early April. Following identification of kelts and pre-spawners using ultra-sound, abundances were estimated using the known number of steelhead collected at the bypass separator, the proportion of kelts and prespawners using the bypass, and expanding using a stratified approach to account for non-sampling periods. Kelts made up 90.5% (95% C.I. 84.1 to 97.8%) of the adult steelhead in the bypass during the 11 weeks of this study. Thus, we estimate that 7,893 (95% C.I. 7,296 to 8,489) kelts and 785 (95% C.I. 189 to 1,382) prespawners were present in the Lower Granite bypass in 2002 from March 31 through June 15, 2002. Personnel counting adult steelhead in the bypass estimated 7,930 kelts and 748 prespawners using visual cues during the same study period. During this year, research was extended to evaluate the benefits of barging kelts, collected from the bypass, and releasing them below Bonneville Dam, as compared to kelts released back into the river below LGD. Results will be based on PIT tag detection. A total of 2,379 kelts were PIT tagged with 660 released in the tailrace and 751 transported on barges. The remaining 968 PIT tagged kelts were released in the tailrace, but were not part of the transport evaluation[its not clear how the last group is different than the treatment groups]. A total of 13 PIT tagged kelts from the study have been detected at Bonneville Dam as of October 30, 2002. These detections correspond to the transportation evaluation as follows: 1 in-river, 12 transported, and 0 in-river but not part of the transport evaluation. Radio telemetry was used to estimate survival of kelts as they traveled downstream from Lower Granite Dam. Data on this objective was not available when we were drafting this abstract. Other expansions to this year's kelt research effort

included: genetic profiling, and age structure determinations. These results will be available next spring and will include critical information on the ecology of kelting.

This project ties closely with a kelt reconditioning project that the CRITFC and Yakama Nation implement on the Yakima River. This BPA-funded reconditioning study has experimented with fish culture techniques to maximize kelt survival and rematuration. Study questions have included: diet formulations (starter and maintenance), husbandry (containers, density, cover, etc.), ecological effects such as homing, and potential genetic effects, risk / benefit analysis, and long- verse short-term reconditioning experiments. The BPA-funded project is scheduled for expansion to include two additional sites, thus geographically replicating the study in 2003. The COE and BPA funded efforts compliment each other since the BPA study is moving toward providing managers with strategies that increase the contribution of kelts to the spawning run, thus increasing steelhead production and abundance. In 2003 management scenarios that will be tested include: in-river release and barge transport options in the COE project, and in the BPA study: short-term reconditioning and trucking to below Bonneville and long-term reconditioning and release into the tributaries.