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Gilk, S. E., D. B. Molyneaux, T. Hamazaki, J. A. Pawluk, and W. D. Templin. 2009. Biological and genetic characteristics of fall and summer chum salmon in the Kuskokwim River, Alaska. Pages 161-179 [In] C. C. Krueger and C. E. Zimmerman, editors. Pacific salmon: ecology and management of western Alaska's populations. American Fisheries Society Symposium 70, Bethesda, MD.

Abstract: The existence of both fall and summer chum salmon *Oncorhynchus keta* populations in the Kuskokwim River was not recognized by fishery managers until the mid-1990's. Harvest statistics currently do not distinguish between fall and summer chum salmon, and escapement of fall chum salmon is not monitored. Some of the yet undescribed characteristics of fall chum salmon in 2004 are examined by comparing spawning populations of fall and summer chum salmon sampled from four tributaries of the Kuskokwim River. Fall chum salmon (n = 336) and summer chum salmon (n = 1,964) were examined for mid-eye-fork length, maximum dorsal-ventral height, maximum width, age, and sex. Fecundity parameters were measured for 15 to 20 females from each of the four sample groups. A baseline of genetic markers was developed for Kuskokwim River chum salmon populations, and its utility for identifying fall chum salmon was evaluated. Multivariate analysis demonstrated a significant difference in size between fall and summer chum salmon, although the differences were not overt to casual observation. The fall chum salmon population had a greater percentage of age-3 fish, but sex ratios were similar. There was no significant difference in fecundity, but fall chum salmon had significantly smaller mean egg weights than summer chum salmon. Analysis of 31 single nucleotide polymorphisms among nine Kuskokwim River spawning populations demonstrated sufficient genetic differences between fall and summer chum populations to distinguish the two runs in mixed stock analyses with a high degree of accuracy (>92%). Analysis of mixed stock chum salmon catches from fish wheels operated near Kalskag indicated a low occurrence of fall chum salmon in 2004, but no definitive conclusion could be made about run timing past Kalskag. Although fall chum salmon appear to constitute a small proportion of the overall Kuskokwim River chum salmon run, this unique group is an important component of the overall biodiversity and should be maintained to foster long-term sustainable harvest of salmon against changing environmental conditions. This preliminary description of the biology of Kuskokwim River fall chum salmon is the first step in including these distinct populations in sustainable chum salmon management.

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