

Stock Structure and Mixed-Stock Analysis of Yukon River Chum Salmon

The management of Yukon River chum salmon fisheries is difficult because of the need to address a variety of complex issues, such as meeting escapements, while still providing harvest opportunities in a mixed-stock and mixed-species fishery. Yukon River chum salmon were assayed for genetic variation at 22 microsatellite loci to establish a baseline for mixed-stock analysis (MSA) applications to assist in addressing these issues. Yukon River chum salmon exhibited a relatively low degree of genetic divergence ($G_{ST} = 0.0157$) that was structured by seasonal race and geographic region. Using the 12 most informative loci, accuracies in MSA simulations for 14 of 17 reporting groups exceeded 90%, with a range of 80 – 98%. Stock composition estimates were within 10% of the actual proportions in a known mixture analysis. Stock specific abundance estimates, derived from combining the estimates of genetic stock composition with Pilot Station sonar abundance estimates, were concordant with upriver escapement data, after accounting for harvest. The combination of genetic MSA estimates from the baseline developed in this study and Pilot Station sonar abundance estimates provides a viable tool for assessing stock strength and assisting managers in regulating fisheries to maintain the productivity and evolutionary potential of Yukon River chum salmon.

Citation: Flannery, B. G., T. D. Beacham, R. R. Holder, E. J. Kretschmer, and J. K. Wenburg. 2007. Stock structure and mixed-stock analysis of Yukon River chum salmon. U.S. Fish and Wildlife Service, Alaska Fisheries Technical Report 97, Anchorage.