

## **Chinook salmon age, sex, and length analysis from selected escapement projects on the Yukon River.**

**Abstract:** Anecdotal information from fishers along the Yukon River suggests that the length of Chinook salmon harvested and the proportion of female Chinook salmon in the run have decreased over time. To determine whether sex composition, size, age, and size-at-age of Chinook salmon in spawning escapements have experienced a basin-wide decline over time, we examined escapement data from the Andreafsky, Anvik, Gisasa, Salcha, Chena, and Big Salmon rivers. Chinook salmon escapement samples were examined for changes in (1) proportion of female Chinook salmon, (2) proportion of large ( $\geq 900$  mm) Chinook salmon (3) proportion of age-1.4 (6-year-old) and -1.5 (7-year-old) Chinook salmon, and (4) average length of older (age-1.4 and -1.5) Chinook salmon. Of the data sets examined only large ( $\geq 900$  mm) Chinook salmon showed a consistent basin-wide trend. Four of seven time series examined show significant decreases in the relative abundance of large Chinook salmon over time. The estimated odds of sampling a large Chinook salmon decreased 4% per year (95% CI = {2.0%-5.0%}) during Anvik River carcass surveys, 2% per year (95% CI = {2.0%-3.0%}) during Chena River carcass surveys, 2% per year (95% CI = {1.0%-2.0%}) during Salcha River carcass surveys and 7% per year (95% CI = {4.0%-10.0%}) during Big Salmon River carcass surveys. No significant change in the odds of sampling a large Chinook salmon was seen at the Andreafsky and Gisasa rivers weirs or during the Andreafsky River carcass surveys. No basin-wide changes were found in the proportion of female Chinook salmon, the proportion of older (age-1.4 and -1.5) Chinook salmon, and in length-at-age of Chinook salmon in Yukon River escapement data sets. The analysis was not designed to infer cause of the observed trends. The scope of the analysis is limited to a relatively small number of spawning tributaries over a relatively short time period during which both fisheries and environmental changes have occurred confounding the ability to establish the sources of the decreasing size trend in Yukon River Chinook salmon.

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