

Yukon juvenile Chinook early ecology, prey, and condition

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Project Period: July 31, 2015 – June 30, 2017

Abstract:

This research proposes to continue Yukon River tributary and delta front/pro-delta sampling under AYKSSI project 1330 to evaluate juvenile Chinook salmon habitat use, outmigration timing, size, feeding and growth. In addition, we propose to examine prey use and quality as it relates to fish condition and growth, and develop a nucleic acid (RNA/DNA) ratio-based growth model to provide an instantaneous growth index. This research will expand work on Chinook diet and feeding on the Chena River by Neuswanger et al. (2014) to the lower Yukon tributaries and through juvenile salmon outmigration off the delta front. The proposed research also would expand our knowledge of juvenile Chinook condition through outmigration and as they head into their first marine winter. The objectives of this research are to: (1) Determine the composition, spatial variation, and temporal variation in fish and invertebrate prey for juvenile Chinook salmon, (2) determine the quality (energy density) of dominant juvenile Chinook salmon prey, (3) assess the relationship between prey quality/composition and juvenile Chinook salmon size and condition during the summer, (4) evaluate juvenile Chinook salmon spatial distribution and habitat use in relation to fish and invertebrate prey communities in Yukon River tributary and delta front/pro-delta habitats, and (5) evaluate spatial and temporal differences in juvenile Chinook salmon condition, size and energy content.

There are no studies evaluating how changes in diet quality of outmigrating smolts from river to offshore habitats affect growth and condition. Factors potentially affecting outmigration timing and fish condition include river processes (e.g. discharge), environmental conditions (e.g. temperature), and biotic conditions (e.g. prey availability and type). Identification of specific habitat use patterns and habitat features will help to illuminate variation observed in juvenile Chinook early marine ecology.

Project Objectives:

Objectives for Hypothesis H1: (1) To determine the composition, spatial variation, and temporal variation in fish and invertebrate prey for juvenile Chinook salmon in tributary and delta front/prodelta habitats. (2) To determine the quality (energy density) of dominant juvenile Chinook salmon prey. (3) To determine whether there is a relationship between prey quality/composition and juvenile Chinook salmon size and condition during the summer.

Objectives for Hypothesis H2: (4) To determine juvenile Chinook salmon spatial distribution and habitat use in Yukon River tributary and delta front/pro-delta habitats. (5) To evaluate juvenile Chinook salmon spatial distribution and habitat use in relation to fish and invertebrate prey communities in Yukon River tributary and delta front/pro-delta habitats.

Objectives for Hypothesis H3: (6) To evaluate spatial and temporal differences in juvenile Chinook salmon condition, size and energy content.