

North Pacific Research Board: Format for Semiannual Progress Reports

Project #: R0327

Title: Early marine ecology of juvenile chum salmon (*Oncorhynchus keta*) in Kuskokwim Bay, Alaska

Principal Investigator(s) and Recipient Organization(s):

Nicola Hillgruber (UAF, SFOS)	n.hillgruber@uaf.edu
Christian E. Zimmerman (USGS, ASC)	czimmerman@usgs.gov
Lewis J. Haldorson (UAF, SFOS)	lew.haldorson@uaf.edu

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Lead Author of Report: Nicola Hillgruber & Christian E. Zimmerman

Project Summary: This project examines the early marine ecology of chum salmon in Kuskokwim Bay, Alaska. Our goal is to assess the effect of physical and biological environmental factors on feeding, condition, and growth of juvenile chum salmon in Kuskokwim Bay. Using a bioenergetically-based food web model coupled with directed sampling for prey and diet composition, growth, size structure, and energy content will help us to understand patterns observed in feeding, growth and condition of chum salmon juveniles. Specifically, our objectives include (1) determining the spatial and seasonal distribution of chum salmon juveniles throughout Kuskokwim Bay, (2) assessing the spatial and seasonal patterns of environmental variables, and (3) describing the relationship between juvenile distribution patterns and these variables. In addition, we will (4) describe food habits, (5) analyze length, weight, condition, (6) diurnal feeding patterns, and (7) growth of chum salmon. Finally, (8) we will model the bioenergetics and growth of chum salmon juveniles in Kuskokwim Bay.

Progress Summary: To date, all juvenile chum salmon have been analysed of energy density and feeding patterns. Prey composition varies among size categories with 30-39 mm fork length (FL) fish feeding primarily on copepods (69%) and insects (23%), 40-49mm FL fish consuming 78% copepods and 14% insects, 50-59mm FL fish consuming 84% copepods and 12% insects, and 60-69 mm FL fish consuming 100% copepods (Figure 1). Gut contents expressed as percent body weight also varied by size category: 30-39 mm FL juvenile chum salmon containing an average of 3.4% (SD=0.021) of their body weight in prey, while 40-49 mm, 50-59 mm, and 60-69 mm FL contained on average 4.1% (SD=0.028), 3.7% (SD=0.022), and 4.6% (SD=0.022) of their body weight in prey.

Other analyses are currently ongoing and include use of otolith microstructure and microchemistry to determine duration of residence in estuarine salinity habitats, bioenergetics modeling, and description of the timing of migration of juvenile chum salmon and association with environmental variables.

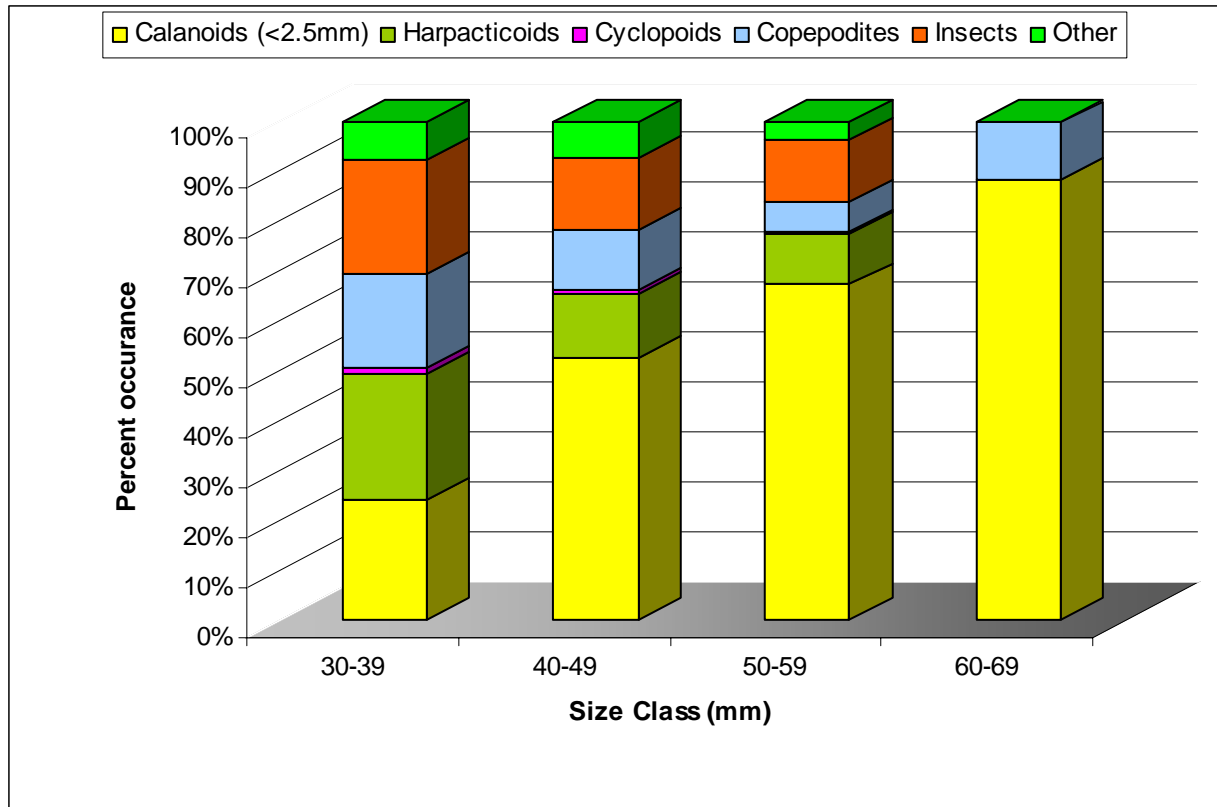


Figure 1. Percent occurrence of prey in stomach contents in juvenile chum salmon by size class, Kuskokwim Bay, Alaska.

Publications and Presentations: (through 31 December 2005)

- Burril, S., N. Hillgruber, and C.E. Zimmerman (2005). Estuarine ecology of juvenile chum salmon (*Oncorhynchus keta*) in Kuskokwim Bay, Alaska. Pink and Chum Salmon Workshop. Ketchikan, Alaska, February 2005.
- Burril, S., N. Hillgruber, and C. E. Zimmermann (*in press*). Estuarine ecology of juvenile chum salmon (*Oncorhynchus keta*) in Kuskokwim Bay, Alaska. Proceedings of the 22nd Northeast Pacific Pink & Chum Salmon Workshop, Ketchikan, Alaska.
- Hillgruber, N., C. E. Zimmerman, and S. E. Burril (2005). Timing of outmigration and distribution during estuarine residence of juvenile chum salmon (*Oncorhynchus keta*) in Kuskokwim Bay, Alaska. 29th Annual Larval Fish Conference. July 11-14, 2005, Barcelona, Spain.
- Hillgruber, N., C. E. Zimmerman, and S. E. Burril (2005). Timing of outmigration and distribution during estuarine residence of juvenile chum salmon (*Oncorhynchus keta*) in Kuskokwim Bay, Alaska. 135th Annual Meeting, American Fisheries Society, September 2005, Anchorage, Alaska.
- Zimmerman, C.E., N. Hillgruber, S.E. Burril, M.A. St. Peters, and J.D. Wetzel. (2005). Offshore marine observation of willow ptarmigan (*Lagopus lagopus*) including water landings, Kuskokwim Bay, Alaska. The Wilson Bulletin 117(1): 12-14.