

RC 057

**Spatial-temporal patterns in distribution and feeding
of juvenile salmon and herring in Puget Sound, WA**

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Chapter II: Evaluating potential for resource competition between juvenile salmon and Pacific herring

Abstract

Feeding and growth of pelagic species may be dictated by resource competition. In the case of severely depleted Pacific salmon (*Oncorhynchus* spp) populations in Puget Sound, WA, competition with abundant Pacific herring (*Clupea pallasii*) during critical juvenile stages might determine growth and ultimately survivorship. We describe feeding habits of juvenile salmon and herring in Puget Sound to quantify spatial and annual variation in diet composition, describe dietary overlap, and assess the potential for competition by quantifying consumption demand by each species for shared prey. Analysis of summer stomach content data over a nine-year period in Puget Sound revealed consistent patterns of spatial, temporal, and dietary overlap. Crab larvae and amphipods were important prey for Chinook salmon (*O. tshawytscha*), coho salmon (*O. kisutch*), pink salmon (*O. gorbuscha*), and herring, whereas chum salmon (*O. keta*) ate predominantly gelatinous prey. Total demand for shared prey taxa was calculated for each population by applying bioenergetics models to data on growth, diet composition, and estimated population abundance. Because herring were much more abundant than salmon species, the population-level consumption by herring exceeded consumption by salmon, sometimes by orders of magnitude. If shared prey items are a limiting resource, there is considerable potential for herring to negatively affect salmon growth, particularly for Chinook salmon. Future work that focuses on characterizing food supply and obtaining more accurate estimates of juvenile salmon and herring growth rates over their residence period in Puget Sound is needed to better ascertain the role of competition on salmon growth and survivorship.