

Coastal Association of Juvenile Chinook Salmon and Krill in the Northern California Current

Jason L. Hassrick^{1,2}, William J. Sydeman², Jarrod A. Santora^{2,1}, and Sean A. Hayes¹

¹NOAA Fisheries, Southwest Fisheries Science Center, 110 Shaffer Road, Santa Cruz, CA 95060, USA

²Farallon Institute for Advanced Ecosystem Research, 101 H Street, Suite Q, Petaluma, CA 9495, USA

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Understanding predator-prey spatial associations provides key information for ecosystem-based fisheries management. The recent collapse and subsequent closure of the western U.S. Chinook salmon fisheries was ascribed to ocean conditions and variation in prey availability thought to influence young-of-the-year salmon during their initial time at sea. Krill (crustaceans of the family Euphausiidae) have been hypothesized to be critical prey for post-smolt Chinook salmon (*Onchorhynchus tshawytscha*), but until recently data were not available to examine spatial associations. Here, we use hydroacoustic surveys of krill and net samples of juvenile salmon from the central-northern California Current region (San Francisco, CA to Newport, OR) to investigate predator-prey spatial associations over three summers, 2010-2012. Krill were distributed throughout the shelf region, with clear aggregations of abundance at the head of submarine canyons, offshore of major estuary outlets, and adjacent to points or headlands associated with strong Ekman transport. Over 95% of the juvenile salmon were caught in waters < 150 m, which overlapped with some locations of high krill abundance. Negative binomial regression revealed that while juveniles were caught throughout the study area, numbers were concentrated near the Klamath River and San Francisco Bay, indicating that juveniles remain near points of ocean entry. After accounting for distance from points of ocean entry, krill abundance was the only significant predictor of salmon abundance in areas where salmon were caught (presence only). Our findings indicate that shelf habitats in proximity to points of ocean entry as well as prey (krill) abundance in these areas are important determinants of juvenile Chinook salmon distribution and may be used to describe important salmon habitats in the region.

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Tel: (604) 775-5550
Fax: (604) 775-5577
E-mail: secretariat@npafc.org
Website: <http://www.npafc.org>