

Resources supporting the food web of a naturally productive lake

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Abstract

A Bayesian mixing model and stable isotopes of carbon, nitrogen, and hydrogen were used to evaluate the extent to which six consumers (three fishes, two zooplankton, and a snail) in a naturally productive lake used terrestrial resources, epilimnetic and metalimnetic phytoplankton, benthic algae, and macrophytes. Resource use varied with consumer habitat use and feeding ability, but allochthony was consistently low (averaging 15% among consumers). The pelagic invertebrates *Skistodiaptomus oregonensis* and *Chaoborus* spp. relied on phytoplankton from the epilimnion (59% and 49%, respectively) and to a lesser extent from the metalimnion (28% and 26%, respectively); terrestrial resources comprised 9% and 18% of the diet of these consumers, respectively. The snail *Helisoma trivolvis* relied mainly on littoral resources (floating-leafed macrophytes; 68% of diet), but terrestrial resources also constituted a substantial portion of its diet (21%). The fishes integrated among habitats more evenly than the other consumers, but pelagic resources formed the largest portion of their diets (*Pimephales promelas* = 64%, *Lepomis gibbosus* = 47%, and *Perca flavescens* = 47%). *L. gibbosus* was the fish with the most allochthonous diet (23%). The consumers of this productive lake were not highly dependent on allochthonous materials and tended to rely most heavily on local resources, including macrophytes.