Terrestrial support of zebra mussels and the Hudson River food web: A multi-isotope, Bayesian analysis

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ABSTRACT: The Hudson River is a strongly heterotrophic system in which the invasive zebra mussel (*Dreissena polymorpha*) comprises >90% of total metazoan biomass. Using a Bayesian mixing model, with isotope ratios of C, N, and H, and four basal resources (phytoplankton, benthic algae, submersed aquatic vegetation [SAV], and terrestrial inputs), we estimated the reliance of 10 consumers on each resource. Copepods, *Bosmina*, and herring (*Alosa aestivalis*) relied 40 – 60% on phytoplankton primary production; amphipods and young-of-year white perch (*Morone* spp.) relied heavily on benthic algae (50 – 60%). Terrestrial detritus was an important resource for oligochaetes, zebra mussels, chironomids, and *Bosmina* sp., for which median estimates of reliance were between 40% and 60%. The dual reliance of zebra mussels on terrestrial detritus and phytoplankton production, combined with their high biomass, along with the significant terrestrial support of several other consumers, indicates that terrestrial detritus supports a significant portion of the Hudson River food web. Nonetheless, given that particulate and dissolved organic matter pools are heavily dominated (60 – 80%) by terrestrial detritus, it is clear that selectivity by consumers for autochthonous organic matter is generally high. Despite its large biomass and productivity, we did not find strong evidence for support of the food web by SAV.

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