

# The relative contribution of pelagic primary production to the littoral food web of lakes

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## **Thesis abstract**

A dual stable isotope approach ( $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ) was used to assess the importance of pelagic organic carbon in littoral secondary production and explore its predictability. Forty-seven sites were sampled in Lake Memphrémagog (Québec – Vermont) to characterize the isotopic position of the primary producers and filter-feeding freshwater mussels, as well as macrophyte biomass, chlorophyll-a concentration, and site exposure. The different sites spanned a wide range in the three environmental variables. For each site, littoral, terrestrial, and pelagic contributions to the diet of the mussels were calculated from mussel isotopic position, corrected for trophic enrichment. The mean contributions were: littoral – 8%, terrestrial – 27%, and pelagic – 65%. However, the magnitude of the pelagic contribution was not related to macrophyte biomass, site exposure or chlorophyll-a concentration. The finding that the unionid mussels, a major littoral zone filter-feeder, obtain about two-third of their nutrition from pelagic zone particles washed into the littoral zone provides evidence for a close coupling in carbon flow of the littoral and pelagic zone. This study represents an important step towards a better understanding of carbon flow in aquatic food webs.