



The influence of nitrogen limitation on $\delta^{15}\text{N}$ and carbon : nitrogen ratios in sediments from sockeye salmon nursery lakes in British Columbia, Canada

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Limnol. Oceanogr., 51(5), 2006, 2333-2340 | DOI: 10.4319/lm.2006.51.5.2333

ABSTRACT: Carbon (C) and nitrogen (N) elemental and nitrogen isotopic ratios were determined for bulk organic matter in surface sediments of 11 sockeye salmon (*Onchorynchus nerka*) nursery lakes in British Columbia, Canada. Chitinous exoskeletons of *Bosmina* spp. were also picked from the sediments and analyzed for $\delta^{15}\text{N}$. The correlation between salmon escapement (spawner abundance) and bulk organic $\delta^{15}\text{N}$ confirms the importance of marine-derived nitrogen to the study lakes. The relation between sediment $\delta^{15}\text{N}$ and escapement, however, suggests that simple mixing models may significantly underestimate spawner abundance in nitrogen-limited lakes. In addition, the use of sediment and chitin $\delta^{15}\text{N}$ and C:N data to characterize lake-specific differences demonstrates that sediment isotope signatures are dependent on attendant nitrogen deficiency. The sediment C:N ratio, on its own, provides a sensitive measure of nutrient status in these lakes. This finding provides an alternate additional interpretation of C:N ratios that may be more appropriate in large lakes where terrestrial contributions to the central basin are insignificant.

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