

## Terrestrial carbon is a resource, but not a subsidy, for lake zooplankton

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*Abstract.* Inputs of terrestrial organic carbon (t-OC) into lakes are often considered a resource subsidy for aquatic consumer production. Although there is evidence that terrestrial carbon can be incorporated into the tissues of aquatic consumers, its ability to enhance consumer production has been debated. Our research aims to evaluate the net effect of t-OC input on zooplankton. We used a survey of zooplankton production and resource use in ten lakes along a naturally occurring gradient of t-OC concentration to address these questions. Total and group-specific zooplankton production was negatively related to t-OC. Residual variation in zooplankton production that was not explained by t-OC was negatively related to terrestrial resource use (allochthony) by zooplankton. These results challenge the designation of terrestrial carbon as a resource subsidy; rather, the negative effect of reduced light penetration on the amount of suitable habitat and the low resource quality of t-OC appear to diminish zooplankton production. Our findings suggest that ongoing continental-scale increases in t-OC concentrations of lakes will likely have negative impacts on the productivity of aquatic food webs.

*Key words:* allochthony; DOC; light extinction coefficient; resource subsidy; terrestrial carbon; zooplankton production.