



## Effects of groundwater flux on open-channel estimates of stream metabolism

McCutchan, James H., James F. Saunders, III, William M. Lewis, Matthew G. Hayden

Limnol. Oceanogr., 47(1), 2002, 321-324 | DOI: 10.4319/lo.2002.47.1.0321

**ABSTRACT:** The open-channel oxygen method can produce precise estimates of photosynthesis (P) and respiration (R) over a wide range of stream conditions. It is widely recognized that flux of groundwater contributes to the oxygen mass balance for a stream. However, groundwater flux is rarely considered in open-channel estimates of stream metabolism, and no guidelines have been established regarding the conditions under which it can be ignored. The purpose of this paper is to describe a method for predicting the effect of groundwater flux on estimates of metabolism and thereby establish the conditions under which flux of groundwater can lead to large errors in estimates of metabolism. Estimation of P is not significantly affected by flux of groundwater. Ecosystem R, however, can be greatly overestimated where the oxygen concentration of groundwater is substantially lower than the concentration in the channel. Although the effects of groundwater flux on estimates of metabolism often are trivial, rates of flux can be sufficiently high in many streams, at least during some part of the year, to affect estimates of R where the oxygen concentration differs substantially between groundwater and surface water. Thus, the potential contribution of groundwater flux to oxygen mass balance should always be evaluated when the

### Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

### Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.