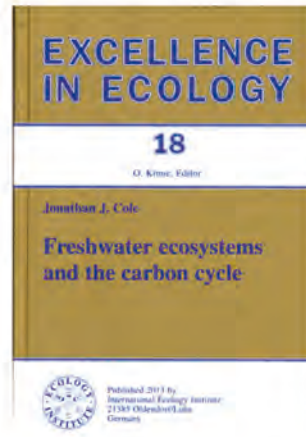


# BOOK REVIEWS

**JONATHAN J. COLE.** 2013. **Freshwater Ecosystems and the Carbon Cycle.** International Ecology Institute, Oldedorf/Luhe. ISBN 0932-2205. 125pp. \$43.

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The book is part of the series 'Excellence in ecology,' authored by recipients of the Ecology Institute Prize. Jonathan Cole was awarded the ECI prize in Limnetic Ecology in 2003. The volume begins with a 'laudatio' by Colin Reynolds, summarizing Cole's accomplishments and highlighting his contributions to our knowledge of lake metabolism. Indeed it is lake metabolism, how we looked at lakes before, and how we see

lakes now that is the major topic of this work.

Cole's preface begins the book right up front with graphic evidence of the metabolism of some shallow acidic lakes of northern Europe in the form an image of a "bog man," a corpse remarkably well-preserved for about 2500 years. The freshwater mummy shows at once the considerable carbon storage capacity of shallow lakes and the fact that lakes are open to external inputs! It is a nice introduction to Cole's domain of the cycling of carbon and carbon budgets, with an emphasis on the importance of external inputs.

The first chapter is 'The role of inland waters in the global and regional carbon balance.' Here he reviews the basic definitions and concepts of carbon cycling. These are actually more complicated than one might think. It is a nice tutorial clearly showing that estimating gas fluxes involves much more than simply extrapolating data from bottle incubations. He then sets the stage for confronting the reader with the question of the overall role of inland waters in the global carbon cycle. Along the way we learn not only of the importance of lakes in global budgets but that small ones are, in aggregate probably the major terms (citing John Downing's work).

Both the second and the third chapters concern the question of the relative importance of allochthonous and autochthonous carbon in lakes. Reading about this question was great fun as my own preconceptions kept me puzzled. The controversy over terrestrial subsidies to lake metabolism appears to be greatest with regard to the diet of lake zooplankton with sides defending an exclusive dependence on phytoplankton prey or also exploiting directly or indirectly carbon fixed outside the lake. Viewed from a background of marine microbial ecology (diagrams of trophic relationships resemble neural networks more than linear chains), the answer would be clearly be 'That depends...'

In the last chapter Cole returns to his starting point – carbon storage in the chapter titled “Why is there so much organic carbon in the sediment of lakes?” Probably few of us know that “There is as about as much organic C in the sediments of lakes as in the entire remainder (e.g., soils, vegetation) of the terrestrial biosphere.” Furthermore, it is not clear exactly why lake sediments are so high in carbon and Cole reviews the major recent hypotheses. It is a nice ending to book highlighting the importance and uncertainties of carbon pathways and budgets in lakes.

Overall, it is well worth the cover price- reading it will be a pleasure, not a chore and you’ll gain an appreciation of lakes of all shapes and sizes.