



An assessment of nitrogen removal from headwater streams in an agricultural watershed, northeast Ohio, U.S.A.

Herrman, Kyle S., Virginie Bouchard, Richard H. Moore

Limnol. Oceanogr., 53(6), 2008, 2573-2582 | DOI: 10.4319/lo.2008.53.6.2573

ABSTRACT: The objective of this project was to assess in-stream nitrogen removal capacity in a fragmented agricultural landscape and to compare removal capacities in streams with agricultural or residential (hereafter referred to as agricultural streams) and forested riparian land use. We also identified what stream characteristics control nitrogen removal in these systems. We examined paired reaches (one agricultural and one forested reach) along five headwater streams in an agricultural watershed (Upper Sugar Creek Watershed) in northeast Ohio. Although denitrification rates were high (<0.1 - $17.2 \text{ mg N m}^{-2} \text{ h}^{-1}$), annual nitrogen removal was most likely low because during spring and fall, when in-stream nitrogen loads were high, removal was low, and during summer when instream nitrogen loads were low, removal was high. Between the agricultural and forested reaches removal rates were similar in terms of loss rate and uptake velocity. Removal capacities were similar despite forested reaches having higher hydraulic residence times. Using a redundancy analysis we identified temperature, in-stream nitrate concentration, and relative transient storage as stream characteristics that affect nitrogen removal. Further analysis suggests that nitrogen removal via denitrification in these headwater streams was not limited by the availability of nitrate. In this fragmented agricultural watershed in-stream nitrogen removal was low and riparian land use had no effect on this process, most likely because of nitrate saturation.

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.

