



TITLE: THE RELATIONSHIP BETWEEN GROUNDWATER NITRATE AND LANDSCAPE CHARACTERISTICS IN THE LAMPREY RIVER WATERSHED

L. Buyofsky, M. Daley, W. McDowell
University of New Hampshire

RESEARCH OBJECTIVE: to determine if watershed characteristics affect groundwater nitrate concentrations in homeowner drinking wells in the Lamprey River watershed.

METHODS:

- Quantified watershed characteristics including land use and population density
- Collected groundwater samples from 188 homeowner wells from summer 2004 to spring 2005
- Compared differences in nitrate concentrations among seasons and locations

RESULTS:

- Some areas of the watershed had higher nitrate concentrations than others (Figure 1).
- Areas with higher population densities had higher average groundwater nitrate (Figure 2).
- One well exceeded the US EPA drinking water standard for nitrate (10 mg N/L), 10 wells were greater than levels associated with increased risk of gastric cancer (4 mg N/L; Ward et al. 1996), and 28 samples were elevated above 2 mg N/L (Figure 1).
- Groundwater nitrate concentrations did not show consistent seasonal variation.

APPLICATIONS:

- Homeowners within the watershed were given the results of this study along with general information about groundwater quality.
- Town planners, managers, conservation commission members, and citizens should consider impacts of population growth on groundwater quality when making future development decisions in each of the Lamprey River watershed towns.

For more information contact: bill.mcdowell@unh.edu or mldaley@unh.edu

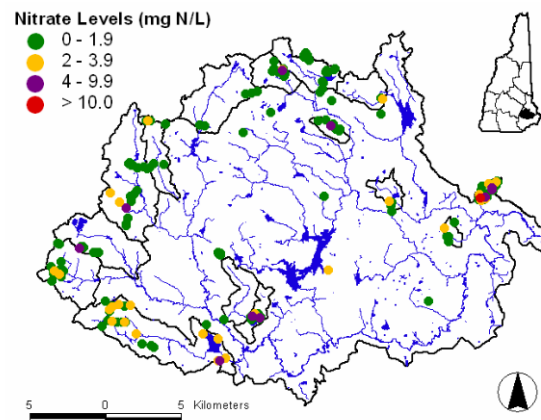


Figure 1. Map showing maximum nitrate concentration measured in homeowner wells and areas of the Lamprey River watershed located in southeastern New Hampshire.

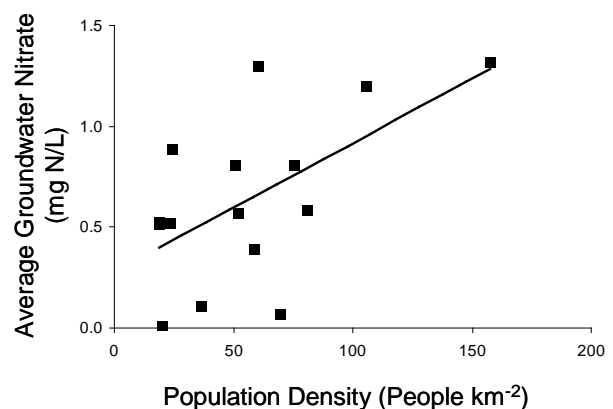


Figure 2. Relationship between average groundwater nitrate and population density ($R^2=0.34$; $p<0.05$)