USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Hydrology and biogeochemistry in the Wisconsin river floodplain: implications for rivervine nitrogen loads

Focus Categories: groundwater, hydrology, nitrate contamination (GW, HYDROL, NC)

Keywords: Denitrification, ecosystems, groundwater hydrology, land-water interactions, nitrogen, rivers, wetlands

Duration: 9/99-8/01

Federal Funds Request: $43,498

Non-Federal Matching Funds Pledged: $43,498

Principal Investigator:

Emily H. Stanley, University of Wisconsin-Madison
Randall J. Hunt, U.S. Geological Survey

Abstract

Throughout the Midwest, increased non-point source pollution has caused significant increases in surface and groundwater concentrations of nitrogen over the past 50 years. Because of the enormous economic and ecological effects of elevated nitrogen (N) in groundwater, rivers, and ultimately the Gulf of Mexico, answers to critical scientific and management questions regarding nutrient loading are needed. This research is motivated by the overall goal of understanding ftmdamental processes controlling nitrogen loading to rivers so that potential management strategies for N reduction can be identified and evaluated. Specific research objectives are to: (1) describe the groundwater hydrology of a study reach on the Wisconsin River, emphasizing water movements through the floodplain aquifer into surface water bodies; (2) determine the extent of surface-groundwater interactions during flooding; and (3) document spatial and temporal patterns of surface and ground water nutrient chemistry and wetland denitrification activity in the floodplain. These objectives will be addressed by collection and analysis of nutrient and isotopic (^{2}H and $^{18}0$) composition of ground and surface waters during baseflow and flood conditions, as well as through hydrologic modeling. These data will provide critical data on hydrologic linkages between rivers and floodplains and an assessment of the potential for floodplains to remove nitrogen. Process-orientated answers to these types of questions will allow us to make initial recommendations regarding potential management strategies aimed at reducing N in aquatic systems.