



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: WI101

Title: Importance of Groundwater in Production and Transport of Methyl Mercury

Focus Categories: Groundwater, None

Keywords: hydrogeochemistry, groundwater

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Abstract

Evidence from prior studies suggests that factors such as land use and surficial geology likely control the speciation, bioavailability, and transport of mercury (Hg) species in watersheds, and yet very little is known about the subsurface behavior of Hg. Few studies have examined groundwater systems to determine its significance as a source of Hg species to surface waters, the rates at which MeHg may be synthesized in the subsurface environment, or the environmental factors that govern its fate and transport. The principal goal of this study is to determine the importance of groundwater systems as a source of MeHg to temperate streams. Specific objectives include: 1) documenting the subsurface locations and biogeochemical conditions under which MeHg is produced, 2) quantifying MeHg fluxes from subsurface zones via groundwater, and 3) characterizing the relationships between land use/coverage characteristics and MeHg fluxes from the subsurface environment. We propose to examine the dynamics of MeHg production and transport in the groundwater systems of two geologically and geochemically contrasting Lake Superior tributaries (Bad River, WI and Tahquamenon River, MI). This project combines both field and laboratory components. Fieldwork will focus on specific stream segments of each tributary that provide contrasting land use and geological characteristics. Laboratory studies will employ intact soil/sediment cores of contrasting physical and chemical properties for controlled determination of MeHg production rates and fluxes through the soil matrix. Project results will be used to address fundamental gaps in knowledge regarding the importance of the subsurface environment in supplying MeHg to surface waters, and its corresponding dependencies upon environmental factors such as land use and geology.