



## WATER RESOURCES RESEARCH GRANT PROPOSAL

**Project ID:** ME2281

**Title:** Seepage Lakes as Indicators of Climate Change: Is Maine Really Cooling?

**Focus Categories:** Acid Deposition, Surface Water

**Keywords:** climate, lakes, acid rain, drought, surface-groundwater relationships, land-water interactions, water chemistry

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**End Date:** 08/31/2003

**Federal Funds:** \$21,046

**Non-Federal Matching Funds:** \$57,933

**Congressional District:** Second

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**Abstract**

Although we have evidence that the global climate is warming, much uncertainty exists as to the local changes in climate, including the seasonality, direction, and magnitude of changes in precipitation and temperature. For example, meteorological data suggest Maine has become wetter and cooler over the past 30 years (Kahl et al., 2000). We propose here to evaluate the potential for using the chemistry of seepage lakes as sentinels for climate change. Aquatic ecosystems are sensitive to changes in climate that alter water balance, and transport of water, solutes, and organic carbon from the catchment. In particular, the chemistry of seepage lakes, which are located at the top of hydrologic flow systems, integrates a variety of climate signals that influence water balance. Our approach will be to take advantage of the substantial long-term database on seepage and other headwater lakes in Maine and supplement this with additional data to be collected from a subset of seepage lakes. These seepage lakes will be classified and sampled based on dissolved organic carbon (DOC; high and low) and hydrology (groundwater recharge and flow-through). Not only will we evaluate the sensitivity of these lakes to climatic fluctuations, we will also examine interactions between the multiple stressors acid deposition and climate, through cross-site comparisons between Wisconsin and Maine. The ecological and economic effects of climate change on a water-resource rich state like Maine are potentially large. Our research plan will provide information to predict future changes in water resources due to both climate change and acid deposition and to develop a proactive strategy for policy and management.