**Coupling the Land Use History of Watersheds with Carbon Turnover and the Biogeochemical Dynamics and Stability of Lake Ecosystems**

Terrence. L. Marsh, David T. Long and Thomas C. Voice

**Project Abstract**

We propose to initiate an investigation into how land-use affects the types of organic carbon materials released to lakes, how these inputs affect the microbial communities in the lakes, and the resulting biogeochemical behavior of the lake systems. In a previous submission to NSF, we included this effort in large, 5-year study involving over 50 lakes. While we received very good reviews, the primary criticism offered in declining funding was that it was too ambitious and that we should first demonstrate proof of concept in a smaller study. To do this, we are requesting a CWS Post-doc to develop and validate the proposed chemical and microbial community analysis techniques, to collect and analyze samples from a small number of lakes, and to apply the proposed data analysis techniques in order to demonstrate the capability of our methods for the larger study. We are seeking an individual with strong laboratory skills in molecular biology and chemical analysis, and an interest in field-scale biogeochemical processes. Our approach will be to simultaneously begin the methods development work with the Post-doc and to seek external funding that will cover sampling a sufficient number of lakes to fully demonstrate the component hypotheses. Attached is a draft of the proposal we intend to submit. Using CWS support we will address all elements of the research effort, but will limit the extent of sampling to 2 to 5 lake systems. In addition to submitting the attached proposal, we will expand the PI group to address related hypotheses involving transport phenomena, historical trends, trace-metals, organic contaminants, and more detailed investigations of land use. We have identified faculty we will invite to participate including the PIs on the original NSF proposal and junior faculty including A. Cupples (CEE), M. Phanikumar (CEE), J. Lennon (KBS), and C. Yansa (GEO).