Project Abstract
Wetlands have diverse hydrologic regimes, flora, and fauna. Consequently, wetlands can have variable nutrient functional roles (sink, source, and transformers) in relation to lake chemistry that are dynamic in time and space. Few studies have taken a landscape approach to explore the effects of wetland mosaics on lake water chemistry. A landscape ecology perspective captures wetland attributes such as areal extent in the catchment, vegetation classes, as well as hydrologic connectivity to surface waters, which all can be important determinants of lake phosphorus (P) concentrations. Similarly, little is known about the role wetlands played in the landscape prior to extensive anthropogenic disturbances. Incorporating a landscape ecology and historic perspective on wetland and lake interactions will provide a better understanding of how wetlands affect lake P levels. We will bring together multiple datasets that include present-day wetland maps (NWI), 1800s land cover/wetland maps (GLO), and paleo-driven estimates of lake TP to address these questions. We propose to examine relationships between lake TP and wetland extent and connectivity metrics for both pre-settlement and current time periods. We currently have wetland and lake data for 31 lakes spread throughout MI along gradients of lake depth, TP and lake hydrology. We are requesting funds for the GIS analysis and statistical modeling, as well additional lake coring on a subset of lakes. These cores will allow us to validate the use of our two GIS sources of wetland data for the two time periods using plant macrofossils in the lake cores. We have targeted two RFP’s for our initial proposal efforts using research outcomes from this CWS Venture proposal. First, we expect to submit a complimentary part of our overall project to EPA-STAR -- Consequences of Global Change for Water Quality, due May 8, 2008. Second, once we have more concrete results from this CWS Venture grant, we will submit to NSF Geography and Regional Sciences Program, due January 15, 2009. See text for further details.