



## **USDA-CSREES 2007 National Water Quality Conference**

### [Assessing Phosphorus Dynamics in Sediments from James River, Virginia](#)

Sediments are heterogeneous mixtures of assorted soil separates and organic matter that serve as repositories of nutrients and chemicals in surface waters. Phosphorus (P) flux into and out of sediments is controlled by P speciation and environmental conditions, such as temperature (T), dissolved oxygen (DO), redox conditions (Eh), and pH. This study was conducted to characterize chemical and physical parameters that affect P speciation in sediments of the James River, and to evaluate the experimental conditions under which sediment-bound P may become biologically available. Sediment cores were analyzed for T, pH, Eh, carbon (C) and metal ions. In a laboratory experiment, sediment samples were suspended in deionized water and equilibrated under different pH and aerobic conditions to assess P speciation and flux. Core samples with high P concentration correlated well with Fe and had non-uniform correlations with Al and Ca, which changed with core depth. Data indicated that interactions among pH, oxygen, metals, and organic matter determined P flux. Moreover, under acidic and aerobic conditions, iron phosphates were predominant species formed, while under aerobic conditions and higher pH, Ca phosphate formation was favored. Electron microscopy assessment and Energy Dispersive X-ray (EDX) analysis provided information that P association with Fe, Ca, Al, C, and O in James River sediments is highly possible.

Author: Asmare Atalay

University Affiliation: Virginia State University

Co-Author(s): C. Bronick and E. Westbrook