SEDIMENT FINGERPRINTING TO DELINEATE SOURCES OF SEDIMENT IN AN URBAN SUB-WATERSHED WITHIN THE CHESAPEAKE BAY WATERSHED

POSTER PRESENTATION

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The Chesapeake Bay is the nation's largest estuary, its watershed covering 165,800 square kilometers and six states. The Chesapeake Bay is designated under the Clean Water Act as an impaired water body due to degradation by excess sediment and nutrients. Eroded upland sediment contributes to the degradation of the Bay and its tributaries by transporting nutrients and toxic contaminants, burying habitat, and reducing water clarity which diminishes light penetration and subsequently affects submerged aquatic vegetation.

Land management practices are being implemented throughout the Bay watershed to reduce and control sediment erosion and transport. The identification and understanding of sediment sources to fluvial systems and a differentiation between in-stream and upland sources of erosion are important to selecting and implementing the most appropriate management actions. Sediment fingerprinting offers a method for identifying fine sediment sources and their contributions to suspended sediment flux within a watershed. This approach entails the establishment of a minimal set of environmental tracers based on physical and chemical properties that can be used to uniquely define each source in the watershed. Suspended sediment collected under different flow conditions exhibits a composite or fingerprint of these properties that allows them to be traced back to their respective sources.

The sediment fingerprinting approach is being used to help identify sources of suspended sediment to Difficult Run, a tributary to the Potomac River and to the Chesapeake Bay. Difficult Run is located in Fairfax County, VA, in the Piedmont Physiographic Province of the Mid-Atlantic Region of the United States (drainage area of 14.2 km2) (NWIS web). The Difficult Run watershed is an urban watershed crossed by several major highways, and is characterized by forested, urban, and mixed residential and commercial land cover. Potential upland sources of sediment including roads, road-cuts, lawns, and forested areas, and in-stream sources (stream banks) will be evaluated in conjunction with suspended sediment collected from Difficult Run. Preliminary results of this sediment fingerprinting analysis will be presented.