

Integration of Stream Monitoring Data Across Maryland Jurisdictions: Comparison of Benthic Macroinvertebrate Sampling Protocols

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Biographical Sketches of Authors

Dr. Jon Vølstad is the Versar Leader for Statistics & Fisheries. He has directed the development and implementation of many large-scale research surveys and monitoring programs for local, state, regional, national, and international institutions. Dr. Vølstad played an integral role in the development of the Maryland Biological Stream Survey, a nationally recognized ecological assessment program, developing the survey design and the analytical methods for evaluating stream condition. He also helped the Maryland Department of the Environment develop and implement biological criteria for streams and the Chesapeake Bay.

Dr. Mark Southerland is a principal ecologist with Versar, Inc. He was the primary author of the 1990 EPA program guidance on the use of biocriteria in surface waters and drafted the first summary of state efforts to develop and implement biocriteria. Dr. Southerland now directs Versar's support of the Maryland Biological Survey, including the development of biological indicators for fish, benthic invertebrates, amphibians and reptiles, and physical habitat. He also recently completed development of biological criteria for the Hudson River.

Nancy Roth is a senior scientist and program manager with Versar, Inc. Since 1996, she has been the lead author of comprehensive statewide reports for the Maryland Biological Stream Survey. Ms. Roth was instrumental in developing and validating the fish IBI for Maryland streams and has assisted the state in developing biological criteria for streams. Ms. Roth also develops assessments and management plans for priority watersheds in Frederick County, MD, Fairfax County, VA, and other local jurisdictions.

Ginny Mercurio is an environmental scientist with Versar, Inc. She provides data management and analysis for the Maryland Biological Stream Survey. During each year of sampling, Ms. Mercurio completes site selection, obtains landowner permissions, compiles quality assurance audits, analyzes sampling results, and produces annual reports. She has also conducted statistical analysis for the Chesapeake Bay Long-term Benthic, Hudson River Biocriteria, and other monitoring programs.

Keith Van Ness joined the Montgomery County Department of Environmental Protection in 1994. He is currently the Senior Ecologist of the Watershed Monitoring Division, a group that is responsible for monitoring and assessing the condition of county streams, identifying areas of impairment, and prioritizing watershed restoration projects. Keith also conducts amphibian, vernal pool and nesting bird monitoring in the County with the purpose of developing an integrated assessment of landscape condition.

Dr. Ron Klauda joined the Maryland Department of Natural Resources in 1990. He is currently Director of the Monitoring and Non-Tidal Assessment Division, a group that is responsible for monitoring and assessing the condition of Maryland's surface waters from the mountains to the sea. Ron is an aquatic ecologist who received his Master's and Doctoral degrees from Penn State University.

Wayne Davis joined EPA in 1987 as an environmental scientist for the Chicago regional office. He moved to the Washington area in 1992 and transferred to EPA's Office of Policy, Planning and Evaluation. Wayne is now with the Office of Environmental Information working at Fort Meade with the Mid-Atlantic Integrated Assessment

Team. He is one of the original members of EPA's biological criteria effort, manages EPA's biological indicators Web site, and is a graduate of The Ohio State University with a Master's degree in environmental biology.

Abstract

At both state and local levels, bioassessment programs supply valuable information to guide stream resource management. For example, the Maryland Department of the Environment (MDE) has a regulatory decision-making framework for listing watersheds (Maryland 8-digit and 12-digit watersheds) as impaired based on indices of biotic integrity (IBIs) for freshwater, non-tidal streams. Both the Maryland Biological Stream Survey (MBSS) conducted by the Maryland Department of Natural Resources (DNR) and several counties in Maryland conduct biological sampling of streams that can be used for biocriteria and other stream management activities. To successfully integrate IBI data collected by both county and state monitoring in the same watersheds, differences in sampling protocols must be evaluated and reconciled. We present the results of a quantitative comparison of benthic sampling protocols used by MBSS and Montgomery County to assess freshwater, non-tidal streams. This comparison study involved paired sampling at a random subset of sites. The experimental sites were allocated in a balanced manner into catchments with both high and low percentages of urban land use and small and large stream size, ensuring that paired sampling was conducted across a range of stream condition. This study supports the contention that Montgomery County and Maryland DNR stream monitoring of benthic macroinvertebrate communities can be effectively integrated. In the case of sampling protocol differences, integration options include (1) continuing to use different protocols when the mean results are comparable but of differing precision; (2) adjusting the result from one protocol to match the other, usually with a loss of precision; and (3) agreeing to adopt the same protocol.