Improving the Utility and Comparability of a Regional Monitoring Program – Chesapeake Bay River Input Monitoring

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Biographical Sketches of Authors

Mary Ellen Ley has served as the Chesapeake Bay Program's quality assurance coordinator since 1998. Her work encompasses a wide range of activities - from project planning to field and laboratory audits, with the goal of obtaining comparable data from multiple agencies in four states. Mary Ellen began her career as a chemist at Wisconsin's State Laboratory of Hygiene. From 1985 to 1996, she worked with the Wisconsin Department of Natural Resources in the areas of quality assurance, laboratory certification and drinking water regulations. Prior to the Chesapeake Bay Program, she worked with the U.S. EPA Office of Groundwater and Drinking Water on monitoring issues.

Mick Senus has served as project manager for the Chesapeake Bay River Input Monitoring program since 2001. His work includes field sampling, nutrient and sediment load estimation, and trend analysis at four major tributaries. Mick began his environmental career in 1995 for the USDA's Natural Resources Conservation Service where he worked in modeling pesticide transport on agricultural lands. From 1996-1999 he worked at Camp Lejeune, NC for the Department of Defense as project manager remediating numerous hazardous waste sites on the Marine Corps installation under Superfund guidelines. From 1999-2001 he worked to plan and implement monitoring programs in two locations at Aberdeen Proving Ground, MD.

Abstract

The Chesapeake Bay River Input Monitoring Program is a long term, cooperative monitoring effort supported by State and Federal agencies. Since the mid-1980s, Virginia Department of Environmental Quality, Maryland Department of Natural Resources, U.S. Geological Survey, and Metropolitan Washington Council of Governments have monitored water quality at nine River Input stations in nine major tributaries of the Chesapeake Bay watershed. The monitored tributaries represent over 90 percent of the streamflow from the nontidal portion of the Chesapeake Bay watershed and are co-located with USGS stream-gaging stations. The objective of the monitoring program is to monitor concentrations, estimate loads, and calculate trends for nitrogen, phosphorus, and suspended sediment over time. This work provides information to resource managers formulating tributary strategies aimed at Total Maximum Daily Load development for nutrient and sediment control in the Bay. Additionally, watershed modelers use the data for calibrating and validating models.

When monitoring began, cooperating agencies used very similar protocols. Over the years, the protocols diverged as the agencies added or dropped parameters and switched to different sampling and laboratory methodologies. The differences did not significantly affect the site-specific trends, but the absence of certain constituents forced watershed modelers to use calculated values rather than measured values. To generate comparable data and add constituents, several method changes were needed: a) alkaline persulfate digestion instead of Kjeldahl digestion for nitrogen; b) particulate analyses for carbon, nitrogen, and phosphorus; and c) transect (equal-width increment) manual sampling instead of single-point automatic sampling.

This presentation will review the challenges facing this multi-purpose, regional monitoring program. It will discuss the process, costs, and benefits of changing an existing monitoring program to accommodate additional objectives. Finally, results from comparability studies conducted by U.S. Geological Survey staff will be used to estimate the biases between methods and their potential effect on future calculations.