

Using Synoptic Water Quality Surveys to Target Nutrient Management Programs

Stuart Lehman, Douglas Marshall, Michael Haddaway,
and Michele Katz

*Coastal and Watershed Resources Division
Maryland Department of Natural Resources, U.S.A.*

The Targeted Watershed Project is a multi-agency State initiative to address pollutant delivery to the Chesapeake Bay and improve water quality and habitat in four key tributaries. Biologists from the Department of Natural Resource's Targeted Watershed Program monitored the two agricultural streams in the project, using same day, watershed-wide sampling during baseflow conditions to characterize the contribution of pollutants from groundwater sources. One of the streams sampled was German Branch which flows through intensively farmed cropland on the relatively flat, Eastern Shore of Maryland. The other site was the Piney and Alloway Creek watershed which has many farms and dairies within its boundaries, in the rolling hills of north-central Maryland and part of Pennsylvania.

The results of these surveys were overlaid on maps showing sub-watersheds above the sampling stations, using computer mapping technology. Areas were identified with disproportionately high concentrations of nitrate+nitrite and ammonia nitrogen. This allowed managers in these watersheds to target agricultural conservation practices in these areas and helped biologists determine where monitoring stations should be located to track restoration progress.

This method of taking numerous samples throughout a watershed during baseflow conditions in streams, allowed an estimate to be made of the relative groundwater contribution per unit area of land for these nitrogen compounds. Nitrogen contributes to the degradation (i.e. eutrophication) of large areas of the Chesapeake Bay by over-fertilizing algal and epiphytic plant growth. Using a photographic-based computer mapping system, the Map Image Processing System (MIPS), to delineate watershed boundaries of areas upstream of the sampling stations will allow future identification of particular fields, forests, developments, and agricultural practices which contribute higher pollutant levels to these watersheds.