Agriculture and Water Quality on the Maryland Eastern Shore: Where Do We Go from Here?

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The current effort to restore water quality in Chesapeake Bay was initiated early in the 1980s, after a baywide study identified excess nutrients as the primary cause of water quality problems in the bay (Malone et al. 1993). Increased nutrient availability has enhanced algal growth throughout the bay, which promotes oxygen depletion below the euphotic zone (Officer et al. 1984) and also reduces light availability for submersed vascular plants. Historically, submersed vascular plants were a key component of the bay’s trophic system, but their distribution by the early 1980s had decreased to less than 20% of what it was before 1960 (Orth and Moore 1983).

Estuarine scientists had recognized for several decades that nutrient enrichment was a threat to the bay, but not until 1987 were formal goals established to reduce nitrogen and phosphorus inputs to the bay from both point and nonpoint sources. Although quantifying point source inputs was straightforward, relatively little information was available on nonpoint source nutrient inputs. Research before 1987 had focused almost exclusively on processes in the bay itself rather than throughout the watershed. Nevertheless, there was a consensus that agriculture was the main contributor of nonpoint source nutrient inputs to the bay.

Nowhere in the bay watershed has the role of agriculture come under more scrutiny than on the Eastern Shore of Maryland (that region of Maryland east of Chesapeake Bay [Figure 1]). Although the Eastern Shore comprises only approximately 5% of the total bay watershed, it contains the most concentrated grain- and poultry-producing regions in the entire watershed. Corn (Zea mays L.), soybeans (Glycine max L.), and wheat (Triticum aestivum L.) are the major crops, with most of the production used in the formulation of poultry feed. The ratio of agricultural land to forest on the Eastern Shore is approximately 1:1 versus 1:2 for the entire bay watershed. Because of the highly irregular shoreline of Chesapeake Bay along its eastern boundary, a major fraction of agricultural drainage from cropland on the Eastern Shore flows almost directly into tidal waters that historically have supported commercial and recreational fisheries. The inland penetration of tidal waters in Eastern Shore tributaries limits opportunities for single-point monitoring of nutrient export rates from large drainage areas. As a result, little information had been collected on nutrient export rates from most of the Eastern Shore before the onset of the effort to restore Chesapeake Bay.

LONG-TERM SOLUTIONS TO ACCELERATED EUTROPHICATION MUST PROVIDE MECHANISMS FOR REDISTRIBUTING NUTRIENTS FLOWING INTO CONCENTRATED ANIMAL-PRODUCING REGIONS

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