

ATMOSPHERIC DEPOSITION

DEFINITION

Atmospheric deposition is the result of airborne chemical compounds settling onto the land or water surface. Some of the most important chemical contaminants are those containing nitrogen or phosphorus. Nitrogen compounds are involved in acid rain, and both nitrogen and phosphorus compounds contribute to nutrient loadings. Nitrogen compounds can be deposited onto water and land surfaces through both wet and dry deposition mechanisms. Wet deposition occurs through the absorption of compounds by rain as it falls, while dry deposition is the direct adsorption of compounds to water or land surfaces.

One group of nitrogen-containing compounds, nitrogen oxides, is produced during high-temperature burning of fuels. Sources include fossil-fuel power plants, industrial boilers, and motor vehicles.

WATER QUALITY IMPACTS & TYPICAL LOADINGS

The relative contribution of atmospheric deposition to total nutrient loadings is difficult to measure or estimate, and many deposition mechanisms are not fully understood. Research continues in these areas. Most studies have focused on wet deposition of nitrate; dry deposition rates are not well defined. Phosphorus loadings due to atmospheric deposition have not been extensively studied.

MANAGEMENT TECHNIQUES & TYPICAL REDUCTIONS

Computer models such as the Regional Acid Deposition Model can be used to relate pollutant emissions to deposition rates. Most of the modeling work has focused on the

Chesapeake Bay watershed, but may also be applicable to the Nanticoke. The latest estimates of nitrate deposition reductions to the Chesapeake Bay due to the implementation of the Clean Air Act Amendments of 1990 are approximately 11% (Robin Dennis, U.S. National Oceanic & Atmospheric Administration, Chesapeake Bay Program Air Subcommittee Meeting, Feb. 29, 2000).

IMPLEMENTATION ISSUES

Sources of emissions that impact the Nanticoke River come from a large region, including other states. State regulations, therefore, are of limited use in improving deposition rates.

On-going national and regional efforts to reduce nitrogen oxides to address other environmental health concerns will also reduce atmospheric deposition as a nutrient-loading source.

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NANTICOKE WATERSHED

This fact sheet was prepared by the Delaware Department of Natural Resources and Environmental Control's Whole Basin Team for citizens and stakeholders interested in one of Delaware's most environmentally and economically attractive areas—the Nanticoke River and its surrounding lands, surface and ground waters.

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