ATMOSPHERIC DEPOSITION

DEFINITION

Atmospheric deposition is the result of chemical compounds containing nitrogen or phosphorus settling onto the land or water surface of the Inland Bays watershed. Both wet and dry deposition can occur. Chemical reactions take place in the atmosphere and water, and emissions from both land and water surfaces can occur. This results in a dynamic system that is difficult to quantify.

WATER QUALITY IMPACTS & TYPICAL LOADINGS

Nitrogen compounds can be deposited onto the water and land surfaces through both wet and dry deposition mechanisms. Nitrogen inputs to the Inland Bays from atmospheric deposition are estimated to contribute between 15 and 25 percent of total nitrogen input. Actual atmospheric contribution is probably larger because most estimates do not address ammonia, and the watershed transmission rate used is conservative (Joseph Scudlark and Thomas Church, University of Delaware, Chesapeake Bay Program Air Subcommittee Meeting, Feb. 29, 2000). 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 Inland Bays. The latest estimates of nitrate deposition reductions to the Chesapeake Bay due to the CAAA implementation are approximately 11% (Robin Dennis, U.S. NOAA/RTP, Chesapeake Bay Program Air Subcommittee Meeting, Feb. 29, 2000).

TYPICAL COSTS

No estimates are currently available.

IMPLEMENTATION ISSUES

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

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.

Author: Air Quality Management Section (302.739.3791)

INLAND BAYS WATERSHED

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

For additional information, contact the:
Watershed Assessment Section
Department of Natural Resources and Environmental Control
820 Silver Lake Blvd., Suite 220
Dover, Delaware 19904-2464
(302) 739-4590

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