

Something in the Air: Researchers look to the atmosphere for sources of pesticide contamination in the Chesapeake Bay watershed.

Challenge

The Delmarva Peninsula, a region within the Chesapeake Bay watershed, is dominated by corn and soybean farming. The heavy use of chemicals on these farms makes the peninsula's streams and tributaries particularly vulnerable to agricultural runoff. However, this is not the only threat to coastal water quality; research has shown that pesticide from regional farms reaches estuaries through the atmosphere as well. Very little is known about the atmospheric transport of pollutants, or its role in water quality degradation. This project explores these processes by expanding an existing air and precipitation monitoring network to include the detection of pesticides, and by testing a new model that will help predict deposition of agricultural pollutants.



Pesticide spraying on farms releases chemical contaminants into the atmosphere.

Science

Approach

Pesticides from the atmosphere reach the coastal environment as airborne particles and through rainwater. In this project, researchers took weekly samples of the air and precipitation from three sites over a two year period. They determined the pesticide concentrations in these samples to calculate the rates of pollution deposition, determine the trends in deposition loads, and identify the regions that contribute the highest amounts of contaminants.

Methods

Researchers adapted a commercial, funnel-type rainwater collector to include a sensor-activated lid that opens when it rains. Rainwater enters the funnel and is pulled through a glass fiber filter and an extraction cartridge. Air samples were collected with a commercial high-volume sampler, with a glass fiber filter and polyurethane foam.



The modified rainwater collector

Results

Investigators found various pesticides (herbicides, insecticide, and fungicides) in air samples. Herbicide contamination peaked during the spring, in correspondence with corn and soy crop spraying. Insecticide and fungicide concentrations appeared to increase during the summer months corresponding with vegetable spraying. Researchers are continuing to develop a model which will determine the contribution of pesticides from various regions.

Application

Managing Local Atmospheric Deposition

This project is providing much-needed information on the contribution of atmospheric-delivered pesticides to the Delaware Bay watershed. Local and state agencies can use these research methods to better understand and monitor contaminant input.

Informing Other Coastal Decision Makers

Managers, scientists, and coastal decision makers from around the country will benefit from understanding more about the total pesticide "budget" entering their watersheds, and the atmosphere's role in this process. To make their methods and results available to a wider audience, investigators have presented their findings at national conferences and submitted them for publication.

Project Essentials

Title: Atmospheric Deposition of Currently Used Pesticides to the St. Jones River Reserve and Upper Delmarva Peninsula

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