Atmospheric Transport and Deposition of Pesticides within the Choptank River Watershed
and the Role of Riparian Buffers in Pesticide Delivery to Streams
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How Do Atmospheric Processes Influence Riparian Functionality within the Watershed?

Research Approach
- Pesticide inputs to subwatersheds will be determined.
  (Data collection is underway, see below).
- Pesticide air samples will be deployed in each subwatershed to measure pesticide and other important VOC concentrations.
- Intensive investigation of riparian function will be conducted within selected subwatershed.
- Remote sensed, land use, and other water quality data will be utilized to determine differences in pesticide loads between subwatershed.
- The data acquired in this effort and in previous air quality projects will be compiled with modeling efforts to further calibrate and validate REMM and to discuss the atmospheric inputs of pesticides to the watershed.

Expected Outcomes
- This effort will provide an evaluation of the effectiveness of riparian areas in mitigating pesticide and VOC inputs especially from drift and volatilization.
- Results will be utilized by producers and policy makers to improve mitigation capacity of riparian buffers.

Choptank River Watershed
The Choptank River is an estuary located in the Delmarva Peninsula of the Chesapeake Bay. It’s watershed is 1756 km² with small watersheds (#2 – Cordova; #3 – Norwich) have consistently higher pesticide concentrations. These two watersheds have higher agricultural use and have somewhat lower forested lands compared to the other subwatershed.

Choptank River Subwatersheds

Effluent subwatershed (WS 93 – Cordova) has been chosen in the upper part of the Choptank. Each varies from 58 – 84% agriculture and 10 – 40% forested. Monthly stream samples are collected under baseflow conditions.

Agricultural Pesticide Usage in Maryland in 2000

<table>
<thead>
<tr>
<th></th>
<th>Herbicides</th>
<th>Insecticides</th>
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<tbody>
<tr>
<td>Corn</td>
<td>8000</td>
<td>6000</td>
</tr>
<tr>
<td>Soybeans</td>
<td>5000</td>
<td>4000</td>
</tr>
</tbody>
</table>

Atrazine and metolachlor are the most commonly used pesticides in Maryland in 2000.

Pesticide Deposition Products in Riparian Well and Stream

- Pesticide concentrations were measured in rain collected outside the riparian area (‘Direct Rain’) and compared to rain collected within the riparian area, i.e., through the concept of a wetted and dry-fall (‘Through Fall Rain’).
- The wet deposition response of corn planting was determined through the method as in corn planting.

Pesticides and Degradation Products in Riparian Well and Stream

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