

## **Agricultural Ammonia Emissions on the Delmarva Peninsula: Transport and Deposition from a Broiler Concentrated Animal Feeding Operation**

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Anthropogenic ammonia emission, especially from animal agriculture (i.e. concentrated animal feeding operations (CAFOs)) has become a major issue on the Delmarva Peninsula. The primary concern is deposition of nitrogen into tributaries that filter into the Chesapeake Bay leading to over enrichment and eutrophication of the ecosystem. In this area, excess nitrogen deposition from ammonia creates large algal blooms that deplete oxygen from the water. This study seeks to analyze ammonia transport and deposition in the vicinity of a broiler-producing CAFO. Employing the EPA-developed air quality dispersion model, AERMOD, the study examines transport and deposition around a representative broiler CAFO in Wicomico County, MD for 2012. On average, the highest ammonia concentrations occur during the summer. However some of the highest ammonia concentrations occur during the winter months within 50 meters of the CAFO housing facility. An overall hourly-maximum ammonia concentration  $5,905 \mu\text{g m}^{-3}$  (7.874 ppm) is calculated in the month of December during the morning hours. It is believed that these high concentrations are due to shallow boundary layer conditions or thermal inversions in the lower troposphere. Deposition is also calculated in the simulation using a deposition velocity for ammonia of  $1.0 \text{ cm s}^{-1}$  for agricultural sites. The simulation finds that total nitrogen deposition from a single CAFO is 15.1 kg  $\text{NH}_3\text{-N}$  per year. There is evidence that a single poultry facility can have a large effect on both the environment and nearby residents. Further model simulations suggest an inclusion of the bi-directional ammonia flux.