

## **Challenges of Modeling the Fate and Transport of Pesticides in a Midwest Watershed**

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**Abstract.** Transport of pesticides in agricultural watersheds has become an increasingly important issue in developing watershed management plans for nonpoint source pollution control. Solutions to this problem have onset a need to credibly model the fate and transport of pesticides. The complexity of modeling pesticides, however, presents numerous challenges including the variability of pesticide application rate and timing, spatial spread of application within the watershed, and sparsity of observed data. In order to methodically approach these challenges, several tools were applied to modeling atrazine transport in Wildcat Creek, a predominantly agricultural watershed located in Central Indiana afflicted with atrazine pollution. Initially, the Soil and Water Assessment Tool (SWAT) was calibrated and corroborated to represent flow processes in the study area. Difficulties in calibration of pesticide components were encountered due to a limited number of daily data and the selection of an acceptable technique for aggregation of sparse daily data to representative monthly values. Information on intra-seasonal planting dates from National Agricultural Statistics Service was used to temporally assign the timing of tillage, nutrient and pesticide application to the cropland in the watershed over a 12-year period. A detailed comparison of observed and simulated pesticide load time series indicated that accurate representation of application dates was imperative. By using a spatially and temporally defined application of pesticides, a more realistic pesticide simulation for the watershed was achieved. This will allow for a more effective planning and placement of management actions in the region to reduce nonpoint source pollution in the form of pesticides.

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