

Modeling of Nitrate Loads and Concentrations in the Raccoon River

Issue: Stream water quality is strongly linked to land use, hydrology and precipitation. Land use in the Raccoon River Watershed is overwhelmingly committed to corn and soybean production. Understanding how climate and weather link to production practices, and how this affects environmental outcomes, is crucial to quantify water quality improvements. Better assessments are needed so policymakers can optimize investment of limited public resources toward improving water quality.

Objective: This project will develop statistical models to describe changes in seasonal concentrations and loads of nitrate in the Raccoon River at Van Meter from 1974 to the present, and how these relate to agricultural production practices.

Approach: Predictors used in the statistical models will be related to climate, agriculture and the economy. For climate, basin-wide seasonally averaged rainfall and basin-wide rainfall for the month prior to the season to model will be used. For agriculture, predictors such as rate, form and timing of nitrogen applications, manure use, tillage practices and corn and soybean acres planted and harvested will be considered. For the economy, seasonal pricing of nitrogen forms and average annual price of corn and soybean for the year prior to the one to model will be used. The development of these models will allow the investigation of the sensitivity of nitrate loads and concentrations to different combinations of predictors.

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