



## WATER RESOURCES RESEARCH GRANT PROPOSAL

**Project ID:** 2004IA64B

**Title:** Hydrologic Modeling of Subsurface Drainage for Predicting Drainage Outflow

**Project Type:** Research

**Focus Categories:** Surface Water

**Keywords:** Subsurface drainage, computer modeling, soil hydraulic properties

**Start Date:** 06/01/2004

**End Date:** 05/31/2005

**Federal Funds:** \$17,000

**Non-Federal Matching Funds:** \$33,506

**Congressional District:** 4th

**Principal Investigator:**

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### Abstract

Movement of water and nutrients through subsurface drainage systems is a concern in many Midwestern agricultural watersheds, including the Des Moines Lobe of Iowa. Although subsurface drainage has its benefits--it improves the productivity of croplands and generally reduces surface water runoff--these systems result in a greater volume of subsurface drainage flow to downstream water bodies, thereby increasing nutrient flow, specifically nitrate-nitrogen, to the same. The increased attention to subsurface drainage systems points to a need to evaluate our ability to model drainage outflow in Iowa. In 1988, a research site in Gilmore City, Iowa was established for studying subsurface drainage from agricultural land. As a result of this study there is a wealth of subsurface flow data to use in calibration and validation of models that simulate subsurface drain flow. The objectives of this investigation are: (1) to evaluate the ability of models to simulate water flow through subsurface drainage systems and (2) to evaluate differences in soil hydraulic properties for the different drainage area plots used for simulation and the impact of varying levels of site-specific soil hydraulic property information on simulated subsurface drainage. The modeling associated with this project will allow for evaluation of drainage systems using a long-term data set (1988-present) in a geographic area of importance (the Des Moines Lobe) in subsurface drainage and nitrate-nitrogen leaching. This research will provide information about factors that need to be considered

in modeling subsurface drainage in Iowa, including sensitivity to soil hydraulic properties. Understanding how models perform in simulating drainage flow in an area with significant subsurface drainage and the impact of varying conditions on drainage, would be useful from a research perspective; it would also be useful to practitioners for estimating the outflow from existing systems, designing drainage-system modifications, and predicting the impact of the modifications.