



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002IL1B

Title: Multi-Objective Decision Support Tools for Protection of Streams in Urbanizing Watersheds

Project Type: Research

Focus Categories: Management and Planning, Non Point Pollution, Water Quality

Keywords: Land Management, Urbanization, Modeling, Decision Support, Optimization

Start Date: 06/01/2001

End Date: 05/31/2003

Federal Funds: \$20,000

Non-Federal Matching Funds: \$52,693

Congressional District: 12

Principal Investigator:

John W. Nicklow

Southern Illinois University

Abstract

The 20th century has witnessed the conversion of a large number of natural and agriculturally dominated watersheds to urban developments. It is clear that such drastic changes in land use stimulate a corresponding cascade of dynamic adjustments in both water quantity and quality at locations further downstream. The Lower Kaskaskia watershed, located in the Metro East area of southwestern Illinois, is an example of a basin that is undergoing extensive land use changes caused by urban development. The use of more comprehensive watershed-scale modeling techniques is needed for assessing the impacts of urbanization in this and other watersheds and for assisting decision makers in the planning of new developments. The objectives of this study are (1) to develop an adaptive, basin-wide decision support model that could be used by land use managers and watershed management institutions to identify optimal land use changes in the Lower Kaskaskia and other similar watersheds, and; (2) investigate stakeholder concerns and reactions regarding formulation and application of the model in order to ensure continuous local support. The model will be based on the integration of distributed, watershed-scale simulations techniques, GIS capabilities, and operations research methods into a single, multi-objective decision support framework. The optimal landscape is expected to be that which is designed to minimize adverse impacts to basin-wide hydrology and water quality, while simultaneously optimizing sustainable economic growth and profit to be earned from urban development. Scheduled meetings with decision makers and citizen organizations will permit the determination of detailed, locally valued parameters that should be included in the model and will allow the effective dissemination of results to these affected groups. Outcomes of this two-year project will include the decision support software package; a historical survey and conceptual model of the relationship between urbanization and the hydrologic and water quality variability in the Lower Kaskaskia basin; results of the decision support model when applied to the Lower Kaskaskia basin, and; a summary and set of conclusions concerning the social science investigation.