



## WATER RESOURCES RESEARCH GRANT PROPOSAL

**Project ID:** 2003KY24B

**Title:** Evaluation of ground water sustainability in the Ohio River alluvial aquifer near Westport, Oldham County, Kentucky

**Project Type:** Research

**Focus Categories:** Groundwater, Water Supply, Models

**Keywords:** flow models, contaminants, management and planning

**Start Date:** 03/01/2003

**End Date:** 02/28/2004

**Federal Funds:** \$13406.00

**Matching Funds:** \$29659.00

**Congressional District:** Kentucky 4th

**Principal Investigators:** Boateng, Samuel

**Abstract:** Numerical simulations will be used to characterize ground water flow trends the Ohio River alluvial aquifer in the vicinity of Westport, in Oldham County, Kentucky. The objective is to evaluate the potential of increasing withdrawal rates in high-yield wells to meet future demands in water supply. Also, the water quality implications of such increases will be analyzed. Emphasis will be placed on the impact of future expansion of residential developments and sewage disposal systems on the migration of contaminants into the aquifer. The study will involve the characterization of the hydrostratigraphic units and hydrologic parameters such as hydraulic conductivity, porosity, recharge and ground water levels. The U.S. Geological Survey computer codes MODFLOW and MODPATH will be used for all the model simulations. MODFLOW will be used to characterize the flow regime with appropriate boundary conditions. Output data from the MODFLOW simulations will be used to simulate the particles of potential contaminants into high-yield water supply wells. The output will include drawdowns, head values, water budgets, and particle pathlines. Increases in withdrawal rates are expected to result in increases in drawdowns. Excessive drawdowns may cause undesirable negative net changes in ground water storage and result in the reduction of yield in shallow low-yield wells. Also, widening of the particle pathlines with increased withdrawal will result in an increase in the contaminant source areas.

This may increase the probability of ground water contamination. It is expected that the results will enhance the County Water Supply Plan and the Well Head Protection Program as stipulated by the Division of Water of the Kentucky Cabinet for Natural Resources and Environmental Protection. Also, the study may help stakeholders such as the Oldham County Water-Supply Advisory Team, the Oldham County Health Department, elected officials and landowners in making decisions related to the expansion of residential developments near Westport, Oldham County, Kentucky.

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