

INTEGRATED SW/GW MODELING PROGRAM

The leading edge in the science of modeling water resources is getting groundwater models (our Illinois Groundwater Model is one of the world's largest) and surface water models to work together. The addition of a groundwater-surface water modeler could position us for profitable research opportunities where we anticipate many new discoveries will be happening in the next few years. This researcher would also be able to collaborate with researchers at the ISGS, specifically those using fiber optic temperature sensors to study processes at groundwater-surface water interfaces.

The Water Survey has a robust modeling program. In groundwater, the modeling team has made great advances, including development of one of the largest models in the world for the deep bedrock aquifers, as well as more local scale models. While groundwater modeling is focused on movement of groundwater and the effects of pumping, surface water modeling focuses on inputs, withdrawals, flooding and low flows.

One area of modeling not currently done to much extent at the Water Survey is integration between surface water and groundwater models. The linkages between these two domains is complex, covering vastly different spatial and temporal scales.

Solving these issues would be very beneficial, allowing us to better understand processes such as changes in groundwater flow gradients resulting from changes in surface water flow, and changes in water quality.

Large-scale monitoring generates unique historical and spatial scientific datasets, to investigate and understand past watershed processes. It represents a finger on the pulse to evaluate long-term trends in water, nutrients, and sediment in watersheds.

This data, not available anywhere else, underpins research in hydrology, water resource management downstream impacts, trends, and transport processes.

Modeling provides information to policymakers, planners, and resource managers so they can develop and implement sustainable watershed programs based on the best scientific analyses possible today.

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**For more information
contact:**

Laura Keefer

Illinois State Hydrologist
Head, Watershed Science
Section

(217) 333-3468

lkeefer@illinois.edu

Walt Kelly

Head, Groundwater
Science Section

(217) 333-3729

wkelly@illinois.edu



Illinois State Water Survey
PRAIRIE RESEARCH INSTITUTE