MODELING GROUNDWATER FLOW AND TRANSIT TIME DISTRIBUTIONS IN THE UPPER MIDDLE LOUP RIVER BASIN, NEBRASKA

DWFI-Supported Student Research

Each year DWFI leverages Robert B. Daugherty Foundation funds and additional donor funds to support graduate and undergraduate student research and creative activity. Funds are matched one-to-one by their DWFI Faculty Fellow advisors. This year we had to cancel our annual research forum, scheduled for April 2, and missed seeing the students present their work in person.

To celebrate the incredible research being done, students have shared a brief summary of their work and its impact. We're excited to share their work with you here. View more research from DWFI's supported students » **http://dwfi.us/Gx3150ze6F5**

Water*for*Food
DAUGHERTY GLOBAL INSTITUTE
at the University of Nebraska

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WHAT?

Groundwater age-dating tracers have been used by many researchers for the investigation of hydrological systems. They can be utilized to estimate groundwater transit time distributions (TTDs) in catchments using standard-lumped aquifer models. TTDs are especially useful tools to assess the non-point source pollution to groundwater wells and rivers. Numerical groundwater flow models and particle tracking simulations can also be used to simulate the TTDs in different field scales.

SO WHAT?

In our research project, groundwater samples were collected from streambeds for age-dating tracer analysis and developing TTDs in the Upper Middle Loup River Basin, Nebraska. A steady-state numerical groundwater flow will also be developed to obtain the groundwater velocity field using finite difference MODFLOW code. Subsequently, particle tracking simulations will be carried out using MODPATH code to model travel paths and travel times within the flow domain.

NOW WHAT?

By the end of this research project we aim to i) evaluate discrepancies between tracer-derived and model-derived TTDs, ii) determine the processes that control the shape of the groundwater TTDs, and iii) investigate how these processes may be better understood by using field measurements and numerical models in nested watersheds at a range of scales.