Undergraduate Internship Project #10 of 10 for FY07

Intern Marie River’s project, co-sponsored by the DWRC and the Delaware Geological Survey, was titled “Hydraulic Properties and Ground Water Flow Modeling of the Unconfined Aquifer in Southern New Castle County.” She was advised by Mr. A. Scott Andres of the Delaware Geological Survey.

Abstract

Ground water is a valuable resource with properties that cannot be directly observed. Through monitoring wells, the quantity and movement of groundwater can be studied and modeled. In particular, slug tests can be used to determine hydraulic conductivity (K) and the rate that groundwater moves in an aquifer. In the field this is achieved by instantaneously adding or removing a volume of water from a monitoring well. For this study, the unconfined aquifer in southern New Castle County, Delaware was chosen. Data were analyzed with the Bouwer and Rice equations by using an Excel spreadsheet and the AquiferTest Pro program by Waterloo Hydrogeologic, Inc.

Hydraulic conductivity is a key factor in determining the amount of water that can flow through or infiltrate into an aquifer. Having site specific K values is important when designing a land-based wastewater disposal system. The study area includes the site of a future Rapid Infiltration Basin (RIBS) that will be designed to serve a new residential development. Slug test-determined K values were used in the Khan and Hantush equations to model mound height and flow rates associated with disposal of wastewater.