

**Groundwater Vulnerability to Agrochemicals:  
A GIS-Based DRASTIC Model Analysis of  
Carroll, Chariton, and Saline Counties, Missouri, USA**

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**ABSTRACT**

This investigation presents an analysis of groundwater vulnerability in three mid-Missouri counties that represent an agricultural production region that is physiographically and hydrogeologically complex. The goals of this study are to (1) provide a spatial analysis of the elements and conditions under which groundwater of the study area may become contaminated, and (2) develop a model and decision support process for identifying particular portions of these counties that are vulnerable to agrochemical applications. Geospatial analysis via a GIS is based on seven hydrogeological elements that are incorporated into the DRASTIC model, a groundwater pollution potential evaluation system. Statistical data grouping is differentiated into three categorical index ranges. Resulting distribution of data indicates high vulnerability exists for over 32 percent of the study area. Moderately vulnerable areas comprise nearly 39 percent of the area, and the least vulnerable areas make up the remaining 29 percent of the total area. A GIS-based groundwater vulnerability map generated by this process provides a decision support mechanism for landowners, agricultural producers, and state and local agencies engaged in investigating the relationship between hydrogeologic-anthropogenic system elements and protective ecosystem planning and management efforts.