



Title: Tools for Prioritizing Ground Water Protection in Colorado

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Theme: Nutrient and Pesticide Management

Situation: Nonpoint source pollutants (NPS) are the leading threat to water resources in Colorado, especially ground water. The challenge for decision makers is to decide where outreach, demonstration, cost share, and monitoring resources will have the largest impact on mitigating existing and preventing future NPS from agricultural chemicals and animal nutrients. Prevention strategies require scarce public resources and decision makers need tools to prioritize where to use these limited resources.

Objectives: Develop statewide ground water vulnerability/sensitivity maps to pesticide and nitrate contamination that will aid decisions makers in prioritizing limited protection resources in areas with the greatest potential for contamination. Develop field specific nitrate leaching and phosphorus runoff indices that will direct growers and their advisors in delineating fields with higher risks for nutrient loss.

Methods: Various spatial data sets were gathered that influence contaminant transport to ground water. These included aquifer location, depth to ground water, soil characteristics, land use, hydrogeomorphic region, recharge (irrigation), and pesticide and fertilizer use. Geographic information systems (GIS) were used to integrate spatial layers using mechanistic, index, or statistical models depending upon the project and data available. Colorado has produced pesticide, atrazine, and nitrate vulnerability/sensitivity maps.

Partnerships: Partnerships with the U.S. Geological Survey (USGS), USDA-NRCS, Colorado School of Mines, and Colorado Departments of Agriculture and Public Health and the Environment were necessary to accomplish the scope of this work.

Research: Researchers from Colorado State University, Colorado School of Mines, and USGS cooperated to produce the maps. Graduate students were heavily involved in this effort, contributing to their education. Outreach thus far has consisted of fact sheets, public presentations, and bulletins. A more extensive plan for presenting the maps over the internet along with other factors that influence ground water quality/vulnerability has been developed and will be implemented if funding can be procured.

Resources: Resources from multiple agencies were utilized to develop these products. The cooperation of two Universities, two federal, and two state government agencies allowed for sharing of data sets, resources, and particularly expertise to successfully develop the products.

Results: In an attempt to better understand the vulnerability of Colorado ground water to contamination, several maps and vulnerability indices were produced. These outputs include statewide maps for pesticide sensitivity, nitrate vulnerability, and atrazine and nitrate probability. The outcome of this work includes a better understanding of the possibility of ground water contamination. Our ultimate goal is to make the outputs more accessible to farmers, consultants, and agency personnel.



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