



USDA-CSREES 2007 National Water Quality Conference

Targeting Watershed Vulnerability and Behaviors Leading to Adoption of Conservation Management Practices

Watershed vulnerability is determined by physical setting (e.g., soils, topography and climate) and land management practices. The most vulnerable areas must be identified so fields can be targeted for conservation management practices that will prevent or mitigate contamination. The USDA-NRCS SSURGO data sets, with scales of 1:12,000 to 1:63,360, provide information for exploring regional processes and relationships and reflect what one might expect to find at a field scale. Building on an understanding of landscape processes and pesticide chemistry, we are using SSURGO and the USGS/USEPA National Hydrography Datasets (NHD), and pesticide property data as model inputs to assess landscape vulnerability to pesticide leaching and solution and adsorbed runoff. The resulting risk assessment models allow conservation practice targeting at a spatial scale that will have significant benefits to those tasked with implementing total maximum daily load (TMDL) recommendations. The aims of our National Integrated Water Quality Program project are to use these models to determine the most vulnerable areas within impaired watersheds in Nebraska/Kansas, Missouri, and Iowa, validate and further improve the models. A behavioral assessment model will be used in selected areas upstream of Tuttle Creek, Kansas to predict the probability that producers will adopt the technologies and practices associated with the TMDL recommendations, as well as the extent of adoption. A survey tool will be used to determine the practices, motivations and behaviors of producers in vulnerable areas, a statistical model will be built that can be used to predict their responsiveness to change, and decision typologies will be mapped. The information gained will be used to design educational programs. A software module will be developed that can be used by educators, consultants, and agency personnel, with ESRI, ArcView and Spatial Analyst 9.x to process the SSURGO and NHD input data, allow user selection of whole system modifications (such as herbicide selection), run the models, and display the model output. Using ESRI, ArcPublisher 9.x, the output could be exported for viewing with ESRI, free ArcReader 9.x. The feasibility of the overall project and approach have been demonstrated in preliminary work. The need to better forecast environmental risks and guide conservation management decisions to protect water quality, along with the increasing availability of SSURGO data, provide the rationale for the project.

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