Applying knowledge to improve water quality
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Using SWAT to Evaluate Six Non-Point Source Pollution Watershed Projects

For the last 20 years, Missouri has used a renewable sales tax to fund watershed-based conservation programs aimed at reducing non-point source (NPS) pollution from agricultural areas. These resources provide incentives toward the implementation of best management practices (BMPs) within a watershed. To assist with determining the effectiveness of the program for conservation, six watersheds representing rain fed cropland, irrigated cropland, and grazed pasture agricultural systems were selected to assess if the practices protected water quality and reduced NPS pollution. In this analysis, the six projects were evaluated with the Soil and Water Assessment Tool (SWAT2003). SWAT is a physically-based, continuous simulation, watershed-scale model developed to predict the impact of land use and land management practices on water quantity and quality. Models were developed and calibrated for each watershed and nutrient, sediment, and pesticide loadings to streams and at the outlet of the watersheds were estimated for baseline conditions that represent the typical agricultural practices and based on 30-year long simulations. The conservation BMPs to be implemented during the projects were simulated by adjusting the SWAT parameters that affect the hydrologic and water quality processes modified by the implementation of these BMPs. Loadings expected from the projects were compared to baseline loadings. Overall reductions were also compared to the spatial and annual variability of the loadings. In addition to the expected water quality impacts of these projects, some limitations of the evaluation process were identified and suggestions are provided that can improve the evaluation of watershed management projects.

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