

ASSESSING IMPACTS AND TARGETING OF AGRICULTURAL CONSERVATION PRACTICES

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ABSTRACT

The U.S. Department of Agriculture initiated the Conservation Effects Assessment Project in 2003 to quantify water quality and wildlife benefits of conservation programs funded by the 2002 Farm Security and Rural Investment Act. This study examined the effects of agricultural best management practices (BMPs) implemented in the Goodwater Creek Experimental Watershed (GCEW) and investigated strategies to target future BMPs.

Evaluation of storm events between 1993 and 2006 showed no significant BMP effects on dissolved atrazine and $\text{NO}_3\text{-N}$ losses after 14% of the GCEW had been affected by BMP establishment. Approximately 20 and 4 years of monitoring will be needed before a statistically significant ($\alpha=0.05$) 25% reduction in mean dissolved atrazine and nitrate-N can be demonstrated at the GCEW outlet, respectively. A widely used hydrologic model, SWAT, identified fields adjacent to streams with lesser depths to the argillic horizon as the highest risk for atrazine and $\text{NO}_3\text{-N}$ pollutant loss. Twenty two percent and 34% of cropped fields in the GCEW required establishment of vegetative filter strips to reduce dissolved atrazine and $\text{NO}_3\text{-N}$ loads by 25% at the GCEW based on SWAT predictions.

A 99% accurate method to quantify soil redoximorphic features (SRFs) was developed using a digital camera and image classification software. Correlation between quantified SRFs and the topographic wetness index was found for one of two GCEW fields, indicating field soil surveys may serve as relatively quick reconnaissance methods to identify sensitive field areas.