AnnAGNPS Model Application for the Future Midwest Landscape Study

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Abstract:

The Future Midwest Landscape (FML) project is part of the US Environmental Protection Agency (EPA)'s new Ecosystem Services Research Program, undertaken to examine the variety of ways in which landscapes that include crop lands, conservation areas, wetlands, lakes, and streams affect human well-being. The goal of the FML project is to quantify current and future ecosystem services across the region and to examine changes expected to occur as a result of the growing demand for biofuels. This study is one of several pilots taking place under the umbrella of the FML research project. In this study, the USDA Annualized Agricultural Non-Point Source Pollution (AnnAGNPS) model was applied on a 28,709-ha. drainage area located in Illinois within the Upper Mississippi River Basin. The AnnAGNPS model has been developed to quantify watershed response to agricultural management practices. Model evaluation including model sensitivity studies and validation, and model performance on different spatial resolutions were achieved by comparing the observed runoff and sediment with the AnnAGNPS simulated results. After model validation, the model was used to simulate runoff and sediment responses for a set of alternative future landscapes. This study provides an important foundation for the larger FML region modeling effort and helps to address challenging questions such as model selection, spatial resolution, and modeling scale. The approach taken in this study also provides a potential method for evaluation of ungauged watersheds or watersheds with limited field observations for conservation program planning or evaluation.

Keywords: Future Midwest Landscape study; AnnAGNPS; watershed modeling; runoff and sediment simulation; impact of landscape changes; assessment