# The spatially-distributed AgroEcoSystem-Watershed (AgES-W) hydrologic/water quality (H/WQ) model for assessment of conservation effects

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**Abstract.** AgroEcoSystem-Watershed (AgES-W) is a modular, Java-based spatially distributed model which implements hydrologic/water quality (H/WQ) simulation components under the Object Modeling System (OMS3) environmental modeling framework. AgES-W has recently been enhanced with the addition of nitrogen (N) and sediment modeling components refactored from various agroecosystem models including SWAT, WEPP, and RZWQM2. The specific objectives of this presentation are to: 1) present an overview of major AgES-W processes, simulation components, and input/output file structure; 2) evaluate the accuracy and applicability of the enhanced AgES-W model for estimation (using a newly developed autocalibration tool) of streamflow and N/sediment loading for the Upper Cedar Creek Watershed (UCCW) in northern Indiana, USA; and 3) discuss the efficacy of AgES-W for assessing spatially targeted agricultural conservation effects on water quantity and quality for the South Fork Watershed (SFW) in central Iowa, USA. AgES-W model performance was assessed using Nash-Sutcliffe model efficiency ($E_{NS}$) and percent bias (PBIAS) model evaluation criteria. Comparisons of simulated and observed daily and average monthly streamflow/N loading and monthly sediment load for different simulation periods resulted in $E_{NS}$ and PBIAS values that were within the range of those reported in the literature for other H/WQ models at a similar scale and time step. Considering that AgES-W was applied with minimal calibration, study results indicate that the model reasonably reproduced the hydrological, N, and sediment dynamics of the target watersheds and should serve as a foundation upon which to better quantify additional water quality indicators (e.g., phosphorus dynamics) at the watershed scale.