

GSSHA Watershed Modeling for the Eau Galle River Basin, WI

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ABSTRACT: The Eau Galle River watershed drains approximately 250 sq. miles of rolling agricultural and wooded areas. Many of the tributaries originate in steep coulees. As is the case with many rivers and lakes within Wisconsin, urban development and changes in land-use have the potential to significantly impact environmental quality, particularly water quality in the Eau Galle River, Spring Valley Reservoir and Eau Galle Reservoir.

A gridded hydrologic model of the Eau Galle River was developed within the Watershed Modeling System (WMS). The individual cells within the gridded model were populated with physical relationships derived from the available GIS layers including USGS 30-meter NED gridded digital elevation data, NRCS SSURGO soils data, land use/land cover data and digital aerial imagery. The Eau Galle WMS grid was developed at a 100-meter grid resolution. This resolution facilitates the targeting of BMPs that will be applied to certain landuses for future model applications.

The GSSHA model was used to simulate hypothetical rainfall events. New reservoir enhancements to the GSSHA model enabled critical reservoirs and lake features to be calibrated to historic surface water records. The Eau Galle GSSHA model facilitates the analysis of various land use treatments as they relate to surface runoff. Issues such as slopes and soil types can be linked to land uses and various magnitudes and durations of rainfall can be analyzed to assess land use impacts on runoff. Outputs of the model can be used as input to water quality models, which allows for evaluation of the impacts of changed land-use/land cover on water quality. The WMS model provides both qualitative and quantitative analyses that can be used to determine best management practices within the Eau Galle River watershed.