**AN ABSTRACT OF A THESIS**

# LINKAGE, ANALYSIS, AND APPLICATION OF THE HSPF MODEL WITH THE AGNPS MODEL USING GEOGRAPHIC INFORMATION SYSTEMS

**Yvette R. Clark**

**Master of Science in Civil Engineering**

The project focused on using the simulation results of a single event surface runoff model executed for multiple rain events to generate time series input for an instream model. The time series instream model simulation results were displayed using an index method for decision makers to assess the environmental impacts due to changing land use.

The single event Agricultural Nonpoint Source Pollution Model (AGNPS) was used to simulate overland flow for a pilot study watershed located in south central Tennessee. The simulated output from the overland flow model was used to generate the time series data sets of environmental parameters required as inputs to the instream simulation model Hydrological Simulation Program Fortran (HSPF).

The single event overland flow AGNPS model was executed for multiple precipitation events to produce time series input for the HSPF model that simulated instream processes. The segmented river reach length ($\Delta x$) for the instream modeling affected the predicted total suspended solids (TSS) values and it was determined that the $\Delta x$ should be set between 4 km and 10 km to represent the variability of land use related to the spatial topography and physical characteristics within the watersheds. The single event and time series simulations both predicted relative improvements and degradations in overall watershed health based on the effects of land use modifications.

A graphical user interface was developed with a combination of ArcView® Avenue™ scripting, Arc/INFO® Arc Macro Language (AML™), and PERL programs that allowed data automation for input to the AGNPS and HSPF model for simulation of alternate land use practices in the watershed. The user interface allowed users of varied technical backgrounds to evaluate the effects land use modifications on overall watershed health.