AGNPS Runoff Model: Geospatial Applications and Predictions in the Upper Pearl River Basin. M.L. Tagert[1], D.R. Shaw[1], J.H. Massey[2], R.L. Bingner[3], and M.C. Smith[2]. [1]GeoResources Institute, Mississippi State University, Mississippi State, MS 39762; [2]Department of Plant and Soil Sciences, Mississippi State University, Mississippi State, MS 39762; [3]USDA-ARS National Sedimentation Laboratory, Oxford, MS 38655.

The Upper Pearl River Basin (UPRB) drains into the Ross Barnett Reservoir, which is the largest of Mississippi's three surface drinking water sources and supplies approximately 90% of the City of Jackson's drinking water. Thus, the UPRB is an area of particular interest with respect to water quality and the establishment of Total Maximum Daily Loads (TMDLs). The USDA Agricultural Nonpoint Source (AGNPS) runoff pollution model, in combination with geographical information systems and remote sensing, is being used to predict water, sediment, and pesticide nonpoint source runoff in the UPRB. GIS software was used to process a digital soils layer, digital elevation models (DEM), digital land cover from Landsat satellite imagery, and other inputs to the AGNPS model. The digital soils information was obtained from the USDA-NRCS State Soil Geographic Database (STATSGO) at a scale of 1:250,000, and the DEMs are from the USGS National Elevation Dataset (NED). The TopAGNPS module of AGNPS, using the DEM as the main input, performed a topographic evaluation of the watershed as well as drainage area identification, synthetic channel networks, watershed segmentation, and subcatchment parameters. AGNPS model predictions for sediment and pesticide runoff in a Mississippi watershed are being compared to water and sediment samples taken at seven USGS-gauged locations within the watershed. Samples were collected weekly from May-August 2002 and monthly thereafter through May 2003. The samples were analyzed for fifteen different pesticides using a multi-residue method. Fluometuron and diuron were analyzed by high performance liquid chromatography – ultraviolet (HPLC-UV), while tebuthiuron, simazine, atrazine, cyanazine, metribuzin, alachlor, metolachlor, pendimethalin, p,p'-DDE, norflurazon, and hexazinone were analyzed by gas chromatography – mass spectrometry (GCMS). Triclopyr and 2,4-D were derivatized and then analyzed by GCMS. Metolachlor was detected in 47 out of 77 samples, followed by tebuthiuron with 45 detections and atrazine with 35 detections. Hexazinone was also frequently detected. The highest concentrations detected were 1.05 ppb for 2,4-D, followed by 0.67 ppb for triclopyr and 0.62 ppb for diuron. The detected concentrations were all below current lifetime health advisory levels (HAL) established by the EPA for each compound. The pesticide concentration and water flow measurements are being used to estimate pesticide loads as a function of land use in the UPRB. In turn, these results are being compared with pesticide loads predicted by AGNPS based on remotely sensed land use patterns.

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Poster
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