

Hydrologic impacts of urban-growth: Modeling direct runoff using L-THIA/GIS for Enoree
River Watershed, South Carolina

Neil Gandy¹, and Suresh Muthukrishnan²

¹Environmental Studies, University of North Carolina, Asheville, NC – 28801

²Earth and Environmental Sciences, Furman University, Greenville, SC 29613

This study presents results of runoff and water quality modeling done in the Enoree river basin, which encompasses rapidly growing Greenville-Spartanburg in South Carolina. Landuse classification required for hydrologic model was carried out using Landsat ETM+ data. The simple, easy to use, and GIS based Long-Term Hydrologic Impact Assessment Model, L-THIA/GIS, was used to predict direct runoff and water quality variables. Relative comparisons were made between developed and undeveloped sub-watersheds. Runoff predictions are compared to estimates of runoff derived from USGS stream gage data. A landuse change scenario was also studied using future land use conditions derived from zoning. Water quality predictions made by L-THIA/GIS model were compared to actual water quality data collected by Furman University over the last few years. Results capture the impacts of changes in landuse on the direct runoff and water quality, and prove the value of L-THIA/GIS as an assessment tool for decision making. Research was carried out as part of River Basins Research Initiative at Furman University during the summer of 2003 and continued by the student.

Key words: L-THIA analysis, direct runoff, landuse study, hydrologic modeling, urban sprawl