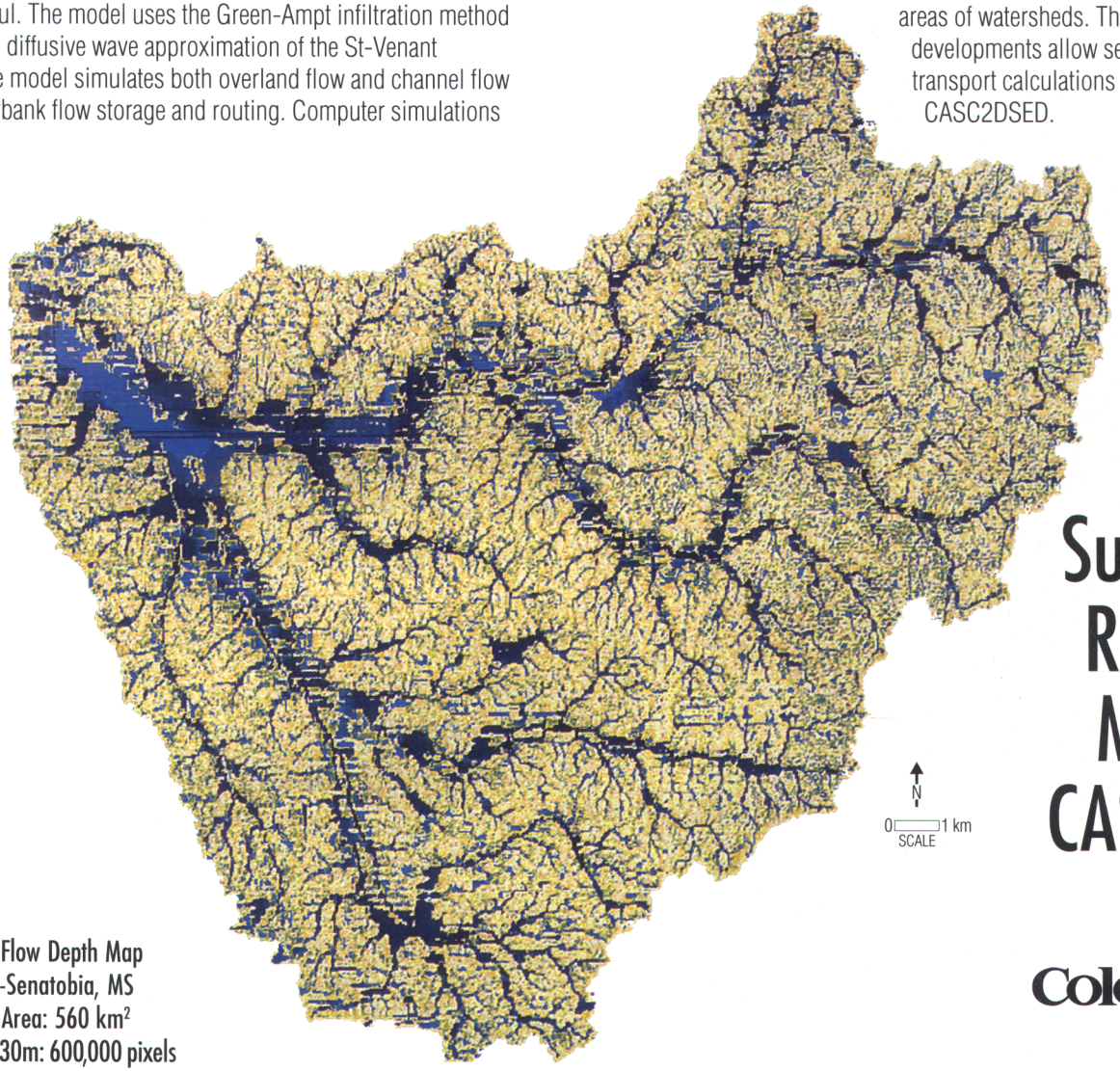
Numerical Modeling Capabilities

The two-dimensional surface runoff model CASC2D has been developed at CSU for the physically-based simulation of surface runoff on large watersheds. The model simulates spatially-varied surface runoff while fully utilizing raster GIS data on topography, soil type and land use. Rainfall data is provided from either a raingage network or from radar-rainfall data. Complete applications with NEXRAD data and the CSU-CHILL dual-Doppler polarized radar have been successful. The model uses the Green-Ampt infiltration method and solves the diffusive wave approximation of the St-Venant equations. The model simulates both overland flow and channel flow including overbank flow storage and routing. Computer simulations with 600,000 pixels at time increments of one second have been completed. CASC2D offers unique color capabilities to display the spatio-temporal variability of rainfall, cumulative infiltrated depth and surface water runoff as thunderstorms unfold onto watersheds. The model has been independently verified to provide accurate simulations of the magnitude and timing of peak discharge from complex thunderstorms moving across partial areas of watersheds. The recent developments allow sediment transport calculations with the model CASC2DSED.



Watershed Flow Depth Map
Hickahala-Senatobia, MS
Drainage Area: 560 km^2
Resolution 30x30m: 600,000 pixels

The Surface Runoff Model CASC2D

Colorado State University