

## **Development of the Flash Flood Potential Index (FFPI) for Central NY & Northeast PA**

**Jim Brewster  
NWS Binghamton, NY**

Flooding continually ranks as one of the top hazardous weather events in the United States each year. Since 1993, the NWS Binghamton county warning forecast area (CWFA) has experienced over 1000 flood/flash flood events, making this region one of the most prone areas for flooding. The hydrologic forecast area of central NY and northeast PA encompasses the fast responding headwater tributaries of the major Delaware, Susquehanna and Finger Lakes river basins and numerous small stream watersheds.

NWS Binghamton forecasters have always understood, in an empirical sense, that the region is at a higher risk for flood danger, due in part to the varied geophysical characteristics of the northern Appalachians, including areas of steep terrain and variable land coverage and use. The question not easily answered is where specifically in the CWFA is there a higher or lower risk for flash flooding. Assessing the answer to that question has always been cumbersome and inefficient during times of critical forecast operations, where forecasters often needed to sift through combinations of paper maps and other reference material in order to obtain a feel for the geography characteristics of a basin.

The goal for developing the Flash Flood Potential Index (FFPI) (Smith, 2003) at NWS Binghamton was to quantitatively identify our highest and lowest flood threat areas, and also to streamline the forecast and warning process by providing a visual reference of flood potential across our small stream basins. The FFPI utilizes GIS technology to mathematically merge four key data sets related to hydrologic response into a single, easy to visualize index map of our small stream basins. The raster grids analyzed for this project were 1) terrain slope from the Digital Elevation Model (DEM), 2) State Soil Geographic (STATSGO) soil type grid, 3) Advanced Very High Resolution Radiometer (AVHRR) density of the forest canopy grid, and 4) Multi-Resolution Land Characterization (MRLC) land use/land cover grid. These data sets were re-sampled and reclassified into common, unit-less files for calculation of the FFPI. The raw FFPI output is a 90 meter resolution grid that can be used as a stand alone reference to assess hydrologic response on a highly localized scale within a basin or urban area. For forecast and warning operations at a NWS forecast office a more appropriate averaging of the index values over each small stream basin was created.