A Discussion on the Utility of the High Resolution Flash Flood Potential Index for Customers and Partners

Jim Brewster
NWS Binghamton, NY

The geophysical makeup of central New York and northeast Pennsylvania region is rather diverse, with characteristics ranging from forested rolling hills and mountain plateaus to deep urban valleys and a flat plain. These features suggest that most of the hydrologic basins in the region can respond quickly during heavy rain events, and historically, it has been demonstrated that our small streams and rivers are very prone to flooding.

The Flash Flood Potential Index (FFPI) was theorized, and developed by hydrologist Greg Smith (2003) of the Colorado Basin River Forecast Center as a method to identify and rank the most flash flood prone small basin watersheds in the western United States. The goal of the FFPI is to provide a visual reference tool in support of flash flood operations at NWS Weather Forecast Offices (WFOs). The FFPI grid is also expected to be incorporated as baseline input into flash flood guidance products produced by the River Forecast Centers.

The FFPI is created via GIS software by mathematically merging four key geophysical data sets that directly relate to hydrologic responses of small stream basins. The GIS 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) forest density grid, and 4) the Multi-Resolution Land Characterization (MRLC) land use/land cover grid. These data sets were re-sampled and reclassified into common, unit less grids for calculation of the FFPI. The raw FFPI output is a 90 meter resolution grid which is then averaged over each of the flash flood sub basins in a hydrologic forecast area for use in flash flood warning operations at a WFO.

In 2008, the FFPI was developed locally for the Binghamton WFO area of responsibility. This presentation will outline suggestions on how the full resolution (90m) FFPI could be used by other government agencies, and private partners to identify specific locations that may be geographically sensitive to flash flooding and /or debris flow problems within their areas of concern. It may also be possible to use the grid within hydrologic modeling schemes.