

Developing a Real-Time Flood Inundation Mapping Tool for Harris County, Houston, TX

By Abebe S. Gebregiorgis¹, Todd Ward¹, Ataul Hannan¹, Mark Carter², Bruce Broussard²

¹Harris County Flood Control District, Planning Division, Houston, TX

²Harris County Flood Control District, Support Service Division, Houston, TX

Abstract

We developed a Real-Time Flood Inundation Mapping Tool (FIMT-RT) that can generate instantaneous inundation map using real-time water surface gage data. The tool is specifically designed to fit the dense gage and water level monitoring network of Harris County Flood Control District (HCFCD). The tool is capable of retrieving the real-time observation data for 156 gages directly from Harris County flood warning system (fws, (<https://www.harriscountyfws.org>), process the gage data, compute the water surface elevation (WSEL) at various cross-sections along the streams and map the extent and depth of riverine flooding along the gage channels and display the inundation map on fws website on near-real-time basis. The method involves estimation of annual exceedance probability (AEP) of the observed WSEL from HEC-RAS profiles at known gage locations using linear interpolation and logarithmic best fit. The estimated AEPs are also interpolated with the same technique at several cross-sections along the channel and then converted to WSEL of the event. Finally, the WSEL of the event that are known at several cross-sections are mapped into inundation raster. The time required to generate the output raster varies from 10 – 20 minutes after the gage readings are taken. The model was validated for several historical events and performed very well. It was also tested during the historical Harvey event in August 2017. Currently, this product is hosted on fws website for public use.