

SOUTH CAROLINA DIGITAL FLOOD INUNDATION MAPPING PILOT INVESTIGATION

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ABSTRACT. Extended abstract

Floods are the leading cause of natural-disaster losses in the United States. Although loss of life due to floods during the past half-century has declined (in part because of improved warning systems), economic losses have continued to rise with increased development in flood-hazard areas throughout the Nation. In 2011, the Federal Emergency Management Agency had 60 declared Federal disasters that were related to floods (<http://www.fema.gov/news/disasters.fema> accessed July 10, 2012).

Digital geospatial flood inundation maps provide a powerful tool for flood response and mitigation. Flood inundation maps that are tied to U. S. Geological Survey (USGS) real-time streamgage data, National Weather Service (NWS) River Forecast Points (RFPs), and the most recent land-surface elevation data enable officials to make timely operational and public safety decisions during floods. These inundation libraries provide critical information on the spatial extent and depth of flood waters in the vicinity of the river forecast points for river levels ranging from minor flooding through the largest observed flood on record. These libraries also are a mechanism to help the homeowner understand what the gage readings mean relative to his front door step. Combined with near-real time and historic river data from USGS streamgages and NWS flood forecasts, these maps enhance the communication of flood risk and provide emergency management agencies and the general public with easy-to-understand information to help them better mitigate the impacts of flooding and assist city and county planners in building more resilient communities.

The USGS, in cooperation with the South Carolina Silver Jackets (SCSJ), is conducting a pilot study to develop a static map library for an approximately 3 ¾-mile reach of the Saluda River near Greenville, SC. (The SCSJ is a voluntary natural hazard mitigation inter-agency team comprises Federal, State, regional, university, and private

entities committed to actively protecting lives, property, and infrastructure in South Carolina.) The reach includes USGS gaging station 02162500, Saluda River near Greenville, SC and a NWS RFP. By using the most recent science and information technologies, this project will produce a flood library that can be viewed interactively through the NWS' Advanced Hydrologic Prediction Service Web pages or the USGS Flood Inundation Mapping portal. Supporting data also will be made available for download in a geographic information system (GIS) file format for use in other flood mitigation GIS tools. The flood-map library will consist of a set of flood extent and water-depth maps corresponding to selected water-level (stage) intervals (for example, one map for each one foot increase in stage). Users will be able to view each map in reference to community features such as streets and structures as well as download each map. Because the forecast/observation point is collocated at a USGS streamgage, the libraries will be tied to historic and real-time USGS flood-level data as well as to NWS flood-forecast levels.

The presentation will provide an overview of the four phases of the study:

Phase 1: Development of an inventory of available resources for flood inundation mapping. These resources will include (but are not limited to): USGS streamgages collocated with NWS RFPs, stream reaches that include the USGS and NWS sites and also have Federal Emergency Management Agency (FEMA)-approved models from completed Flood Insurance Studies, and Light Detection and Ranging (LiDAR) data availability.

Phase 2: Evaluation of the prediction capabilities of the FEMA-approved models.

Phase 3: Selection of a study reach, data collection, model development, calibration, and validation.

Phase 4: Generation of a static map library for the NWS forecast point.

Phase 5: Publication of the static map library operational on the NWS web page or the USGS Flood Inundation Mapping portal and publication of a USGS Report to document the investigation.

The presentation also will describe challenges encountered and provide suggestions to facilitate completion of similar studies.