

The Susquehanna & San Antonio River

Good Practices Forum

"Risk and hydrological extreme events: Early warning and resilience capacity to floods."

First Series, 2007

Inter-American Network for Disaster Mitigation RIMD

The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) assisted the Philadelphia District to develop a Flood Warning and Response System (FWRS) for Susquehanna River, PA. Additionally, HEC worked with the Fort Worth District to apply a revised version of the FWRS to the San Antonio River, TX and Cibilo Creek, TX river system.

The objective of the FWRS is to provide accurate and timely warnings in order to maximize response time for floodplain residents and emergency managers while also creating a flood plain management and planning tool for the region. The FWRS incorporates aerial photography, terrain elevation data, channel geometry, demographic and structural data, and transportation systems with a hydraulic model to create an automated and interactive flood inundation mapping application using Geographic Information Systems technology.

Hydraulic models created in HEC-RAS were used to develop an atlas of inundation maps to query using a customized interface in ArcGIS. Multiple discharge profiles for flooding events were established and mapped on the elevation model. The functionality of the FWRS is based on river stages at stream gages located along the river system. A known or predicted stage at one or more of the gage locations is used to display the appropriate flood inundation depth grid. The impact to infrastructure may then be determined using the flood extent and underlying base data, while estimated damages to structures and contents may be computed from the flood depths. The flood inundation mapping, in conjunction with the variety of base data that can be displayed concurrently, allows managers to identify potentially hazardous areas and prepare and execute flood response measures to mitigate the loss of life and structural damages.

Timely estimates of the severity of flooding will better equip emergency management officials to identify those at risk and plan for evacuations accordingly. It will also allow affected property owners the opportunity to minimize potential damages. In addition, preliminary damage estimates may be furnished to FEMA in advance or during a high water event so that disaster relief may be expedited.