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Storm Surge Maps

Saving More Lives During Hurricane Season

BY JoAnne Castagna
U.S. ARMY CORPS OF ENGINEERS

Hurricane Sandy led to one of the largest-scale U.S. evacuations in recent history, according to Edward Schneyer, director of Emergency Preparedness, Suffolk County (N.Y.) Office of Emergency Management.

“During Sandy, we rescued 250 people from their flooded homes, evacuated two major hospitals and several adult care homes,” Schneyer said.

Schneyer was able to do this effectively because his agency uses storm surge maps created by the U.S. Army Corps of Engineers, New York District. Storm surge is when a significant amount of water is pushed from the sea onto the land caused by a hurricane.

The maps provide emergency managers in hurricane-prone states with an understanding of storm surge potential that could occur for worst-case Category 1 to 4 storms, identifying areas from which people should evacuate if faced with the threat of storm surge.

The Army Corps is updating these maps with higher resolution modeling and topography performed by NOAA’s National Hurricane Center’s Storm Surge Unit, so agencies will have more accurate information to educate the public — reducing risk to themselves and their property.

HAZARD ANALYSIS

“Historically, 49 percent of human casualties from hurricanes are due to storm surge,” said Donald E. Cresitello, the Corps’ Hurricane Evacuation Study

program manager for the New York District. “Other impacts like riverine flooding due to rainfall, falling trees due to high winds, and indirect impacts like carbon monoxide poisoning and electrocution can cause deaths. The development of these maps is the first step in the hazard analysis for the hurricane evacuation study process.”

The “New York Hurricane Evacuation Study Hurricane Surge Inundation Maps” are being produced in collaboration with the Army Corps’ New England and Baltimore Districts and provided to emergency managers. The Army Corps also guides emergency managers on using the maps in the decision-making software HURREVAC (Hurricane Evacuation), developed by Sea Island Software for the National Hurricane Program.

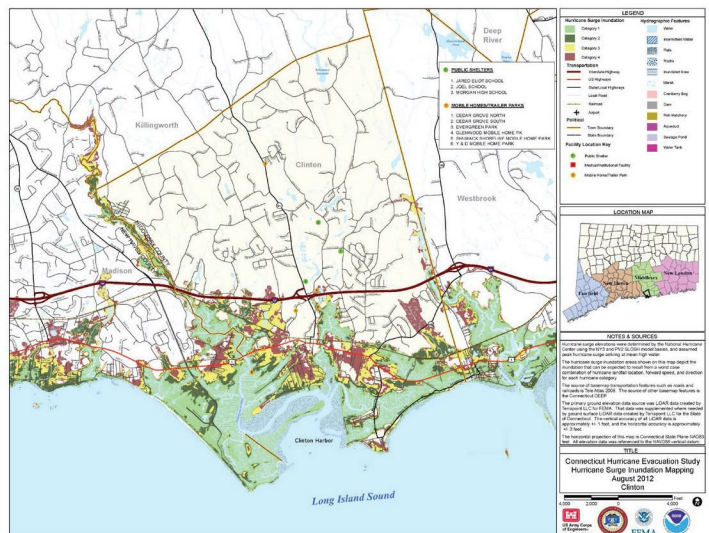
“Agency officials can use these maps

USING GIS TO CREATE HIGHER RESOLUTION MAPS

Geographic information systems (GIS), which capture, store, analyze and display location information, are being used to create higher resolution storm surge maps.

To create the maps, the Corps of Engineers uses the SLOSH model (Sea, Lake, Overland Surges from Hurricanes) provided by the National Oceanic and Atmospheric Administration (NOAA). The SLOSH data is layered over lidar-based topography in Esri ArcGIS software.

“To come up with the actual depth of water through GIS, we are overlaying the data out of NOAA’s SLOSH model and subtracting out the ground elevations using digital elevation models and coming up with an actual depth of water in feet,” said Donald E. Cresitello, USACE Hurricane Evacuation Study program manager for the State of New York, U.S. Army Corps of Engineers, New York District.



CONNECTICUT SHORELINE: This example of a storm surge map shows the extent of surge that can be expected as a result of a worst-case scenario that combines hurricane landfall location, forward speed and direction for each hurricane category. (Credit: USACE)

MAPPING 



STORM SURGE in downtown New York City in the aftermath of Hurricane Sandy. (Photo: USACE)


to help reduce risk to the public,” Cresitello said. “They can use them for evacuation planning, to redefine their hurricane evacuation zones, identify where shelters should be located and identify where assets should be staged

prior to impact from a storm.”

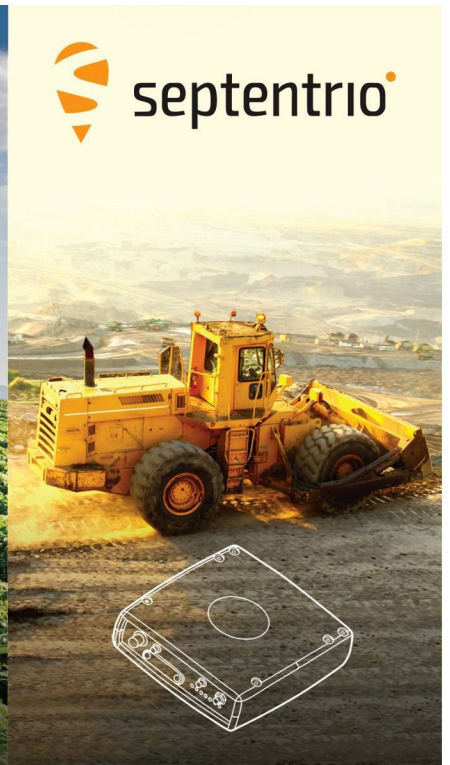
The new maps will not only show the extent of inland storm surge, but also the depth of the water — in ranges of feet — during different categories of storms, enabling emergency managers to better focus limited resources.

“In the initial stages of a response, our recovery resources are limited, especially for an event the size of Sandy. If resources are dispatched to areas that were not impacted, valuable time is lost mobilizing and reassigning those resources,” Schneyer said.

At press time, Schneyer’s agency is entering information from the maps into an interactive program viewable on its county’s website, so the public can see whether their home is in a storm surge zone and which designated shelter is nearby. During Sandy, people who should have evacuated were stranded and faced dangers such as electrocution from downed power lines and fires from gas leaks.

“This very valuable resource is an excellent tool for public education, emergency management planning, and emergency preparedness in general,” Schneyer said. 

JOANNE CASTAGNA is a public affairs specialist and writer for the U.S. Army Corps of Engineers, New York District.



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