FEMA

Region IV Coastal Analysis and Mapping Project – Southeast United States

The Federal Emergency Management Agency (FEMA) Region IV Office in Atlanta has undertaken a multiyear coastal engineering analysis and mapping effort to better identify, quantify, and communicate flood hazards and risks associated in coastal areas of Alabama, Florida, Georgia, South Carolina, and North Carolina. FEMA is working with our State and regional entity partners (listed below) and officials of affected communities in the coastal counties to update hazard and risk information and produce new National Flood Insurance Program (NFIP) maps.

- Alabama Department of Economic and Community Affairs (ADECA);
- Coastal Regional Commission of Georgia (CRC);
- Florida Division of Emergency Management (FDEM);
- Georgia Department of Natural Resources (GA DNR);
- North Carolina Division of Emergency Management (NCDEM)
- North Carolina Floodplain Mapping Program (NCFMP);
- Northwest Florida Water Management Disrict (NWFWMD);
- South Carolina Department of Natural Resources (SCDNR);
- South Florida Water Management Disrict (SFWMD);
- Southwest Florida Water Management Disrict (SWFWMD); and
- Suwannee River Water Management Disrict (SRWMD).

An integral component of the flood risk study is the development of state-of-the-art Digital Elevation Models (DEMs). The DEMs are produced by merging the best available topographic and bathymetric data, including recent Light Detection And Ranging (LiDAR) system-generated data and bathymetric data from multiple sources (National Ocean Survey, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Association). By integrating the latest topographic datasets with state-of-the art modeling techniques, FEMA will provide citizens and community officials with up-to-date flood hazard and risk information.

The FEMA coastal flood risk study process is guided by the procedures described in FEMA's *Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update*. This fact sheet provides an overview of the two phases of a coastal flood risk study: (1) storm surge and wave modeling and (2) wave hazard analysis and mapping. More information on flood risk study components can be found on the Region IV Coastal Analysis and Mapping Website, which is located at www.southeastcoastalmaps.com.

Storm Surge and Wave Modeling

The rise in water level associated with the passage of a hurricane is called "storm surge." Determining the magnitude of the storm surge is challenging, because it is affected by many variables, including storm size and intensity,.

Coastal Flood Zones

Within the coastal Special Flood Hazard Area (SFHA), there are two primary zones: Zone VE and Zone AE. Zone VE, also known as the Coastal High Hazard Area, has a wave component that is greater than 3 feet in height. The coastal Zone AE has a wave component of 0-3 feet in height.

Base Flood Elevations (BFEs) will vary in each zone. Changes in flood zones and BFEs can have a significant impact on building requirements and flood insurance costs. BFEs may differ dramatically within a small area because waves can diminish in size over a short distance upon encountering obstructions or steep ground.

LiMWAs and Community Rating System

Post-disaster assessments and wave tank research have shown that waves as small as 1.5 feet can cause significant structural damage. For all coastal studies, FEMA now maps the limit of the 1.5-foot wave as an informational layer; this boundary line is known as the Limit of Moderate Wave Action, or LiMWA.

The NFIP Community Rating System, or CRS, provides credits for communities requiring VE zone construction standards in areas defined by LiMWA or areas subject to waves between 1.5 and 3 feet. More information on the CRS can be found on the FEMA Website: www.fema.gov/business/nfip/crs.shtm.

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storm track and speed, atmospheric pressure, offshore water depths, and landfall location. To address all combinations of these variables, sophisticated models and supercomputers are used to simulate hundreds of hurricane events and compute surge elevations for the 1-percent-annual-chance (100-year) and 0.2-percent-annual-chance (500-year) events. These models are validated with historic storm and tide data.

The results from the storm surge and wave modeling are new total stillwater elevations that include storm surge and wave setup (additional elevation of water due to nearshore wave breaking). The surge and wave modeling provides water levels for the next component of the study.

Wave Hazard Analysis and Mapping

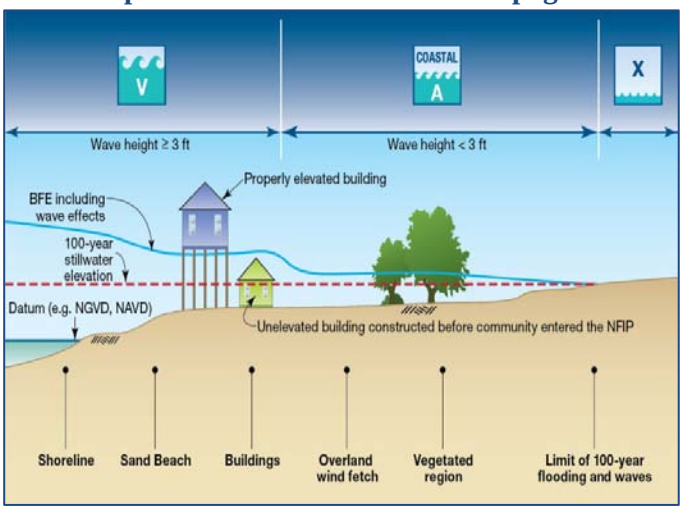
Using the updated stillwater elevations, the Project Teams perform overland wave hazard analysis and produce updated digital Flood Insurance Rate Maps (FIRMs) and accompanying Flood Insurance Study (FIS) reports. Components of the overland wave hazard analysis are discussed below.

- ***Defining transects to represent regional land use, vegetative cover, building obstructions, and terrain variability along the shoreline***. Transects are cross-sections taken perpendicular to the shoreline that represent a segment of coast with similar characteristics. Transect profiles are generated based on the DEMs. Field reconaissance is conducted to identify and verify features such as dunes, building types, and vegetation.
- ***Overland wave modeling to define coastal hazard areas and establish BFEs.*** Project Teams model overland propagation of waves using Wave Height Analysis for Flood Insurance Studies (WHAFIS). Where flooding intersects a shore protection structure or other steep feature, Project Teams perform analyses of wave runup (uprush of waves on a slope or structure) and overtopping.
- ***Mapping of coastal hazard areas.*** Using the results of the overland wave modeling, the Project Teams identify the areas subject to waves greater than 3 feet. This area, along with the primary frontal dune, is mapped as Zone VE. Where waves are less than 3 feet, the area is mapped as an Zone AE. The Project Teams also map the Limit of Moderate Wave Action (LiMWA). The LiMWA is a boundary that identifies the location of the 1.5-foot wave height within the coastal AE zone.

Once the mapping is completed, Project Teams will provide Preliminary versions of FIRMs and FIS reports to community officials and citizens for their review and use.

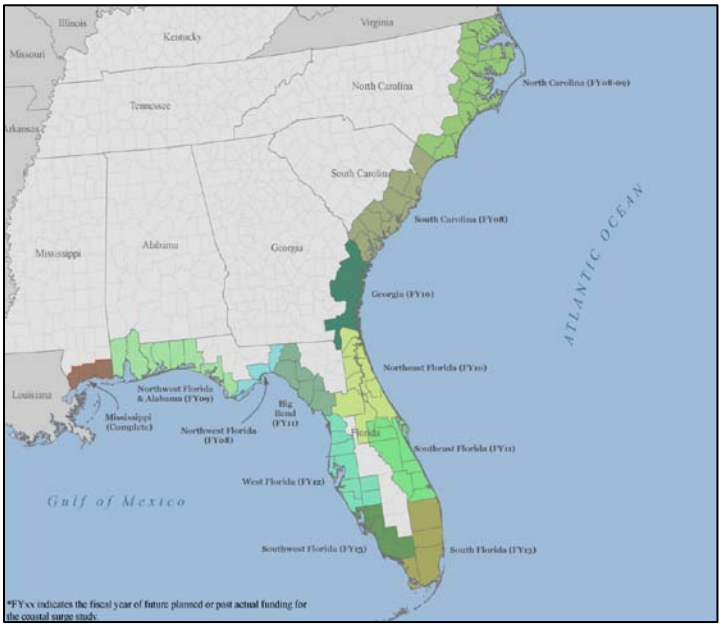
As a result of these studies, communities will have the best available coastal flood hazard and risk information and will be able to make more informed risk-reduction decisions.

Components of Overland Wave Propagation



Production Schedule

The map below provides information on when the coastal analysis and mapping efforts started or will start in the coastal areas of each state. For information on when the new digital FIRMs and FIS reports will be available for public review, please visit the State pages on the www.southeastcoastalmaps.com.



Contact Information

Questions regarding the coastal analysis and mapping effort should be addressed to the community floodplain administrators or to the FEMA or partner contacts provided at www.southeastcoastalmaps.com/resources/coastal_contacts.php.

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