FEMA

Region IV Coastal Flood Risk Study – Southeastern Georgia

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 associated risks in Southeastern Georgia (SEGA) and other coastal areas of the Southeastern U.S. To update hazard and risk information and produce new Flood Insurance Rate Maps (FIRMs) for the SEGA Study Area (Bryan, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, and McIntosh Counties), FEMA has initiated studies through its Production and Technical Services mapping partner and is coordinating closely with the Georgia Department of Natural Resources (GA DNR), Georgia's National Flood Insurance Program (NFIP) Coordinator, and community officials and other stakeholders in the affected communities.

An integral component of a coastal 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 (i.e., 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 Web Portal, which is located at www.southeastcoastalmaps.com.

Storm Surge and Wave Modeling

Storm surge is the increased water level due to water being pushed landward by the wind and pressure fields of coastal storms, such as a nor'easters or hurricanes. Determining the magnitude of the storm surge is challenging, because it is affected by many variables, including storm size and intensity, storm track and speed, atmospheric pressure, offshore water depths, and landfall location.

To address all combinations of these variables, Project Team members use specialized computer models and high-powered computers 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) flood events. These models are validated using historic storm and tide data.

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, identifies areas exposed to wave heights of 3 feet or greater. Coastal Zone AE identifies areas subject to wave heights less than 3 feet.

Base Flood Elevations (BFEs) will vary in each zone. Changes in flood zone and BFEs can have a significant impact on building requirements and flood insurance costs. Because waves can diminish in size over short distances, particularly where the ground is steep, BFEs can differ dramatically.

LiMWAs and Community Rating System

Post-disaster assessments and laboratory 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 wave heights between 1.5 and 3 feet. More information on the CRS can be found at: www.fema.gov/national-flood-insurance-program/community-rating-system.

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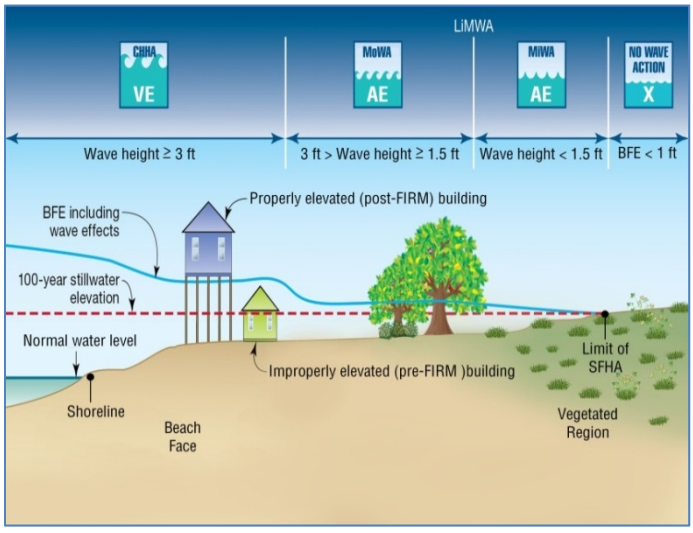
The results from the storm surge and wave modeling are new ***stillwater elevations*** (SWELs) that include storm surge and wave setup (additional elevation of water due to nearshore wave breaking). The surge and wave modeling provides the SWELs for the next phase of the study.

Wave Hazard Analysis and Mapping

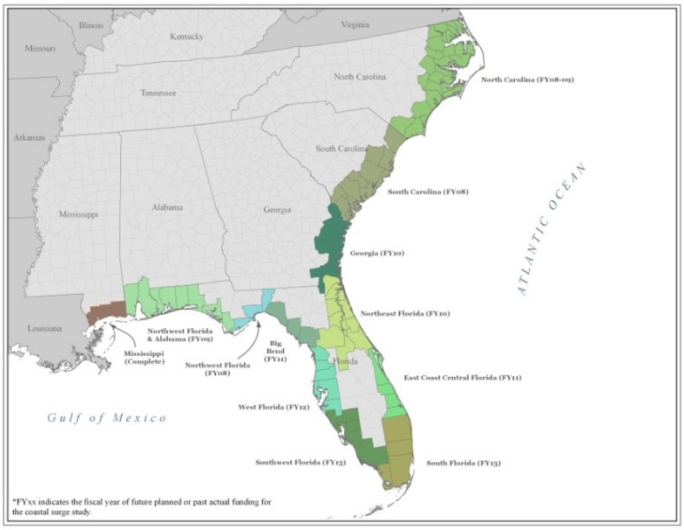
Using the updated SWELs, Project Team members perform an overland wave hazard analysis and produce updated digital FIRMs and accompanying Flood Insurance Study (FIS) reports. Components of the overland wave hazard analysis are discussed below.

- ***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.*** Overland propagation of waves is modeled using Wave Height Analysis for Flood Insurance Studies (WHAFIS). Where flooding intersects a shore protection structure or other steep feature, analyses of wave runup (uprush of waves on a slope or structure) and overtopping are performed.
- ***Mapping of coastal hazard areas.*** Overland wave modeling results are used to identify areas subject to wave heights of 3 feet or greater. These areas, along with the ***Primary Frontal Dune*** (PFD), are mapped as Zone VE. The PFD is a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach. The PFD is subject to erosion and overtopping from high tides and waves during major coastal storms.



FEMA typically maps areas subject to 1-percent-annual-chance flooding with wave heights of less than 3 feet as Zone AE. FEMA also will delineate the ***Limit of Moderate Wave Action*** (LiMWA). The LiMWA is a boundary that identifies the location of the 1.5-foot wave height within this AE zone, which is also referred to as the ***Area of Moderate Wave Action*** (MoWA). The area landward of the PFD, where wave heights are less than 1.5 feet, is also mapped as Zone AE and is referred to as the ***Area of Minimal Wave Action*** (MiWa). Once floodplain mapping is complete, FEMA provides preliminary versions of FIRMs and FIS reports to community officials and citizens for their review and use.

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



Study Coordination

As shown above, coastal flood risk studies are also underway for counties north and south of the SEGA Study Area. The analyses and mapping for all study areas will be coordinated closely to assure consistent, accurate information is provided for local decision-making. Information on the new digital FIRMs and FIS reports is available through both the GA DNR website (www.georgiadfirm.com/status/status.html) and through www.southeastcoastalmaps.com/Pages/States/Georgia.aspx

Contact Information

Questions regarding the coastal flood risk study should be addressed to the community floodplain administrators accessible through the ECCFL Study Area page cited above or to the FEMA or GA DNR contacts provided at www.southeastcoastalmaps.com/resources/coastal_contacts.php.

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