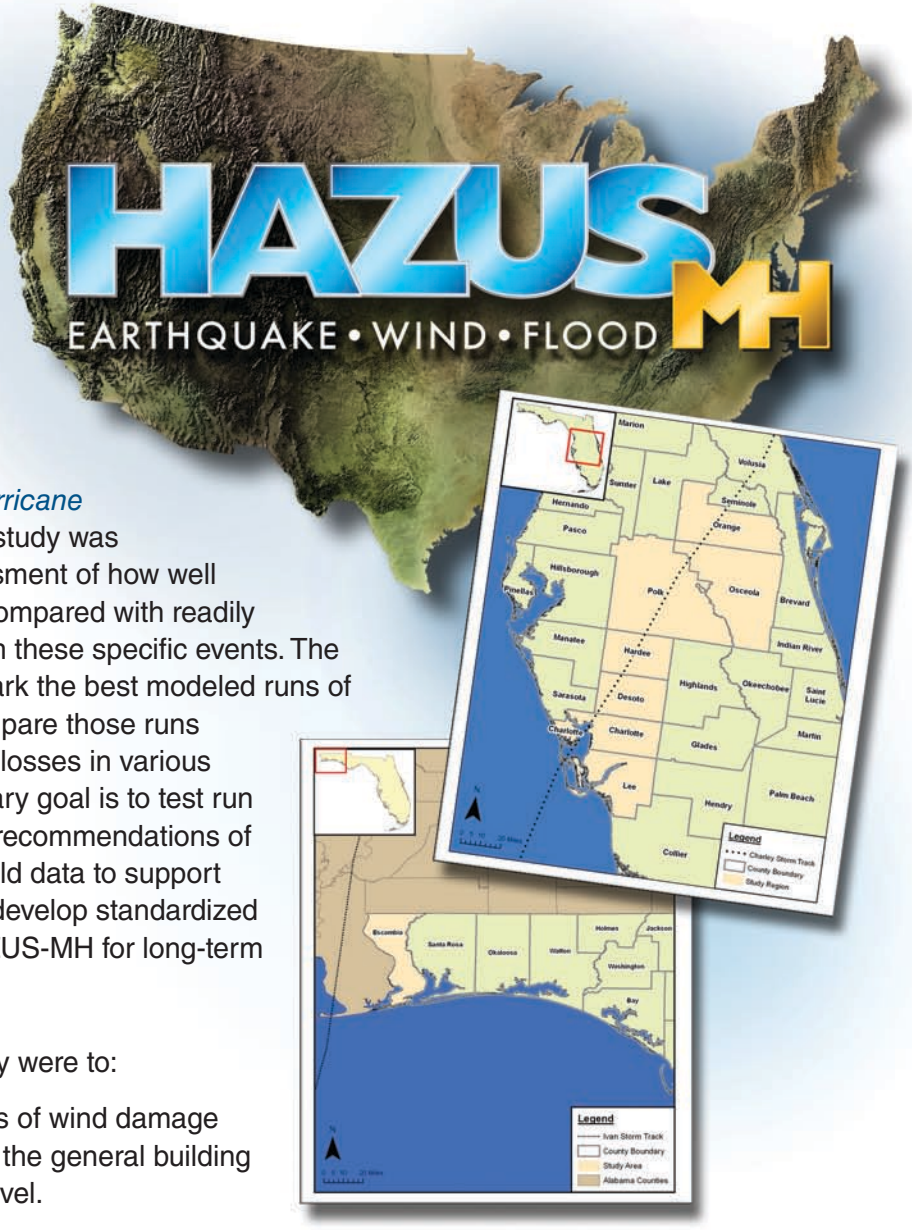
FEMA Releases HAZUS-MH Hurricane Wind Model Validation Study



FEMA has just released the *HAZUS-MH Hurricane Wind Model Validation Study: Florida.* This study was intended to help provide a systematic assessment of how well the model performed in several categories compared with readily available historical data (observed data) from these specific events. The overall objective of this project is to benchmark the best modeled runs of HAZUS-MH (MR2 version) for wind and compare those runs to the observed and recorded damages and losses in various counties and jurisdictions in Florida. A primary goal is to test run HAZUS-MH's functionality, utility, and make recommendations of the estimate against "real world" historical field data to support disaster operations. A secondary goal is to develop standardized data collection process and analysis for HAZUS-MH for long-term recovery operations.

The specific objectives of the validation study were to:

- Compare HAZUS-MH predicted estimates of wind damage and loss with actual damage and loss for the general building stock and critical facilities at the county level.
- Compare HAZUS-MH estimates of wind impacts such as displaced populations and debris generated at the county level with observed data.
- Compare HAZUS-MH-modeled damage and loss estimates for critical facilities at the site level with observed data.
- Compare HAZUS-MH-modeled damage states and resultant loss of functionality (loss of use in days) of hospitals at the site level with actual impacts.
- Explore documented vulnerability reduction measures and the potential to mitigate these measures in HAZUS-MH.
- Validate the existing HAZUS-MH wind loss curves.
- Provide recommendations, as appropriate, to improve the HAZUS-MH Hurricane Wind Model.
- Provide recommendations to enhance data collection for future HAZUS-MH validations.

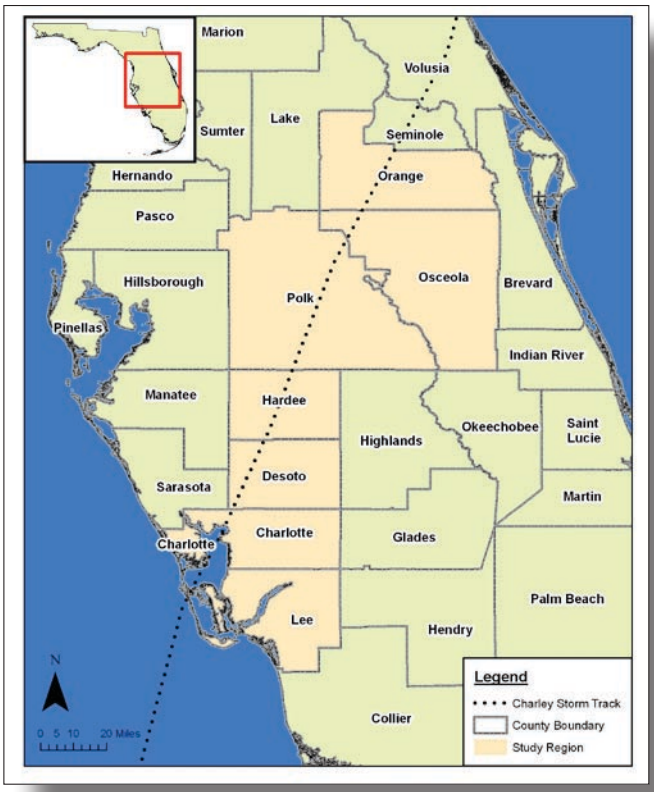
FEMA

Important Findings:

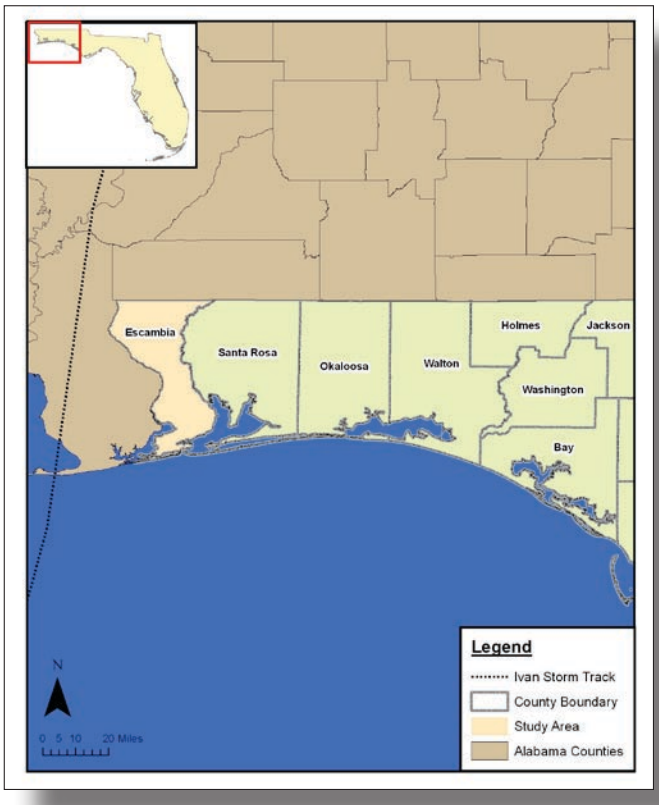
Specific conclusions from this report include:

- The observed data for the Hurricane Charley study region compared well with HAZUS-MH (1) residential qualitative damage; (2) residential, commercial and industrial economic loss; and (3) short-term shelter demand estimates.
- There was better agreement at the regional level, as seen in the Hurricane Charley study region versus the results for one county (Escambia County) in the Hurricane Ivan Study Region.
- HAZUS-MH public and critical facilities qualitative damage (e.g., for schools) and economic loss estimates did not compare well with observed data. HAZUS-MH consistently and significantly underestimated economic loss for public and critical facilities. This is most likely because the HAZUS-MH default inventory for public and critical facilities was collected at the national level in 2001.
- HAZUS-MH site specific qualitative damage estimates were in good agreement for 80 percent of the sites for Hurricane Charley and 50 percent of the sites for Hurricane Ivan. Considering that HAZUS-MH was designed to be used at a larger scale (e.g., region, county), it appears that the analysis showed that HAZUS-MH estimates compared reasonably well with the observed damage at the site specific level.
- HAZUS-MH wind damage curve estimates were in good agreement at the low end for 60 percent of the sites for Hurricane Charley, but underestimated 88 percent of the sites for Hurricane Ivan.
- HAZUS-MH wind loss curve estimates underestimated for all sites for Hurricane Ivan.
- HAZUS-MH hospital loss of functionality estimates did not compare well with the observed data. The model significantly overestimated the loss of functionality (e.g., number of days). However, it is important to consider that HAZUS-MH estimates loss of functionality based on building damage.

The lessons learned and next steps from this important study are organized into three categories: 1) data collection; 2) modeling capabilities; and 3) software functionality.



Hurricane Charley Study Area < View larger graphic. >



Hurricane Ivan Study Area

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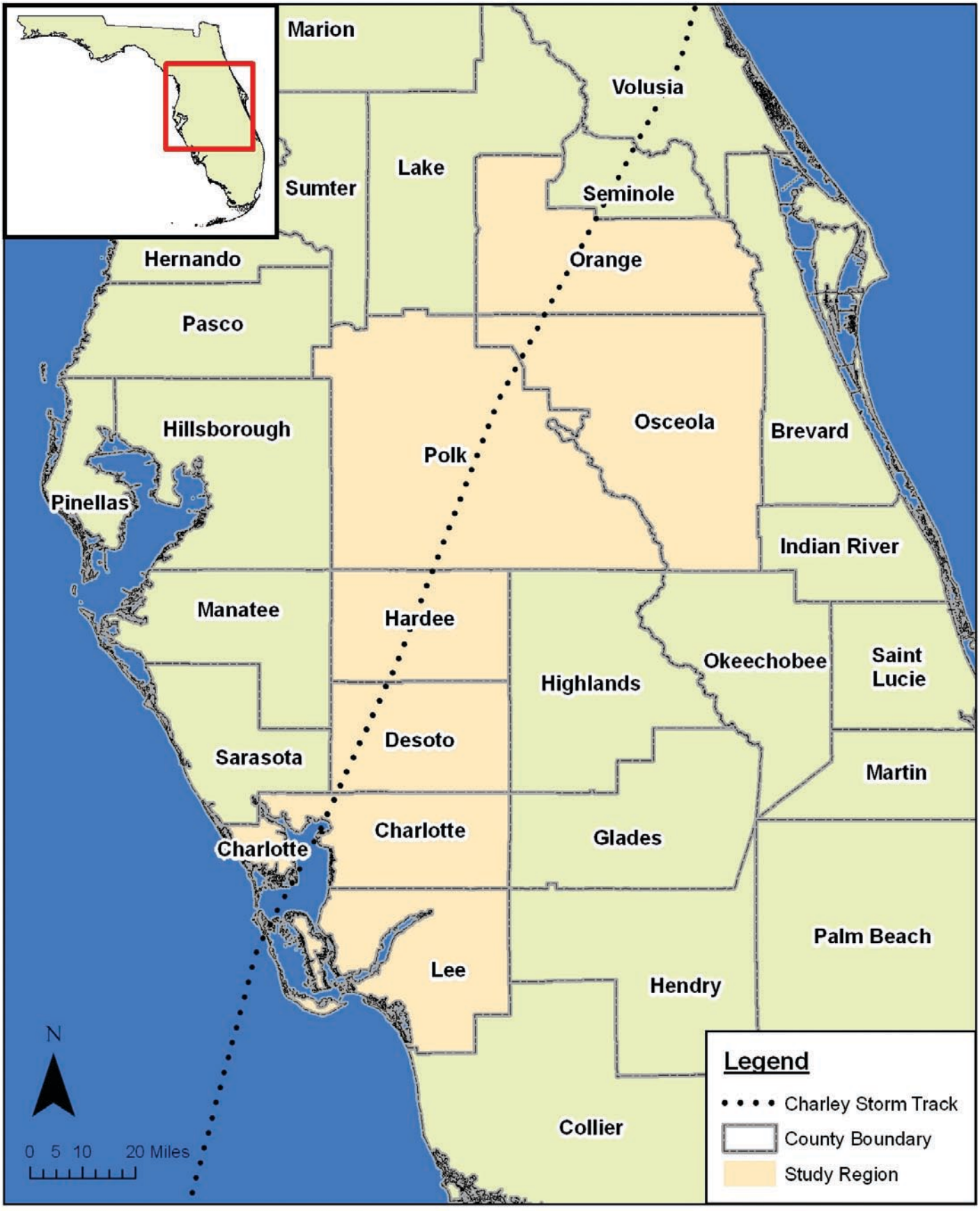
Hurricane Charley Study Area



Hurricane Ivan Study Area