FEMA Completes Validation Study of Hurricane Model

FEMA recently completed a validation study of the HAZUS-MH MR-2 (Build 45) Hurricane Wind Model. The purpose of the study was to compare the HAZUS-MH modeled results with observed hurricane wind hazards and impact data that were collected after Hurricane Charley in Charlotte, DeSoto, Hardee, Lee, Orange, Osceola, and Polk Counties, and Hurricane Ivan in Escambia County in the State of Florida. See Hurricane Model Validation Study (2006) for a summary of the results of this important study.

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.

Important Findings:

- There was better agreement in the Hurricane Charley study region versus the Hurricane Ivan region. This was expected since HAZUS-MH estimates are most accurate at the regional scale.

- HAZUS-MH estimates for residential, commercial, and industrial occupancy classes compared well with the observed data. Overall, HAZUS-MH estimates were in good agreement for residential qualitative damage and economic loss.

- HAZUS-MH consistently and fairly significantly underestimated economic loss for public and critical facilities, which may be attributed to the age and source of the default inventory in HAZUS-MH.

- HAZUS-MH estimates compared well with observed data for the general building stock versus the critical facilities, as the general building stock data are more accurate than the critical facilities inventory.

Hurricane Charley Study Area

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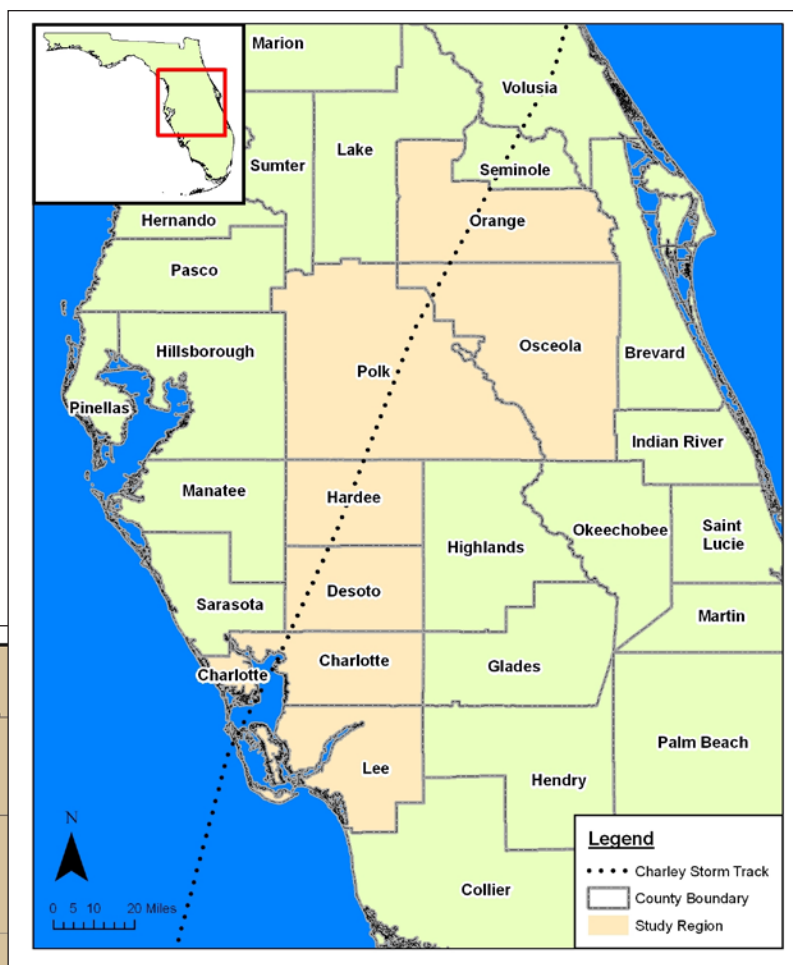
- HAZUS-MH estimates compared the best with observed data for the Hurricane Charley study region, as Charley caused predominantly wind damage and loss. Therefore hurricane wind estimates generated by HAZUS-MH could be more accurately compared with observed data for a predominantly wind event.

- HAZUS-MH estimates were in good agreement for residential qualitative damage and economic loss. This good agreement can be attributed to the updated and improved residential building stock in the MR2 version HAZUS-MH default inventory.

Hurricane Ivan Study Area

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