Panel - Real World Applications: Overview of Virginia Beach Center for GIS' Geoprocessing of Storm Surge Models

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Overview of Virginia Beach Center for GIS’
Geoprocessing of Storm Surge Models

In Support of the City’s
Emergency Operations Center

Hampton Roads Sea Level Rise/Flooding Adaptation Forum
Real World Applications User Panel
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Objective

- Overview of recent storm surge model applications by Virginia Beach’s Center for GIS in support of the City’s Emergency Operations Center (EOC)
  - in the context of the hurricane preparation exercise in June 2014 and Hurricane Arthur, July 2014
The Decision Wedge

**P-Surge: Probabilistic Storm Surge** shows the overall chances that the specified storm surge height will occur at each individual location on the map during the forecast period indicated.

**MEOW: Maximum Envelope of Water** refers to the maximum level the water reaches at any point in time and can be chosen based on storm direction, forward speed, and tide.

**MOM: Maximum of Maximum** is a composite of the maximum storm surge height for all hurricanes of a given category and tide.

The data/information you have about a particular storm event determines which SLOSH product you use.
Within 48 Hours of Storm’s Landfall: P-Surge

- Purpose of further geoprocessing of P-Surge data
  - To identify facilities, roads, and residential areas within the City that are vulnerable to flooding based on forecasted storm surge.

1. Modeled Data Points with Water Heights

2. Modeled Water Depths After Subtracting Surface Elevations from Water Heights Using DEM
P-Surge Geoprocessing Using ArcGIS Desktop w/ ModelBuilder

KEY POINTS
• Currently 26 processes
• Takes approx. 30 minutes to run, using workstation w/ 32 Gb RAM
• Requires ArcGIS Desktop 10.2 w/ Spatial Analyst Extension
• Other inputs/geographic features can be added

MAIN INPUTS
• SLOSH P-Surge Data Points (initially 20% exceedance)
• Address Points
• Critical Facilities
• Roads
• LiDAR Derived Digital Elevation Model (5' resolution)
• Subdivision Boundaries

MAIN OUTPUTS
• P-Surge Depth of Inundation Grid
• Potentially Inundated Critical Facilities
• Potentially Inundated Residential Address Points
• Potentially Inundated Road Segments
• Subdivisions with Potentially Inundated Residence Counts

Diagram: Flowchart showing the process of P-Surge Geoprocessing using ArcGIS Desktop with ModelBuilder, with nodes representing various input and output functionalities.
Sharing P-Surge Geoprocessing Results

- Only available to City’s Emergency Operations Center
- Use map services hosted locally using ArcGIS Server
- Interactive data/map viewer using ArcGIS Online
Lessons Learned/Future Considerations

- Little variation between P-Surge data releases
- Models and geoprocessing results are not a “crystal ball”
  - Intended to be used in conjunction with other sources of information
  - How to appropriately represent analysis results from data sources at varying scales/resolutions
- Incorporate/evaluate multiple probabilities/scenarios
- Transition geoprocessing from semi-automated to fully automated
- Offer greater interaction/functionality through web mapping applications
- Interactive maps and web applications aren’t always the most effective form of sharing information
Thank you for your time!

Questions?