What is the Storm Surge part of the Flood & Sea Level Rise App?
The Storm Surge module in the Flood & Sea Level Rise app in the Coastal Resilience tool shows the potential effects of sea-level rise scenarios on wind- and wave-driven storm surge along Virginia’s Eastern Shore. Multiple theoretical hurricanes and one historic nor’easter were modeled for this app. The theoretical storms were selected from the Federal Emergency Management Agency’s Flood Insurance Study database. The selected storm scenarios include a variety of storm parameters and tracks to capture a range of potential surge conditions in areas of interest identified by community stakeholders.

Who should use it?
Planners and managers can use this app to visualize the potential future risk of storm surge in response to sea-level rise on towns, homes, property, and critical built infrastructure like roads and utilities, as well as coastal habitats. This information helps support planning and decision-making related to hazard mitigation, emergency services, storm water management, land use and conservation.

How does it work?
The app shows the potential maximum storm surge water depth for multiple modeled storms for three intensity categories and one historic storm defined, as follows:

- **Low Intensity** includes three Category 1 hurricanes with maximum winds of 80 mph.
- **Moderate Intensity** includes a combined total of six Category 1 and 2 hurricanes with maximum winds between 85 and 110 mph.
- **High Intensity** includes a combined total of seven Category 2 and 3 hurricanes with maximum winds between 95 and 115 mph.
- **Nor’Ida** shows the modeled storm surge generated by that particular storm, which occurred in 2009.
All storms were modeled for current (2015), 25-year (2040) and 50-year (2065) sea-level rise scenarios using the projected “high” sea-level rise curve based on the 2012 National Climate Assessment and corrected for local land subsidence by the Virginia Institute of Marine Science.

The sea-level rise scenarios selected to model with storm surge, (feet above baseline)

![Projected Sea-Level Rise Curve](image)

**What are strengths and limitations?**

The app demonstrates that surge does not respond uniformly in response to sea-level rise as commonly portrayed by simplistic “bath tub models”, but rather, is influenced by topography, bathymetry, and land cover in addition to sea-level rise. Simply stated, a given sea-level rise will not affect all places equally. Users can see these differences in the app by clicking on the absolute difference (in feet) or percent difference options.

All the storm surge modeling was done based on mean tide level. Since the purpose of the app is to convey how wind- and wave-driven surge will be affected by rising sea levels, tides are not needed to evaluate the sensitivity of surge to sea level. The app allows users to visualize surge-only results and to view the local tidal amplitude for locations throughout the study area. Importantly, actual water levels may be higher or lower based on tidal conditions at the time of the surge.

The modeled storms in the app do not have a probability of occurrence associated with them. However, subjectively speaking, a low-intensity storm has a higher probability of occurring in any given year than a high-intensity storm. Also, the storms were randomly generated and, therefore, do not share the same track, which results in varying flooding potential for seaside versus bayside.

**How is the app being used?**

The Storm Surge module of the Flood & Sea Level Rise app is currently being used by Accomack-Northampton Planning District Commission to update the Eastern Shore Hazard Mitigation Plan.

**Who developed it?**

The Storm Surge module of the Flood & Sea Level Rise app was developed through a partnership between The Nature Conservancy and Arcadis with guidance from the Virginia Coast Reserve Long-Term Ecological Research Program and input from local community stakeholders on Virginia’s Eastern Shore.

For general info about the Virginia Eastern Shore Coastal Resilience project: [coastalresilience.org/virginia](https://coastalresilience.org/virginia/)

To access the Virginia Eastern Shore Coastal Resilience mapping portal: [maps.coastalresilience.org/virginia/](https://maps.coastalresilience.org/virginia/)

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