

NYS Department of State Risk Assessment Area Mapping – Datasets and Methodology

Knowing which areas have been and will be affected by storms and other threats such as sea level rise are the first step towards understanding risk. To help understand the geographic distribution of coastal risk, the Department of State prepared coastal risk assessment areas with assistance from the National Oceanic and Atmospheric Administration Coastal Services Center (NOAA-CSC) and the Federal Emergency Management Agency (FEMA).

The following process was used to develop risk assessment areas depicting geographic areas of extreme, high and moderate hazard risk areas for New York City, Nassau County, Suffolk County and Westchester County.

1. Map risk assessment areas. The objective of the Risk Assessment is to define areas at risk from coastal hazards, distinguishing significant differences in the exposure of the landscape. Data was collected from sources accurate enough to differentiate geographic areas according to the likelihood of flooding, erosion, waves and storm surge. To the extent allowed by source data places where flood water can extend up streams and under culverts and bridges are reflected in mapping. Data sources include but are not limited to:

- **High Resolution Topography.** Best available topography for all areas was used. This allowed topographic mapping of differences in elevation that could affect the potential to flood. Topographic data for inundation analysis had an average vertical error of 9cm.
- **1% and 0.2% flood zones from 2009 FEMA Flood Insurance Rate Maps for Nassau and Suffolk Counties and from FEMA 2013 Preliminary Flood Insurance Rate Maps for New York City and Westchester County.** A and V zones on floodplain maps are areas with a 1% annual risk of flooding based on the most recent FEMA analysis. They are commonly referred to as 100-year flood zones. The boundaries of these zones are identified on Flood Insurance Rate Maps (FIRMs). The FIRMs also delineate zones X and B, which are subject to a “500-year flood,” or 100-year flood with depth less than 1 foot, or with a contributing drainage area less than 1 square mile, and areas protected by levees from the base flood. For this Risk Assessment, zones X and B are relatively low-risk areas subject to future storm surge inundation with sea level rise where a higher standard for flood protection may be appropriate. Near-shore water elevations were extracted from the FEMA Flood Insurance Rate Study for the following elevations:
 - V-zone or wave velocity zone
 - 1% still water elevation (100 year flood zone)
 - .2% still water elevation (500 year flood)

- **SLOSH storm surge inundation zones (NY3 Basin).** The Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model of the National Hurricane Center estimates hurricane storm surge. Because category 3 hurricanes (Saffir-Simpson scale) have occurred numerous times in New York, the SLOSH category 3 inundation zone was used to identify the geographic extent of coastal inundation risk.
- **Sea level rise scenario.** 0-3FT above Mean Higher High Water (MHHW) shoreline using NOAA VDatum for MHHW surface that shows both possible and more likely areas that will be impacted based on mapping confidence. Future sea level rise was also accounted for by adding 3 feet of elevation to the NOAA National Weather Service coastal flood advisory and adding 3 feet of elevation to the inland extent of the 100 year flood zone.
- **Shallow coastal flooding.** NOAA National Weather Service (NWS) shallow coastal flood advisory thresholds. An analysis of the number of events and duration of coastal flooding over the past 3 years and what 0.5m and 1m of SLR will do to increase those was carried out. See SLR viewer flood frequency tab for examples www.csc.noaa.gov/slr
- **Susceptible Natural Shoreline Features.** Areas subject to shoreline erosion are at risk of chronic impacts as well as increased storm impacts.

2. Compile mapping into a summary, classifying geographic areas according to differences in vulnerability. Mapped areas described in Step 1 above were overlaid, combined vulnerabilities were used to discriminate geographic areas into three classes:

- a. Extreme Risk Areas: Areas currently at risk of frequent inundation, vulnerable to erosion in the next 40 years, or likely to be inundated in the future due to sea level rise:
 - i. FEMA V zone.
 - ii. Areas subject to Shallow Coastal Flooding per NOAA NWS's advisory threshold.
 - iii. Areas prone to erosion, natural protective feature areas susceptible to erosion.
 - iv. Added 3 feet to the MHHW shoreline and extended this elevation inland over the digital elevation model (DEM) to point of intersection with ground surface.

Result: An area depicting the maximum extent of the above areas was compiled. This is the Extreme Risk Area.

- b. High Risk Areas: Areas outside the Extreme Risk Area that are currently at infrequent risk of inundation or at future risk from sea level rise:
 - i. Area bounded by the 1% annual flood risk zone (FEMA V and A zones).
 - ii. Added 3 feet to NOAA NWS coastal flooding advisory threshold and extended this elevation inland over the DEM to point of intersection with ground surface..

Result: An area depicting the maximum extent of the above areas upland of the boundary of the Extreme Risk Area was compiled. This is the High Risk Area.

- c. Moderate Risk Areas: Areas outside the Extreme and High Risk Areas but currently at moderate risk of inundation from infrequent events or at risk in the future from sea level rise.
 - i. Area bounded by the 0.2% annual risk (500 year) flood zone, where available.
 - ii. Added 3 feet to the Base Flood Elevation for the current 1% annual risk flood event and extended this elevation inland over the DEM to point of intersection with ground surface.
 - iii. Area bounded by SLOSH category 3 hurricane inundation zone.

Result: An area depicting the maximum extent of the above areas upland of the boundary of the High Risk Area was compiled. This is the Moderate Risk Area. (4/17/13)