



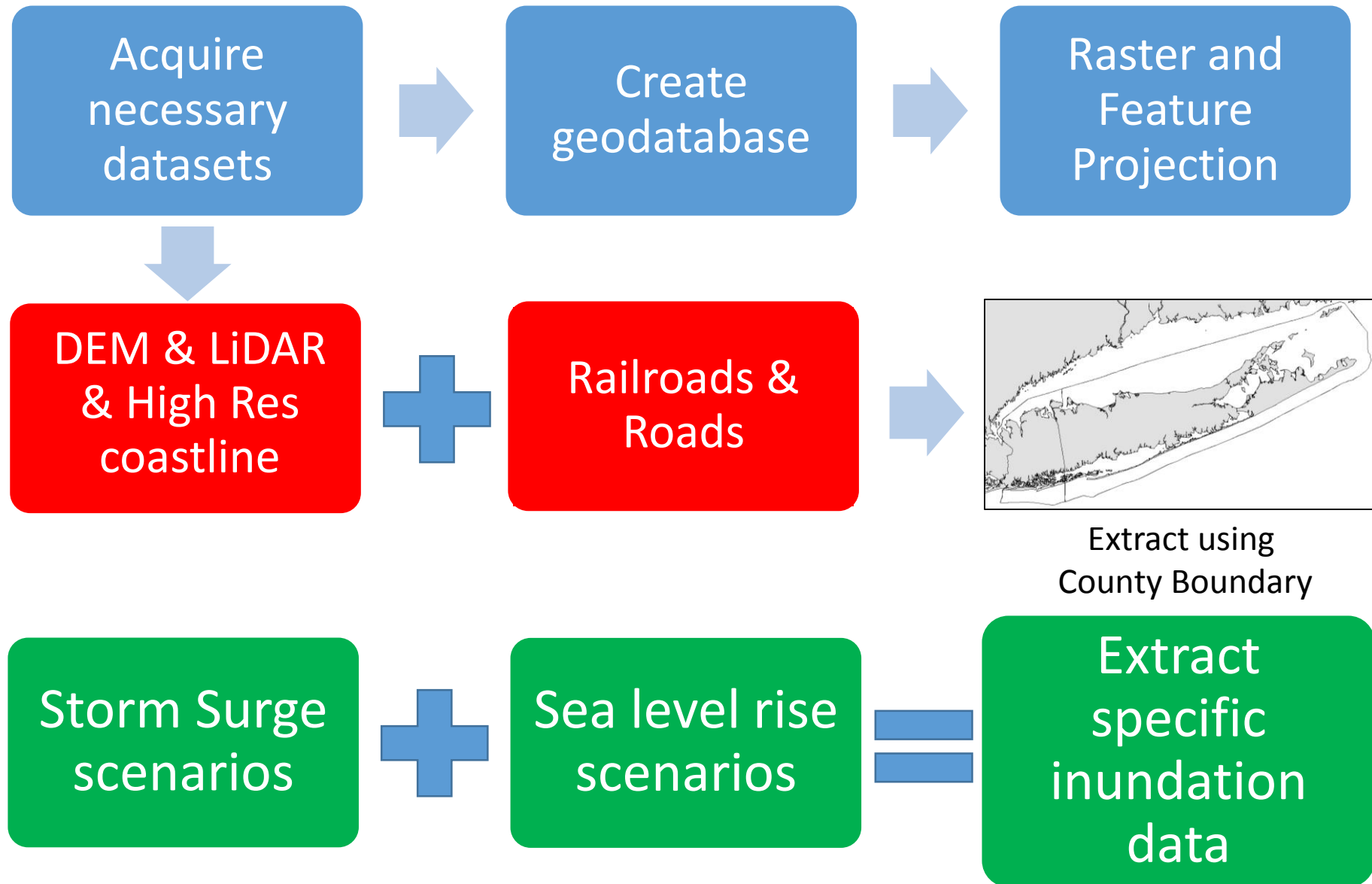
## Task 2.1:

Interactions of Water Bodies with  
Transportation Infrastructure in  
Nassau and Suffolk County  
SBU lead – Chris Gobler

## Task 2.1 objectives, SBU

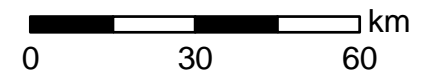
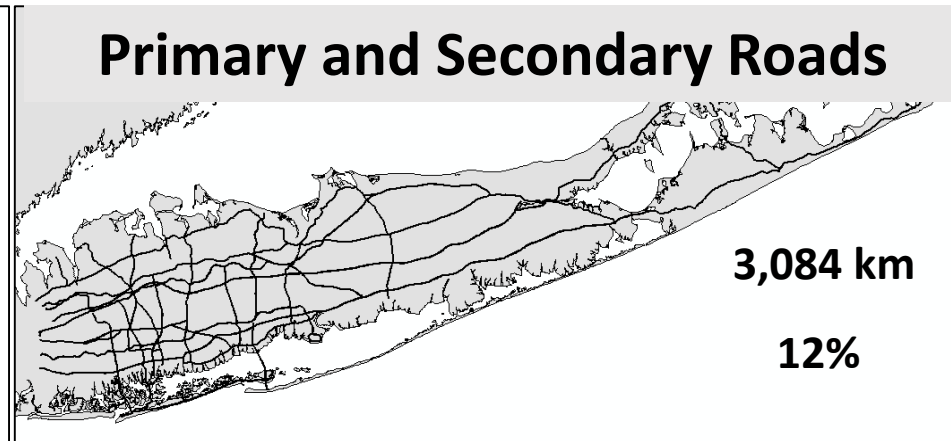
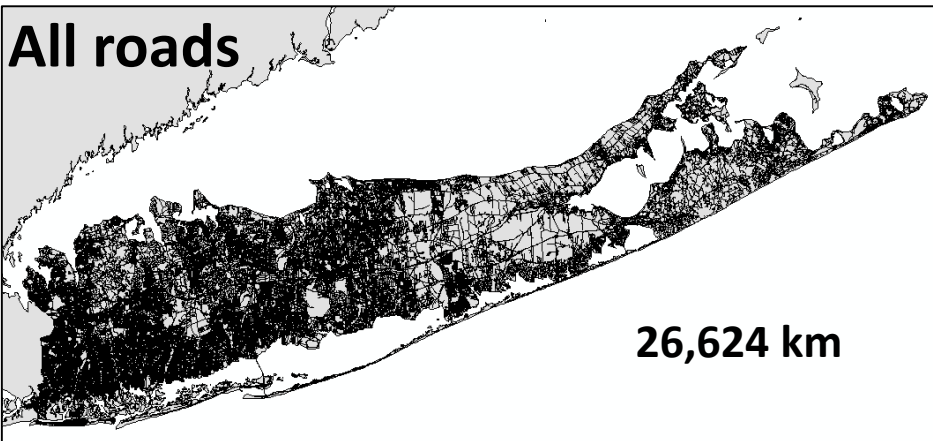
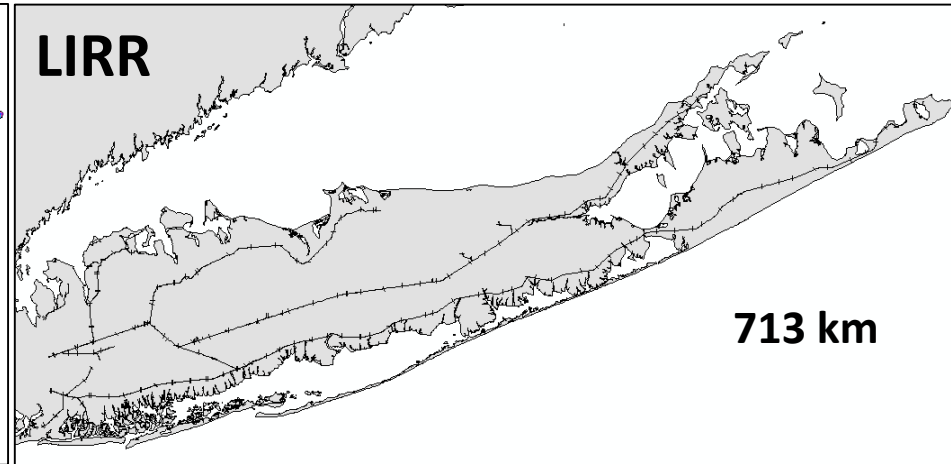
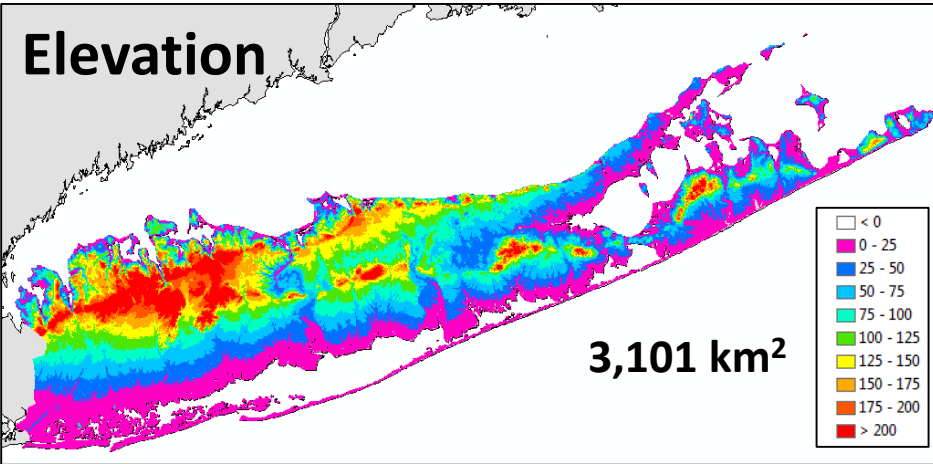
- Quantify flooding of Long Island transportation infrastructure (roads, rails) during **Hurricane Sandy**.
- Quantify flooding of Long Island transportation infrastructure (roads, rails) **under FEMA and other storm surge scenarios**.
- Quantify flooding of Long Island transportation infrastructure (roads, rails) under **multiple sea level rise scenarios**.
- Assess failure modes due to the interactions and thresholds of impact
- Assess vulnerability of the Long Island road and rail network, and potential inundation of transportation infrastructure.

# Geospatial approach



County border shapefiles	NYS GIS Clearinghouse	Clip all data to boundary for specific Long Island County analysis
LI Elevation 30m res DEM	USGS	Analysis of sea level rise scenario over both counties based on current elevation data
LI railways shapefile	NYS DOT	Specific railways that would be inundated by different scenarios
LI roads shapefile	NYS DOT	Specific roads that would be inundated by different scenarios
Superstorm Sandy storm surge raster	FEMA	One specific scenario that has occurred, used to look at specific inundation
High Resolution LI Basemap shapefile	NYS GIS Clearinghouse	Used as basemap clip elevation and other data to this boundary
Future sea level rise raster datasets	SLOSH model/NOAA/FEMA	Specific sea level rise predictions, used to look at specific inundation
LiDAR based coastal elevation models	NYS GIS Clearinghouse	High resolution elevation dataset to look at specific coastal zones which may be most impacted under different scenarios

# Results – GIS plots

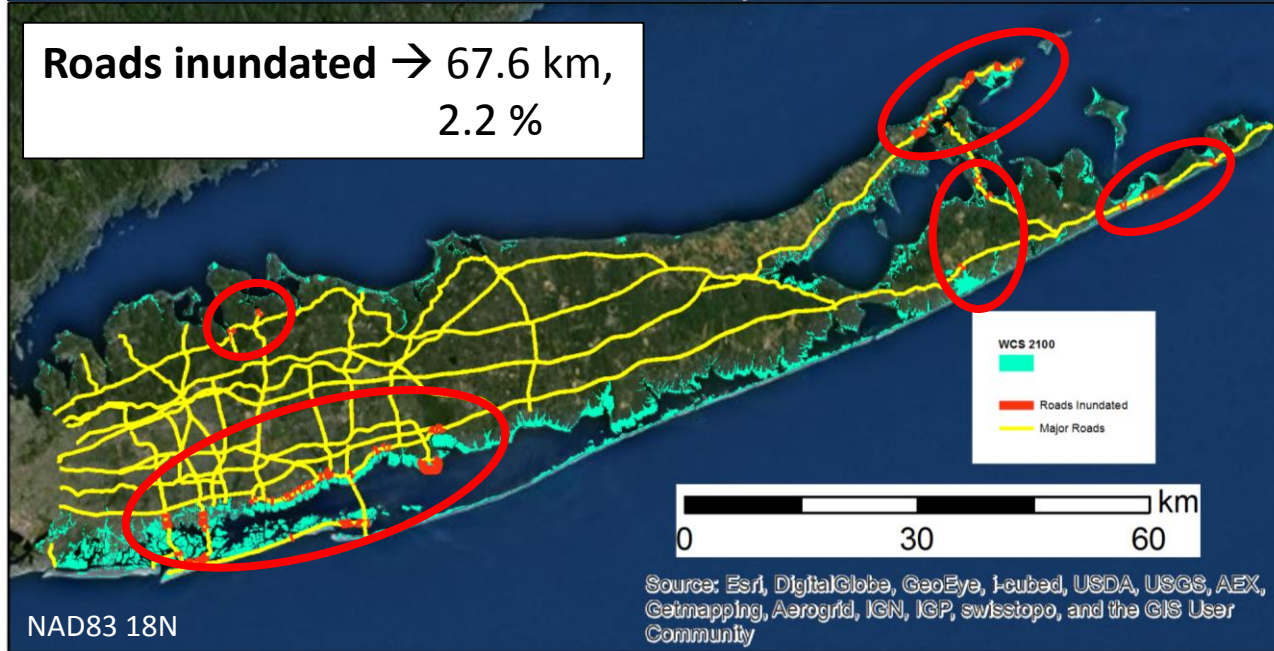
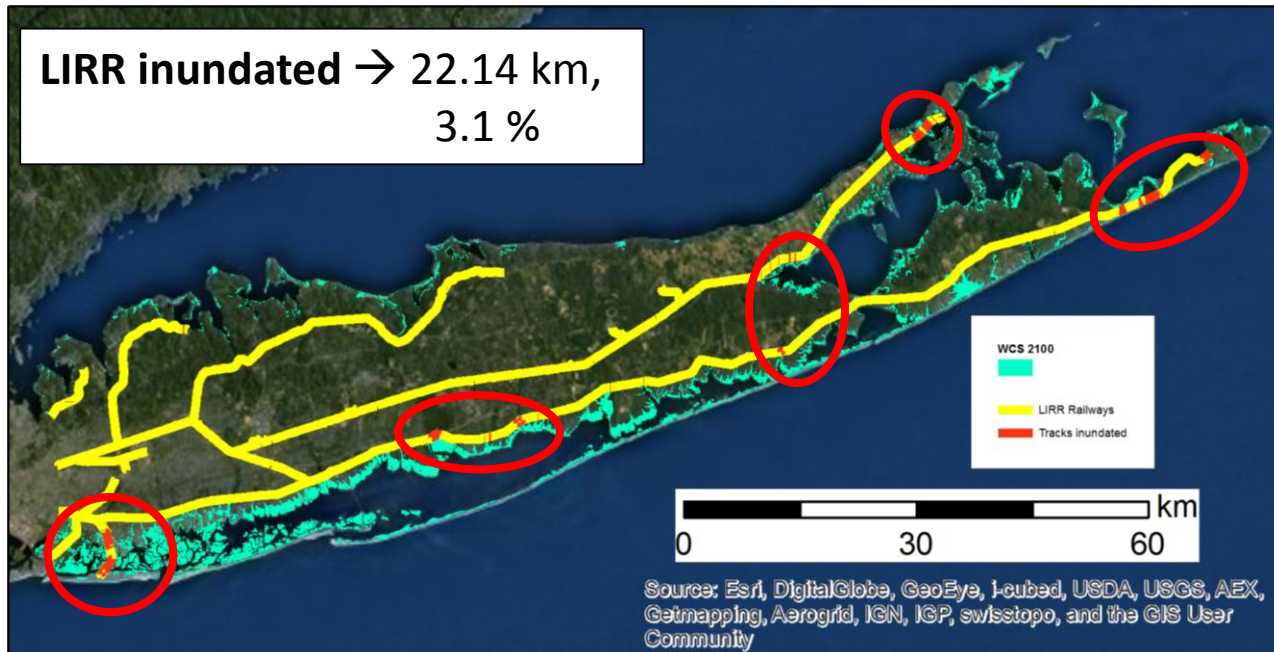


*How will sea level rise effect flooding of roads and rails?*



**Sea Level Rise:**  
**Year 2100 (6.6ft)**

**Land Inundated:**  
**270 km<sup>2</sup>**  
**= 8.7%**

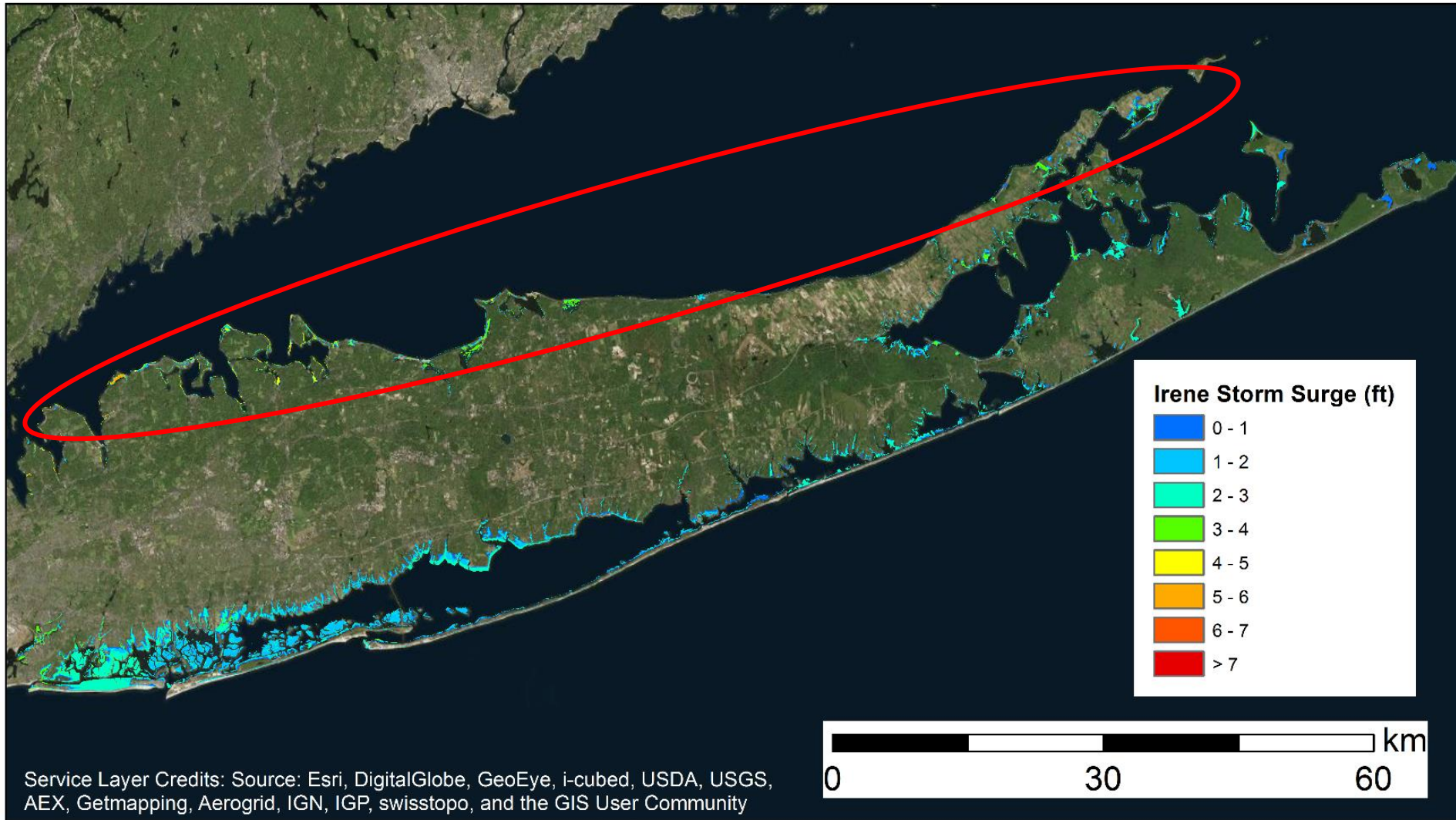


# Hurricane Irene





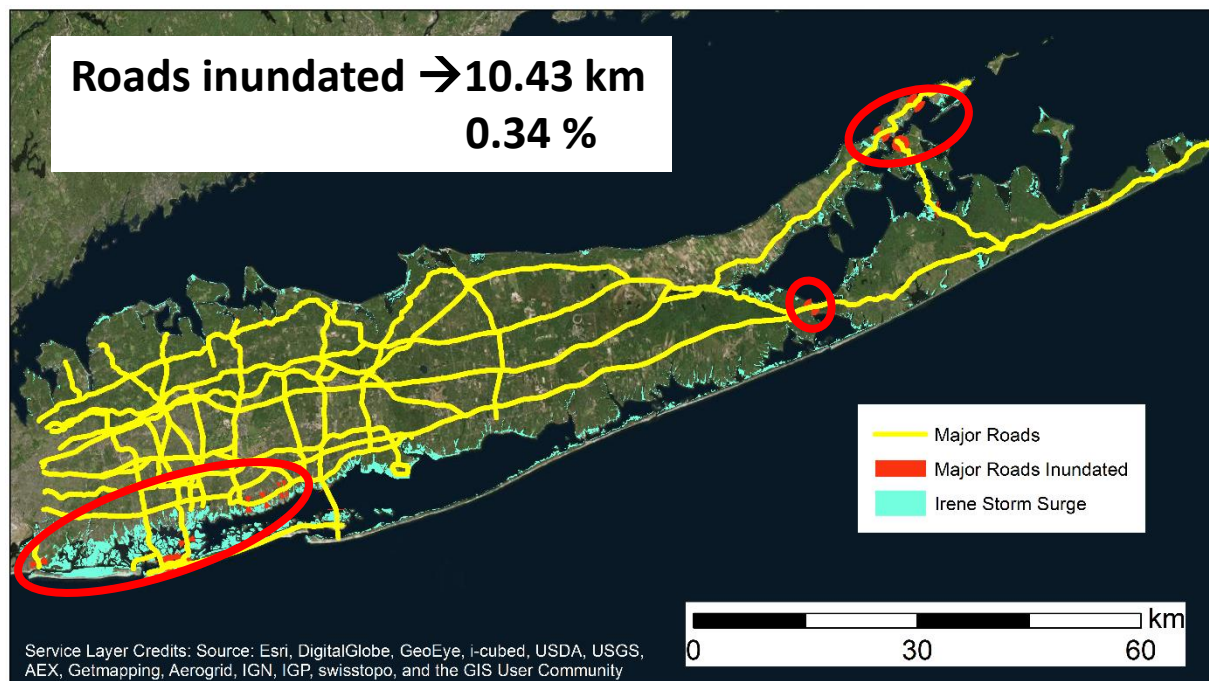
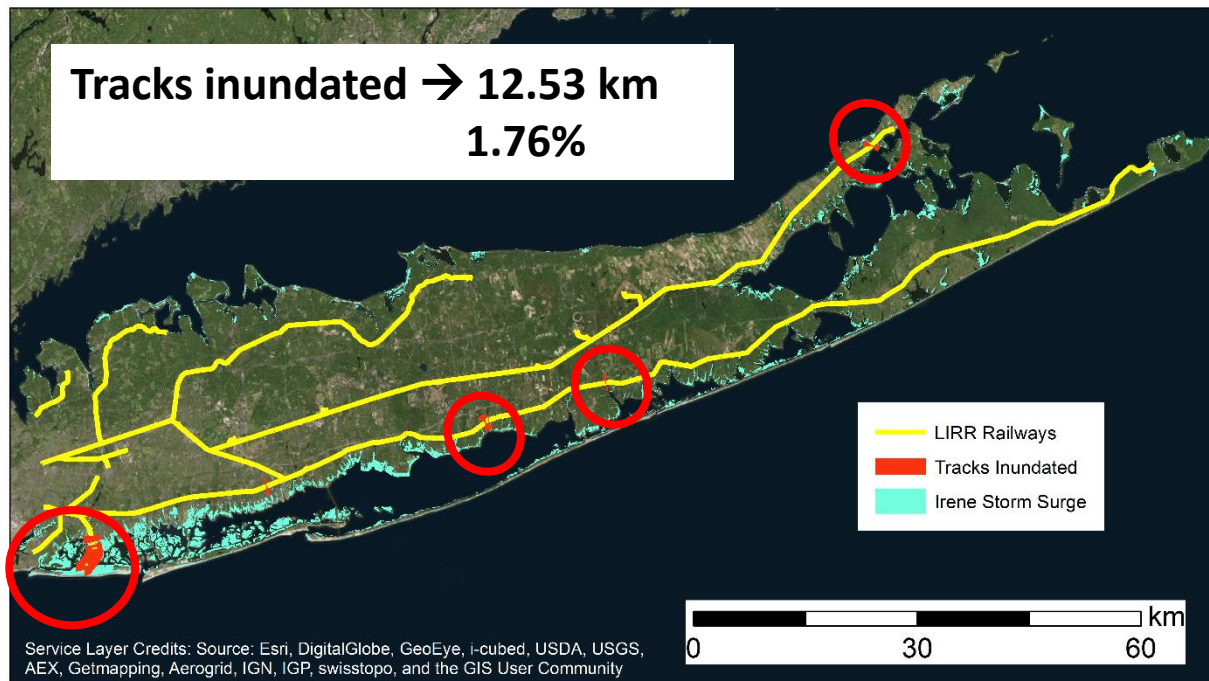
# Hurricane Irene



**Land Inundated = 187 km<sup>2</sup>, 6 %**

# Hurricane Irene

## Irene

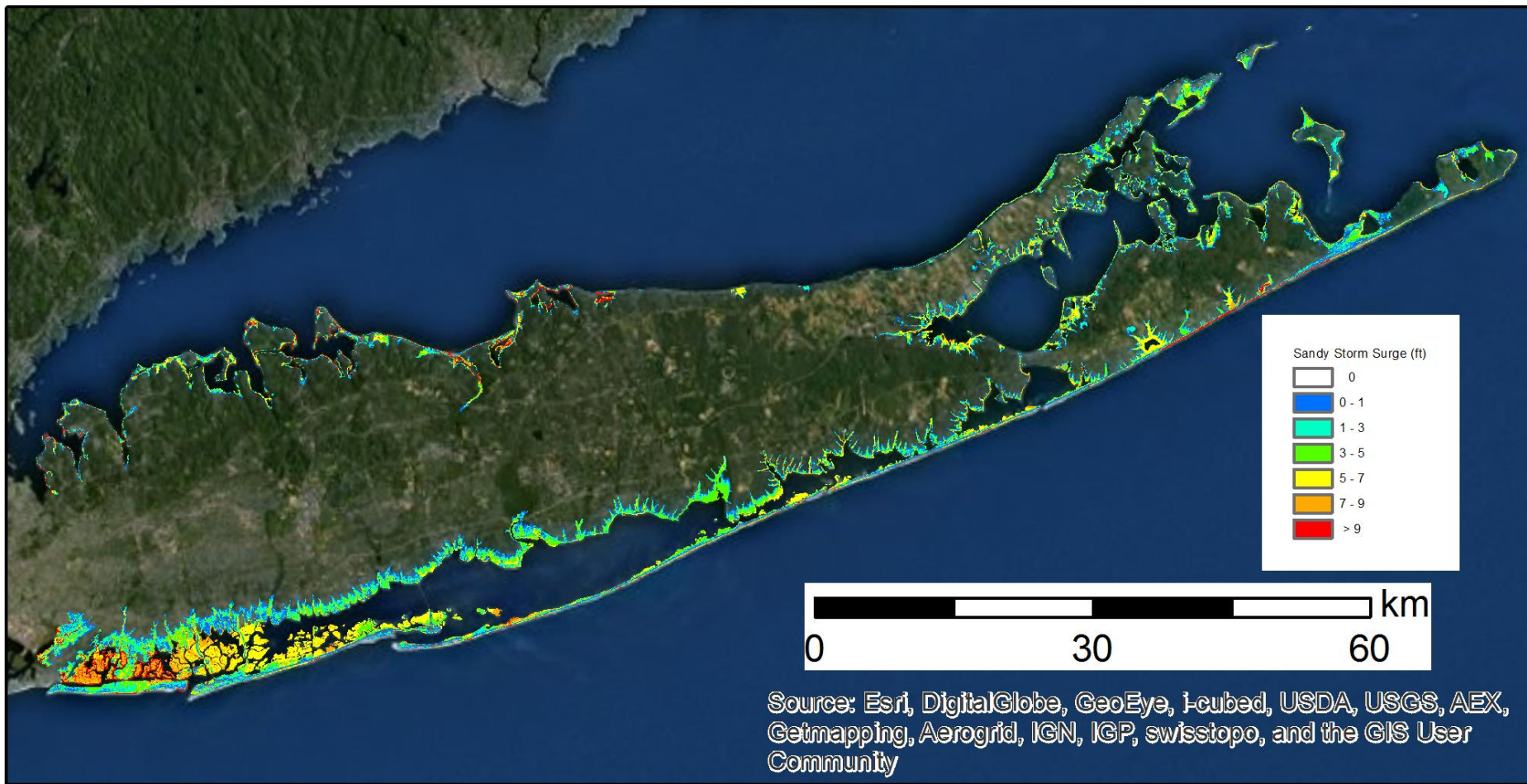


# Super Storm Sandy

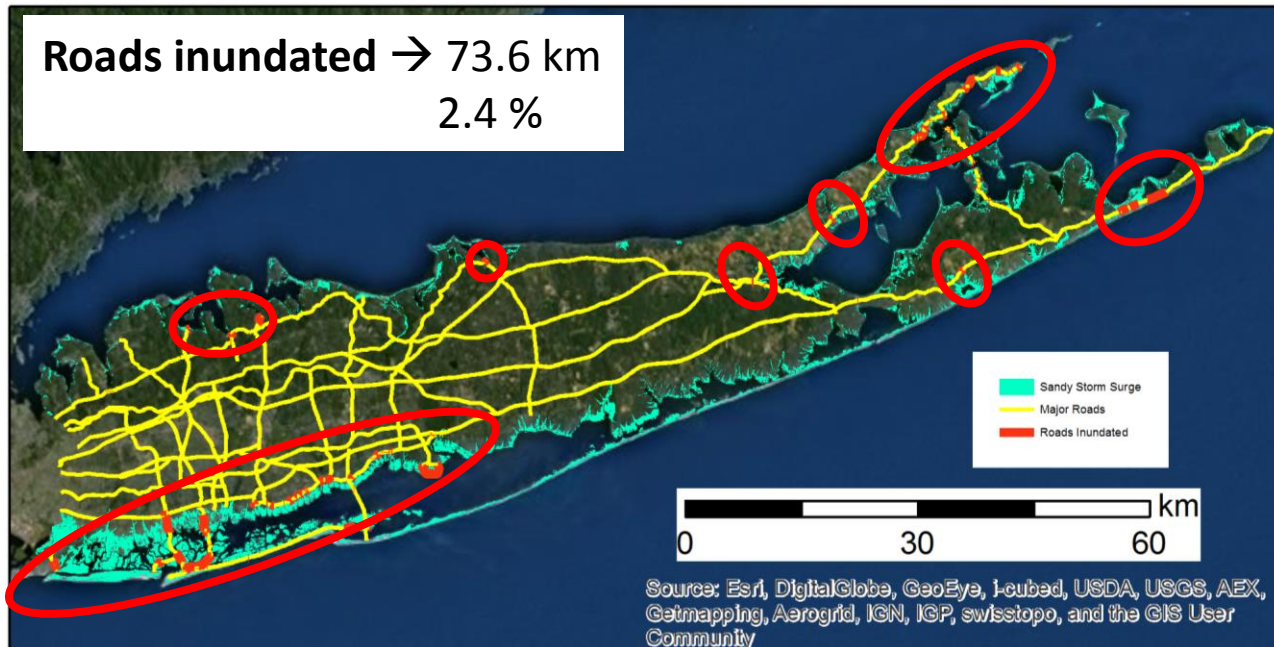
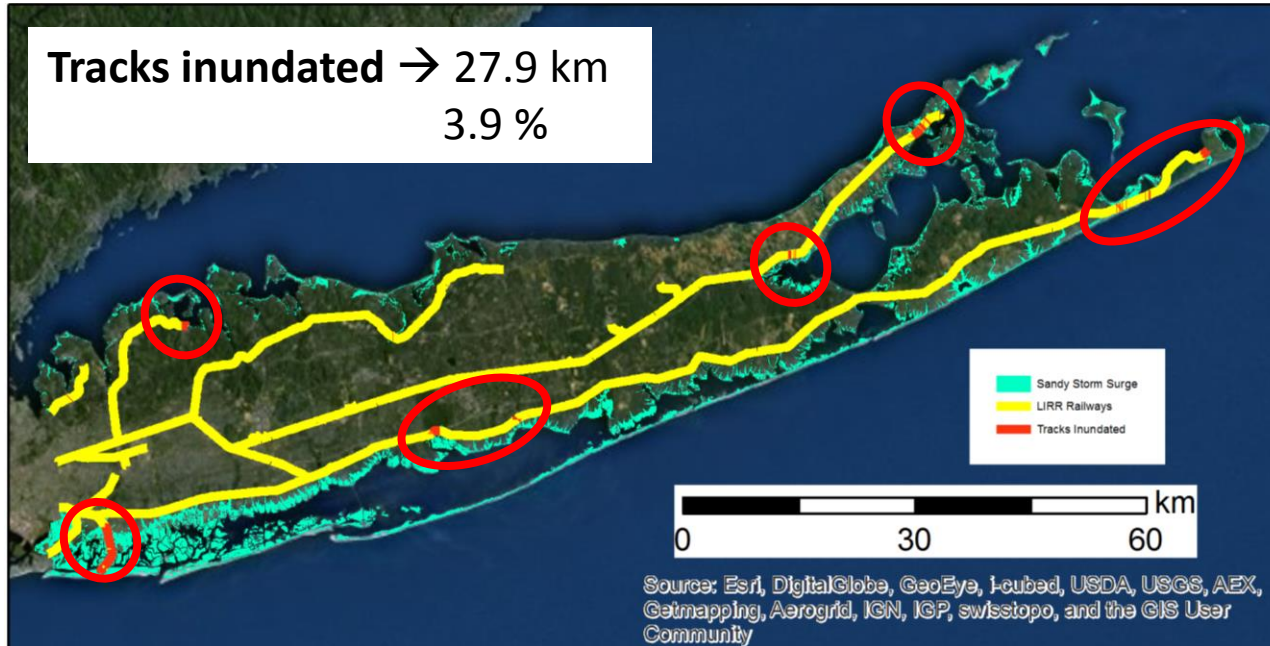


# Super Storm Sandy:

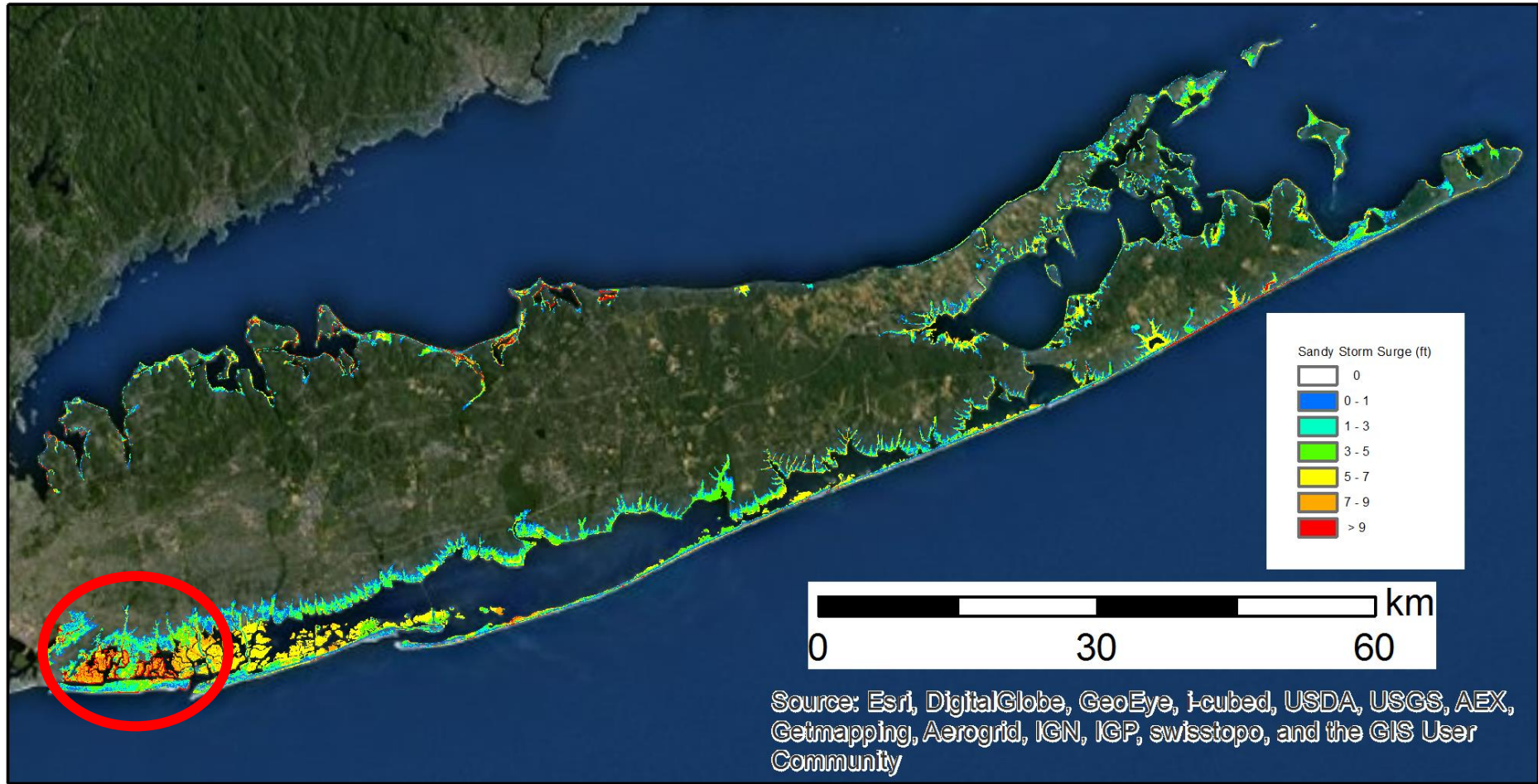
334 km<sup>2</sup> of inundated, 10.7% of land

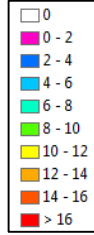
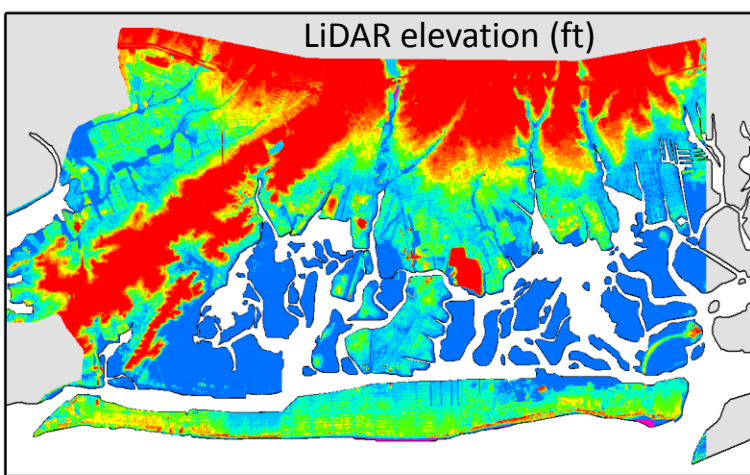


# SuperStorm Sandy

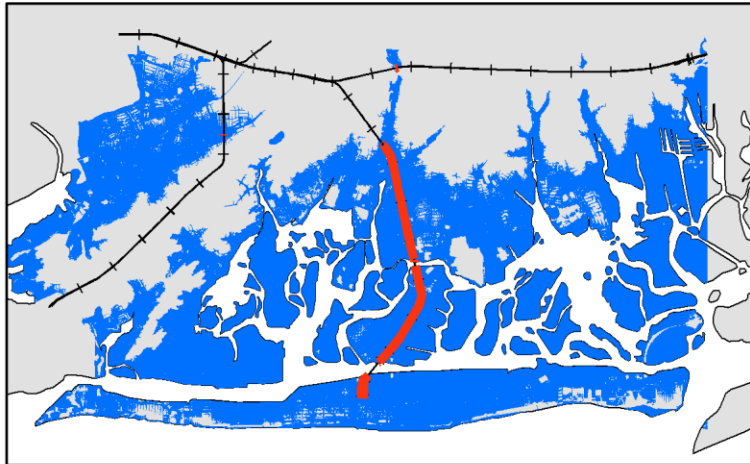
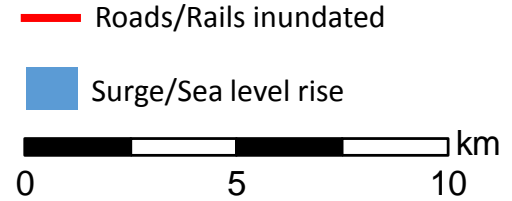


# Super Storm Sandy





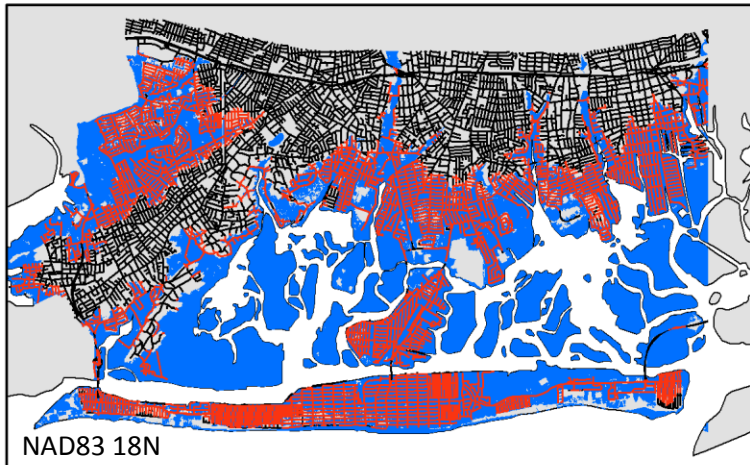
# Focus on southwest Nassau County – as per NYSDOT, to be expanded



## Rails

← Sandy  
15.5 km (19.4%)

SLR 2100 →  
8.5 km (10.6%)

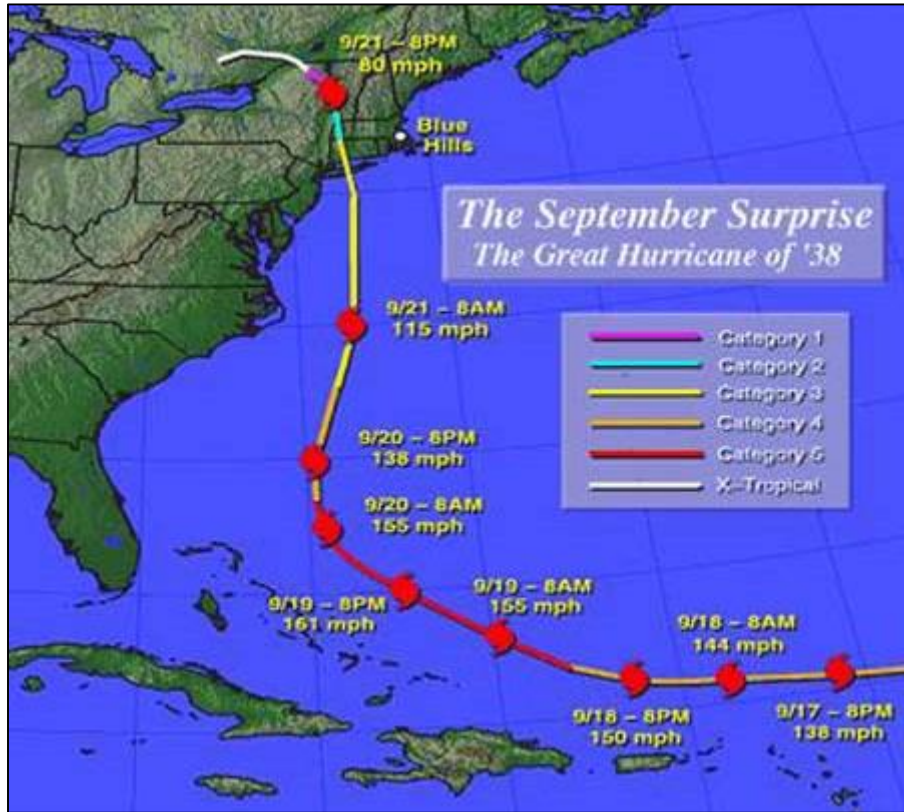


## Roads

← Sandy  
585 km (49%)

SLR 2100 →  
333 km (28%)

# Hurricane of 1938



Moving north at 70MPH, Category 3 hurricane; landfall at high tide; fastest moving storm to hit NYS; different storm trajectory than Sandy and Irene

The Paper with the News, the Advertising and the Circulation, (Reprinted Clearly, Concisely, Correctly, Staff's Complete Paper.)

## The Patchogue Advance

LONG ISLAND'S LEADING NEWSPAPER

66th Year - 1st Number 3      Patchogue, N. Y., Friday, September 23, 1938      16 Pages      Five Cents

# 21 Deaths from Hurricane in Suffolk; Many Missing; Damage Totals Millions

**Death List Of Storm In Suffolk**  
WESTHAMPTON BEACH  
Carl Della  
John Della  
Mrs. Myrtle Flagg  
of New Rochelle  
Mrs. Leo Kelly  
Leon Johnson  
Mrs. John L. King  
Mrs. Warren Lewis  
Mrs. Wagner  
Ann Seely

**WATERVILLE**  
William Allen, of St. Louis, Mo.  
EASTPORT  
Marshall Hawkins  
Oliver Brown  
FRESH WATERS  
Gran Deming  
NEW BRUNSWICK  
New Resident, of New York  
New Hope  
John Taylor

**WATERVILLE**  
Edward  
Mrs. Paul Lee Hunter  
and daughter  
Mrs. Della Lee Johnson  
OYSTER BAY  
Robert Prude, of Norwalk, Conn.

**WATERVILLE**  
When we went home during the night in the hurricane the wind roared overhead and the waves were in general, strong along the coast and near the shore. The sea was very rough, and the waves were very high. The wind was very strong, and the waves were very high. The sea was very rough, and the waves were very high. The wind was very strong, and the waves were very high.

**WATERSIDE** — Top—Typical scene, anywhere on South shore. The boat, Lawrence Henderson's launch, was moored east of Ocean Avenue dock, Patchogue, west 100 yards, up on the bluff South street wharf still attached. Frank Taylor's large fishing boat was still there. Bottom—Ocean Avenue dock, lower view, the shore at Bellport dock, one of many boats sunk or spoiled.

**Death List Of Storm In Suffolk**  
The death list from Wednesday's storm on Long Island continues to increase as bodies are found of persons formerly cleared as missing. Identified and unidentified dead numbers at least 21 in Suffolk county.

**The Worst Storm Loss, Many Years**  
Colonies on Beaches Demolished — Mainland Also Hard Hit  
Patchogue Village Board Votes Special Appropriation \$5,000 — Electric and Phone Service Still Short, Repairs Proceed Under Difficulties — Outside Emergency Helpers

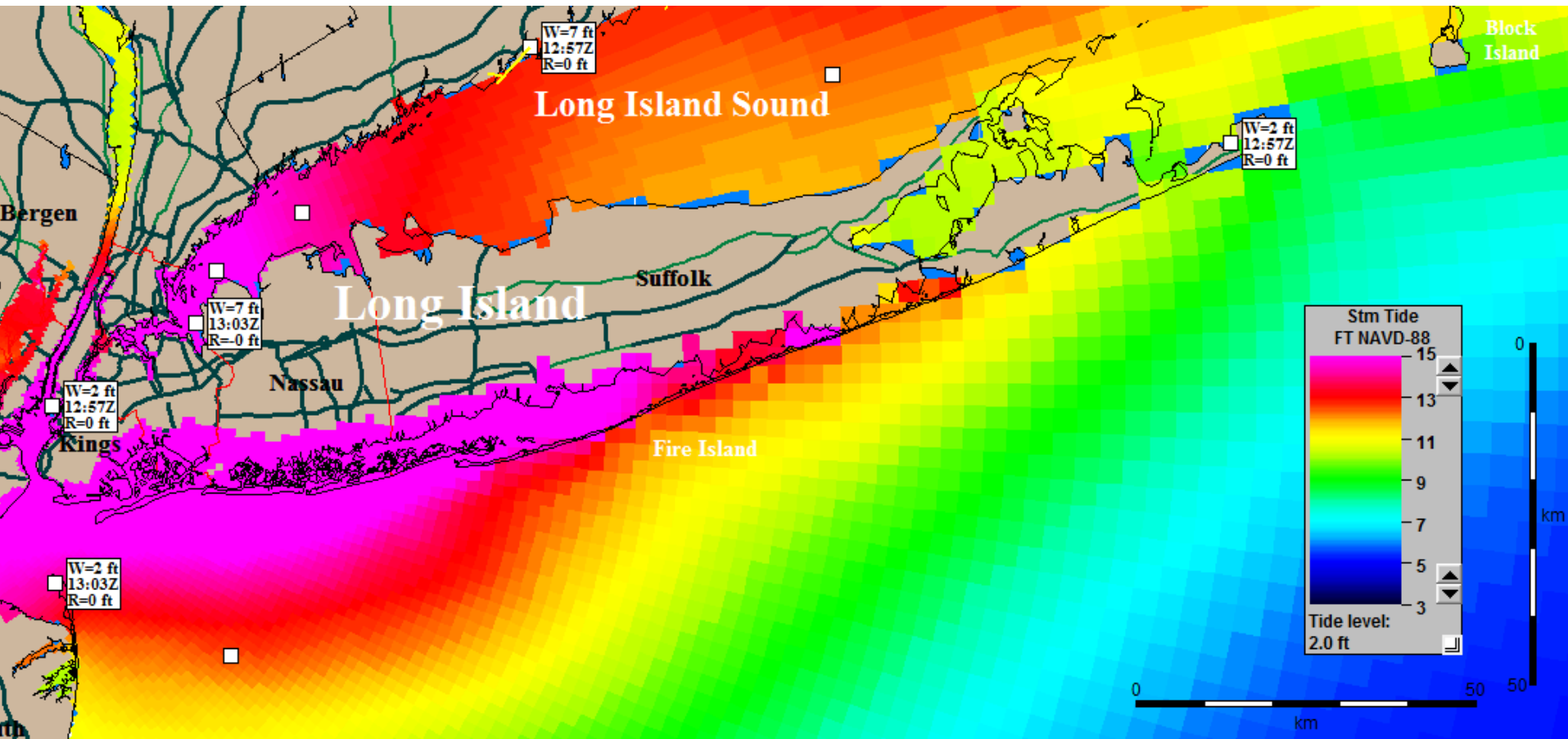
**Less Than Score Buildings Intact At Cherry Grove**  
Harry T. Weeks Describes Scene at Beach Colony  
Head and Shores-Patchogue 2111  
Beaching—Three Heaves Carried Inland Down the Beach  
CLEARING up operations as to what happened to Cherry Grove on Great South beach in the hurricane, Superintendent of Parks Harry T. Weeks of Patchogue, who has headed a salvage crew for 20 years.

**Frightful Scenes at Whampton Survivors Tell of Giant Waves**  
By JOHN V. TUTTILL, JR.  
When we went home during the night in the hurricane the wind roared overhead and the waves were in general, strong along the coast and near the shore. The sea was very rough, and the waves were very high. The wind was very strong, and the waves were very high. The sea was very rough, and the waves were very high.

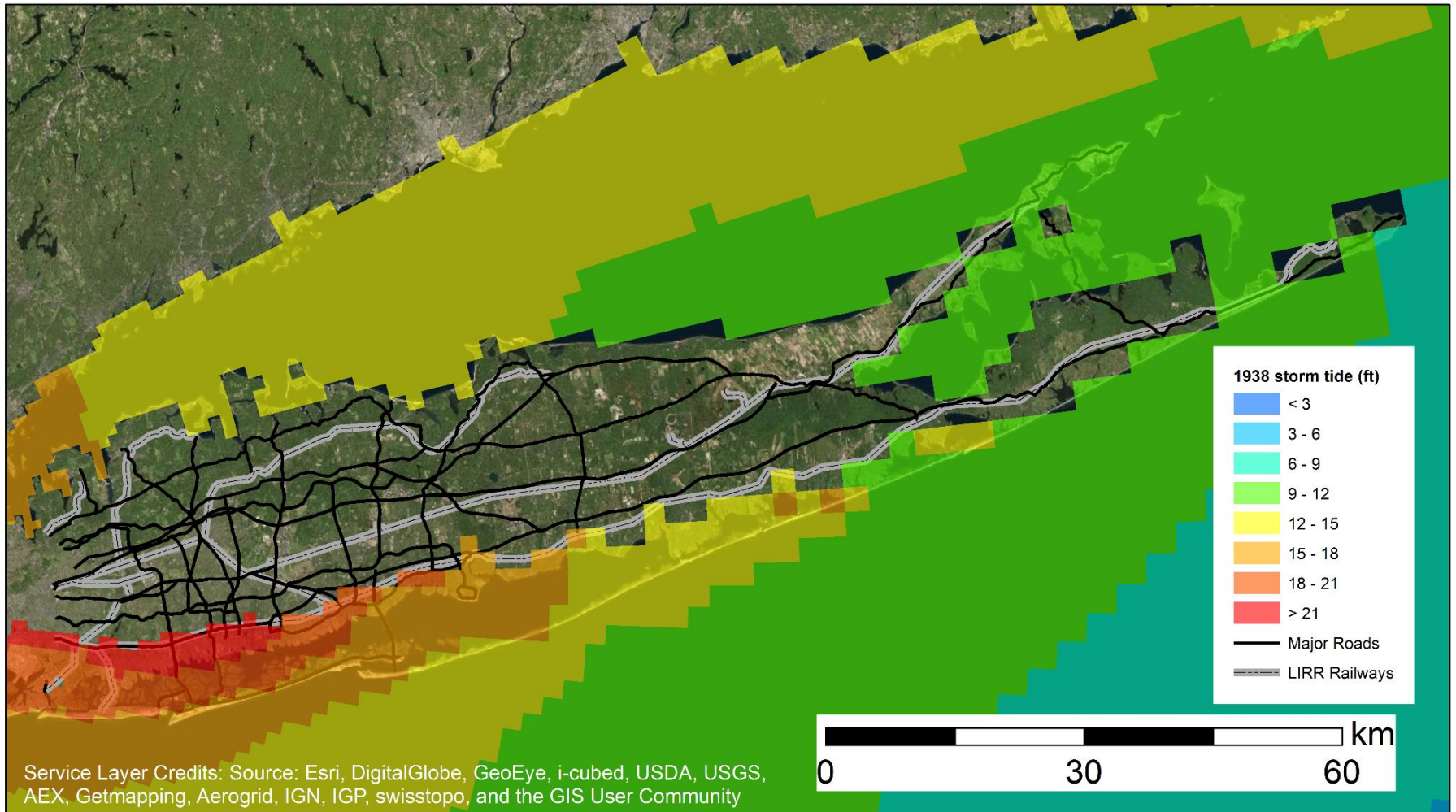
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# Hurricane of 1938 – SLOSH model



# Hurricane of 1938 – GIS import





# Summary



- Storm Surge from Sandy caused major inundation; almost 4% of rails and almost 2.5% of major roads
- Sea level rise 2100: >2% of major roads & >3% of all rails; Irene less intense.
- Southwest Nassau County roads and rails are most vulnerable to flooding.
- The North and South fork of eastern Suffolk County flooded under all scenarios; creates evacuation danger.
- Evaluation of alternative storm scenarios and the use of LIDAR elevation data will provide NYSDOT with tools not currently available to them.