

# Long Island Economic Flood Risk Study



*Leadership on Regional Issues*

A Study of Businesses, Revenues,  
and Jobs at Risk in Flood Zones on  
Long Island's South Shore



**LiRo GIS, Inc.**  
A LiRo-Hill Company

# LIRPC/LiRo-Hill Collaboration

- **Long Island's First Waterfront Zoning and Uses GIS Inventory (1<sup>st</sup> Phase)**
  - Available as a web-based “Story Map” on [LIRPC website](#) in the “Environment” Section
  - ¼ mile coastal buffer study area; 79 jurisdictions; 600 zoning designations
  - Analysis included examination of zoning in context to several other spatial datasets:
    - NY State Parcel Land Use database (280 categories)
    - Data Axle Business Location data (filtered for “Blue Economy” NAICS codes)
    - Hurricane Sandy Buyouts & Acquisitions; FEMA Flood Zones
    - World Resources Institute Global Power Plant Database
- **Long Island Economic Flood Risk Study (2<sup>nd</sup> Phase)**
  - Available as a “Map Dashboard” on [LIRPC website](#); summary numbers and downloadable PDF maps for jurisdictions/census designated places
  - FEMA Flood Zones/Expanded Risk Areas and Data Axle Business Location data
  - First study of its kind – to focus on flood risk threatening businesses, employees, and revenues

LONG ISLAND / ENVIRONMENT

## Rising ocean, bay tides could eventually reshape Long Island – and will alter how we live, work and play, experts say

LONG ISLAND / ENVIRONMENT

ONLY IN NEWSDAY

By Nicholas Spangler

[nicholas.spangler@newsday.com](mailto:nicholas.spangler@newsday.com) [Xspanglernewsday](#)

Updated November 10, 2023

## 'Living' shorelines help guard Long Island coast against ravages of storms

CLIMATE CHANGE EAST HAMPTON MONTAUK TOP STORIES

### EAST HAMPTON READY TO PUT ALL ITS COASTAL RESILIENCE OPTIONS ON THE TABLE

January 26, 2024 Beth Young 824

AUGUST 9, 2024 | Albany, NY

### Governor Hochul Announces Resiliency Efforts to Protect Long Island from Extreme Storms

## Hochul announces \$5 million for Long Island beach replenishment

WSHU | By Sabrina Garone  
Published January 23, 2024 at 4:00 PM EST

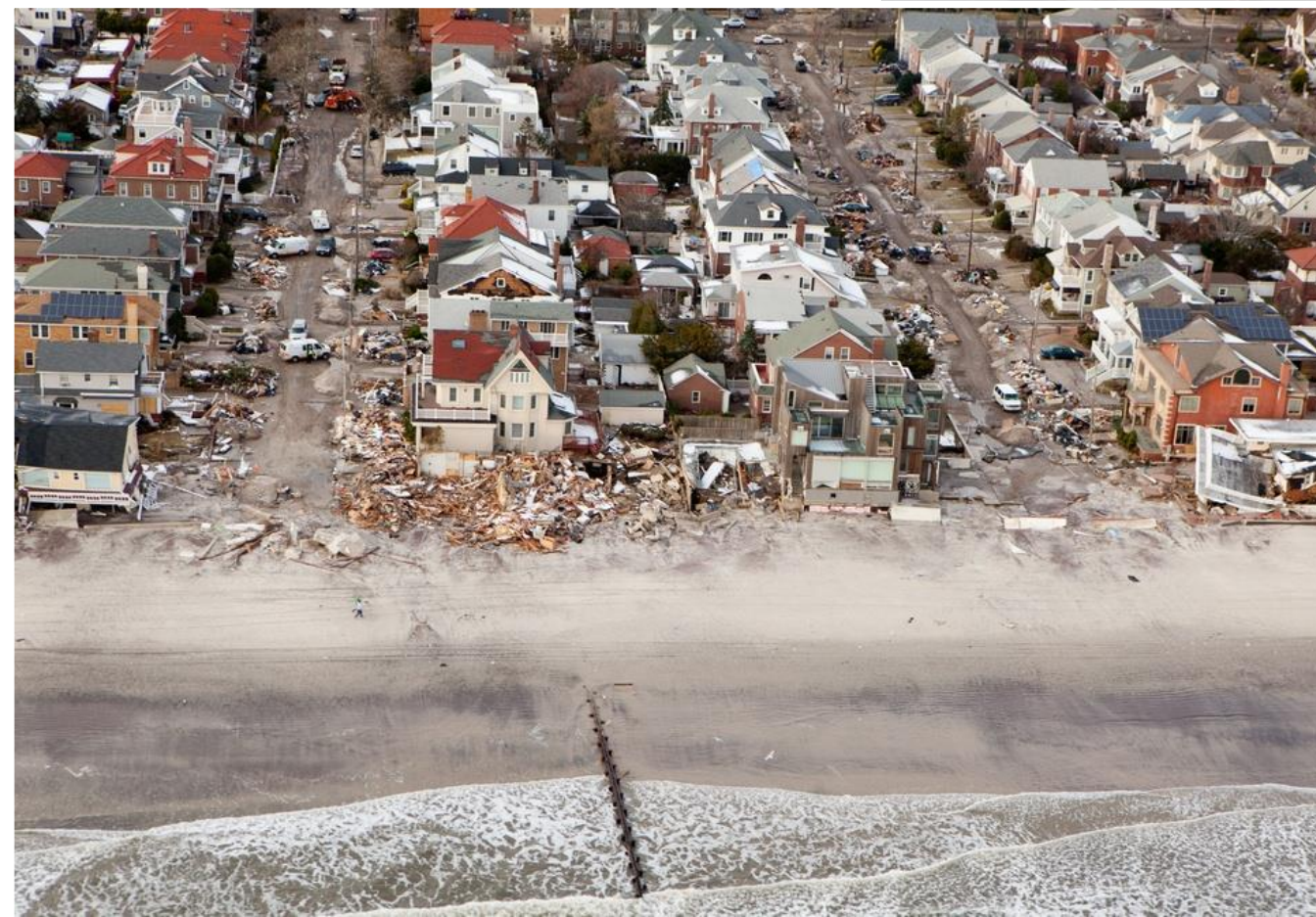
BUSINESS

ONLY IN NEWSDAY

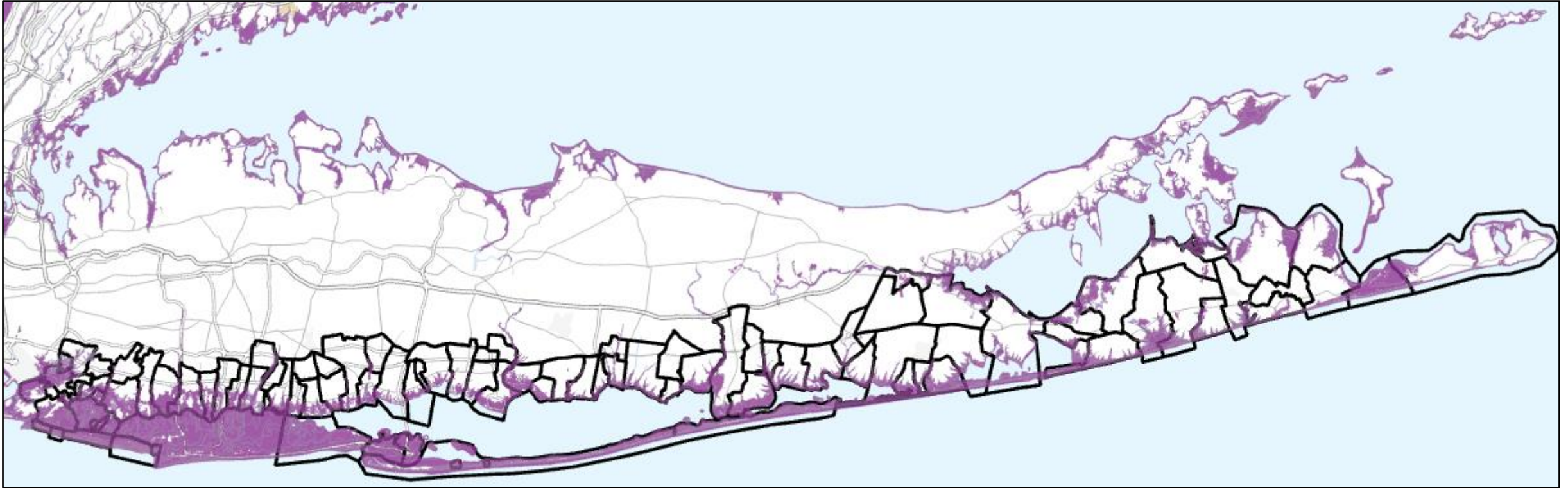
## Flood insurance premiums on Long Island could double over next 10 years as sea levels rise

# Shoreline projects ongoing on Long Island

There are at least 12 such shoreline projects in New York, state environmental officials say. Besides Patchogue, they include public projects in Riverhead, Baldwin, Southold, the Shinnecock Nation and Westchester County. East Hampton officials plan at least two in Montauk. A shoreline built to protect eight properties on Dune Road in Westhampton Beach is likely the first private project on Long Island, according to its designer. Another private project, still in permitting, will protect 12 nearby properties.

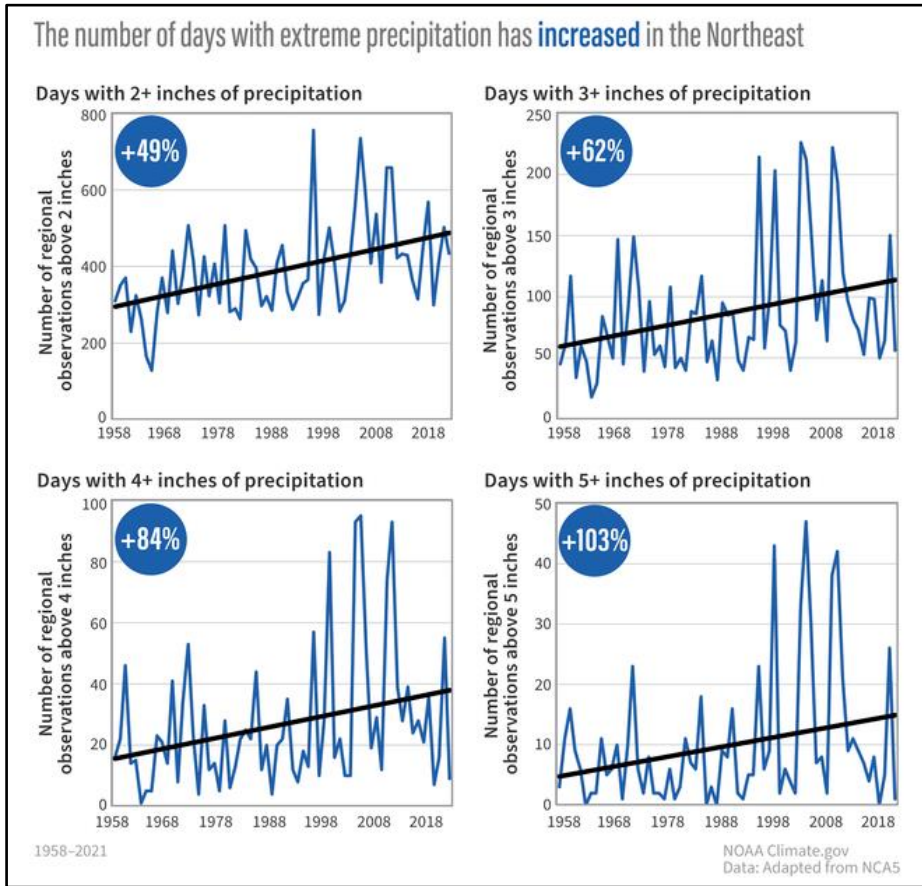


# FEMA Flood Zones



- Focus of this Study was Jurisdictions/Census Designated Places (“CDP”s) of the South Shore and the South Fork

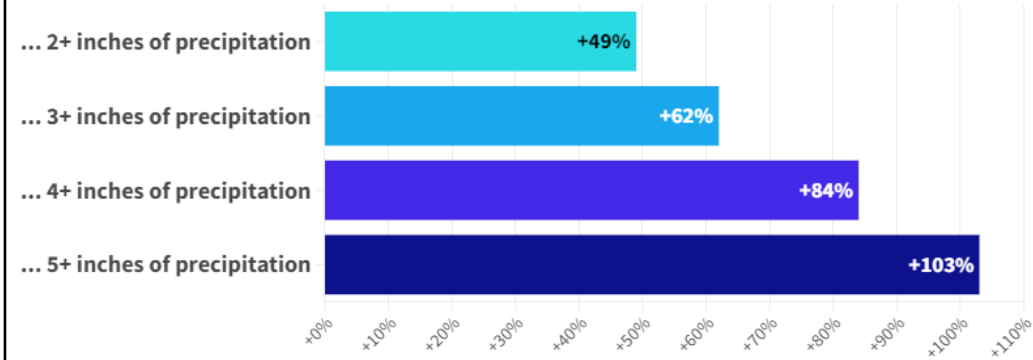
# FEMA Flood Zones Don't Capture The Whole Picture



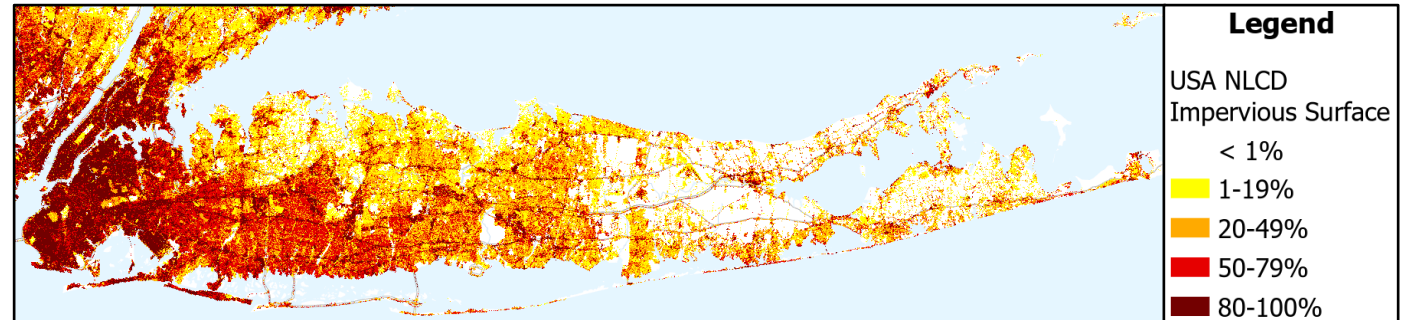
## Trends in Extreme Precipitation in the Northeast

Since 1958, there have been dramatic increases in the number of days with 2 or more inches of rain in the Northeast.

Days with:



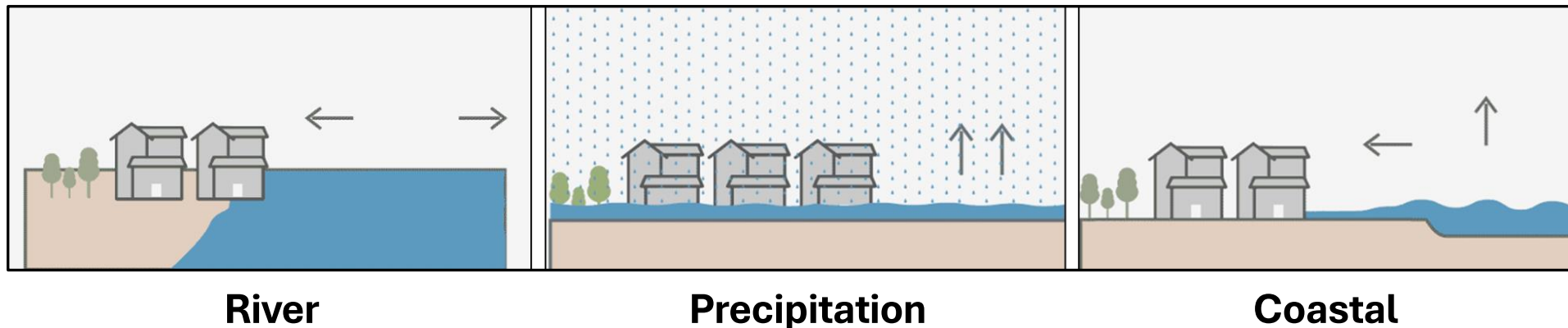
Source: USDA Forest Service, Drexel University, NOAA NCEI, and CISS NC.



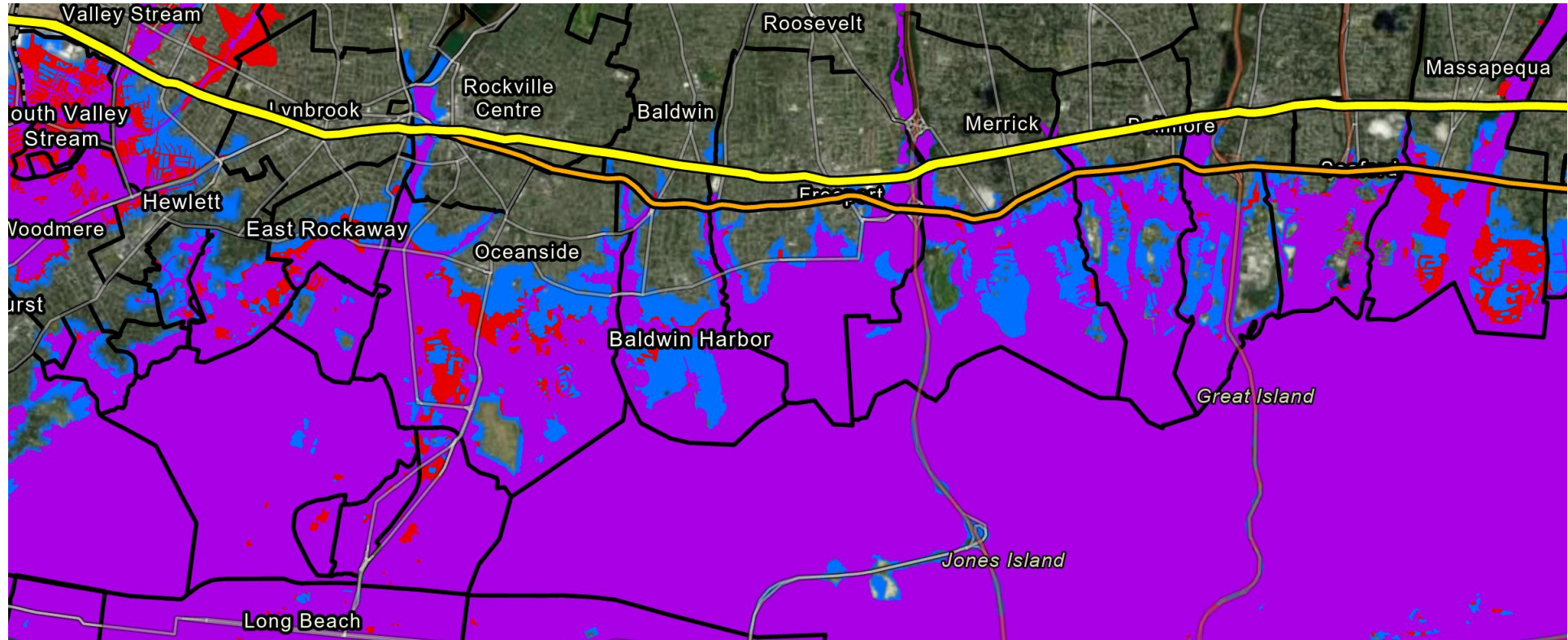
- Increase of extreme precipitation events
- Role of impervious surface or stormwater redirection

# Flood Types

	Flood Type	Description	Adaptation Infrastructure
Conventional FEMA Modeling	River	Flooding resulting from the overflow of rivers or streams due to heavy rainfall or snowmelt, inundating adjacent land areas	Floodwall, Levee, Dikes, Dams
	Coastal	Flooding when seawater inundates coastal areas due to storm surges, high tides, or sea-level rise	Seawalls, Living breakwaters
Frequency Increasing →	Precipitation	Flooding caused by excessive rainfall leading to surface water accumulation	Floodwall, Levee



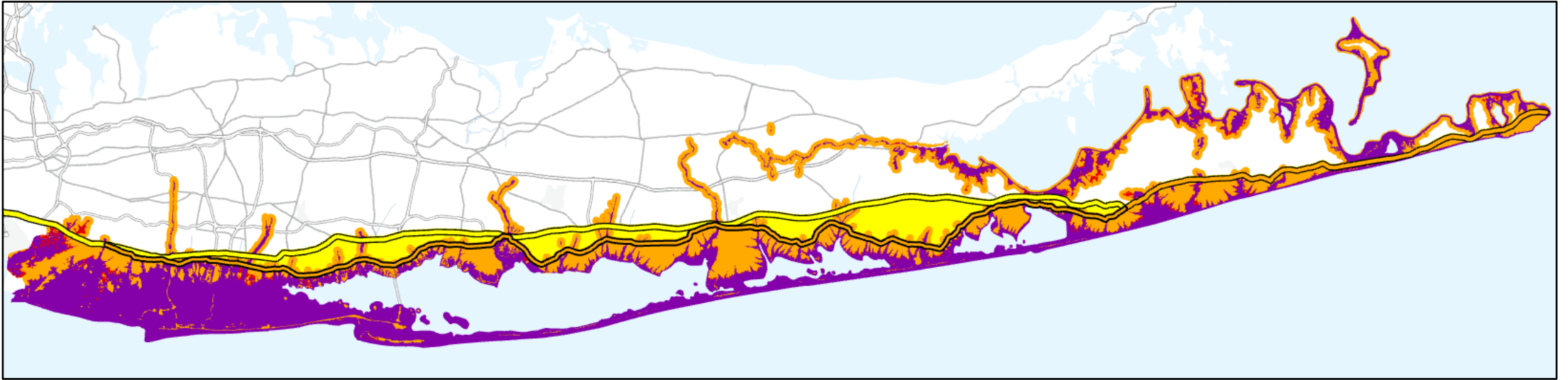
# Hurricane Sandy Versus Inundation Zones



- The Blue shows areas where the Sandy Inundation Zone extend past FEMA 100 Year (Purple) and 500 Year (Red) Zones
- Sunrise Highway-27 (Yellow) and Merrick Road/Montauk Highway-27A (Orange)

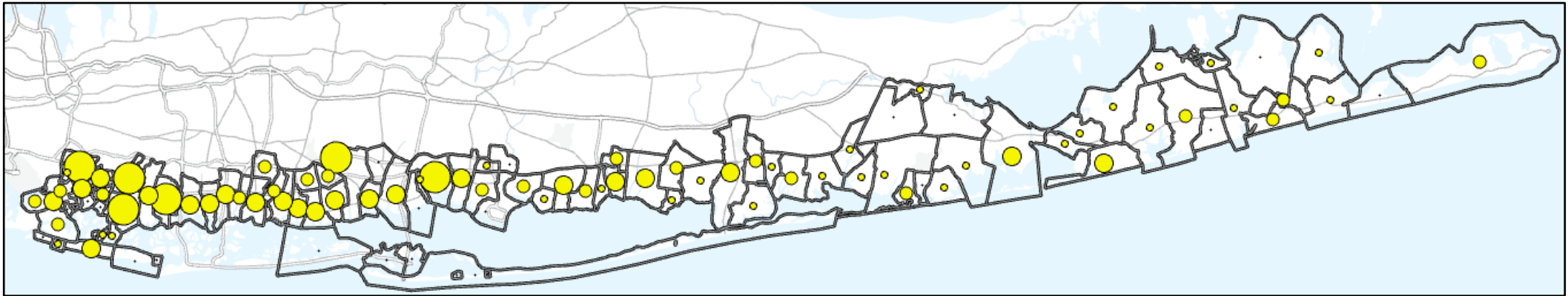
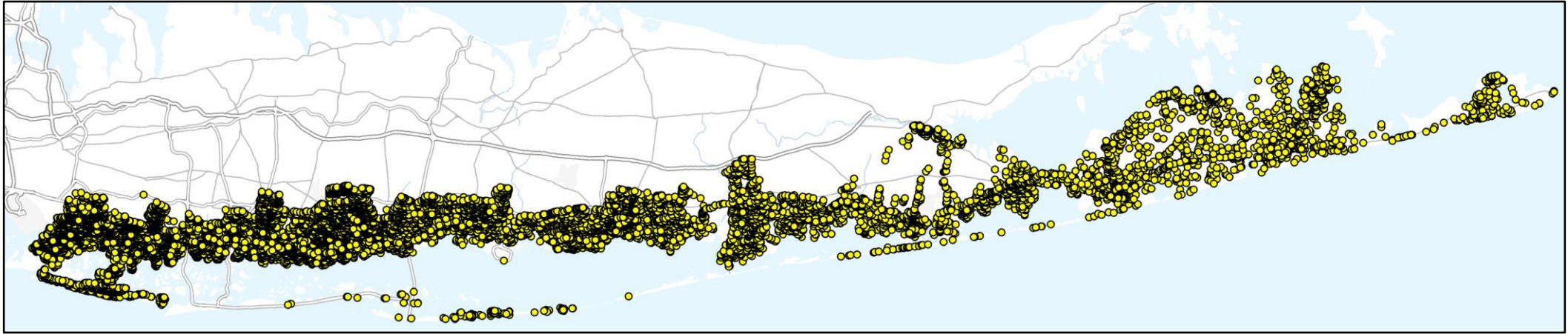


# Expanded Flood Zones



- South Shore highways used to establish expanded Risk Zones because of prevalence of businesses in these corridors; flat topography; historical flooding events; simplicity; and to establish relatable/consistent boundaries
  - Very High Risk** – FEMA 100 Year Flood Zone (“1% Risk Zone”) as is
  - High Risk** – FEMA 500 Year Flood Zone (“0.2% Risk Zone”) as is
  - Medium Risk** - Quarter mile buffer from FEMA 100 Year Flood Zone (including riparian areas); north to Merrick Road/Montauk Highway-27A (including quarter mile buffer to north)
- **Low Risk** – North from Medium Risk Zone to Sunrise Highway-27 (including quarter mile buffer to north)
- Quarter mile north was to account for businesses on both sides of the highways

# Business Locations



- Business Locations (top) and Business Location Count per jurisdiction (bottom)

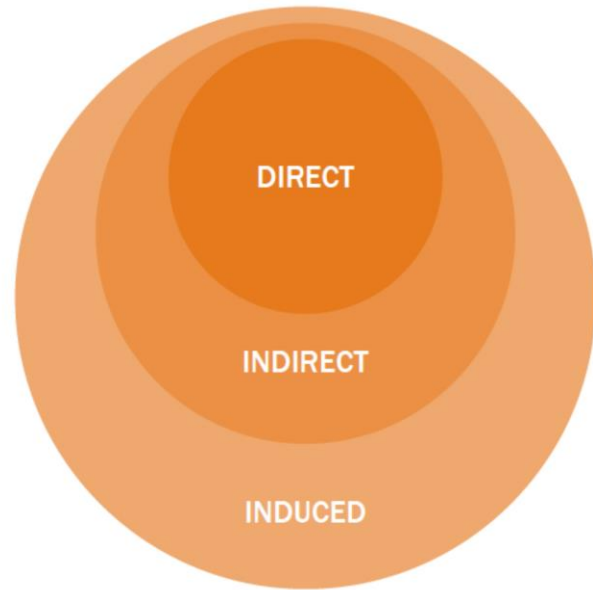
# The Numbers

	Number of Businesses (est)	Annual Sales Volume (est)	Number of Employees (est)
<b>VERY HIGH RISK</b>	5,903	\$7,090,593,000	70,214
<b>HIGH RISK</b>	1,457	\$1,475,703,000	11,438
<b>TOTAL FEMA RISK</b>	<b>7,360</b>	<b>\$8,566,296,000</b>	<b>81,652</b>
<b>MEDIUM RISK</b>	26,818	\$32,563,192,000	200,272
<b>LOW RISK</b>	8,854	\$15,085,343,000	87,558
<b>TOTAL RISK</b>	<b>43,032</b>	<b>\$56,214,831,000</b>	<b>369,482</b>
<b>NEGLIGIBLE RISK</b>	5,099	\$8,277,657,000	41,989
<b>GRAND TOTAL</b>	48,131	\$64,492,488,000	411,471
	Number of Businesses (est)	Annual Sales Volume (est)	Number of Employees (est)
<b>VERY HIGH RISK</b>	12.3%	11.0%	17.1%
<b>HIGH RISK</b>	3.0%	2.3%	2.8%
<b>TOTAL FEMA RISK</b>	<b>15.3%</b>	<b>13.3%</b>	<b>19.8%</b>
<b>MEDIUM RISK</b>	55.7%	50.5%	48.7%
<b>LOW RISK</b>	18.4%	23.4%	21.3%
<b>TOTAL RISK</b>	<b>89.4%</b>	<b>87.2%</b>	<b>89.8%</b>
<b>NEGLIGIBLE RISK</b>	10.6%	12.8%	10.2%
<b>GRAND TOTAL</b>	100.0%	100.0%	100.0%

- Federal Reserve Economic Data estimates Nassau and Suffolk Counties have an estimated GDP of \$246 billion; the \$56B of annual sales here in a Flood Risk Zone (Low to Very High) is ~25% of that number; the \$8.5B of annual sales here in a FEMA Flood Zone (High to Very High) is ~3.5% of that number
- The Bureau of Labor Statistics estimates that Nassau and Suffolk Counties contain a total of 1.5 million jobs; this study estimates that 369,000 jobs are in a Flood Risk Zone (Low to Very High) about ~25% of total jobs; whereas 81,000 jobs are in a FEMA Flood Zone (High to Very High) about ~5% of total jobs
- The Blue Economy Study of Long Island counted 68,000 jobs; the 369k jobs in a Flood Risk Zone (Low to Very High) here is over 5x that number; whereas the 81k jobs in a FEMA Flood Zone is 20% higher than that number

**Sources: Bureau of Labor Statistics, Federal Reserve Economic Data, HR&A**

# Economic Impacts Ripple Out from Businesses



- Direct output or economic contribution of the Industry
- Effect of Direct Spending on regional supplier firms and their employees
- Economic effect induced by re-spending by industry and supplier employees

**Direct impacts** - The immediate change to the economy, such as the jobs and money that come into the economy as a result of an activity. .

**Indirect impacts** - The economic activity created by businesses that provide goods and services to the businesses directly impacted by the activity.

**Induced impacts** - The economic activity created by the spending of people working for the businesses directly impacted by the activity.

*Hurricane Sandy affected 265,300 businesses, causing an estimated \$6 billion in damage from revenue losses and repairs  
-Hurricane Sandy Response & Recovery Report (2013)*

# Map Demonstration

[Link to Map](#)

Long Island Economic Flood Risk Study

Jurisdiction  
Select

Risk Category  
Select 1 or more

☰

◀ 1 of 100 ▶

Amagansett CDP

Interactive Future Flood Scenario Map by First Street
Click Here

Amagansett.CDP.pdf

Total Number of Businesses by Risk Level

- Very High Risk 5.9k
- High Risk 1.5k
- Medium Risk 26.8k
- Low Risk 8.9k
- Negligible Risk 5.1k

When a jurisdiction is selected the pie graph represents totals by jurisdiction, otherwise the pie graph will show the totals of the map extent.

**Map Legend**

**Business Locations**

- Very High Risk
- High Risk
- Medium Risk
- Low Risk
- Negligible Risk

**Flood Risk Zones**

- Very High Risk
- High Risk
- Medium Risk
- Low Risk

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Data Sources: Data Axle 2023 (Business Locations); FEMA Flood Hazard Layer (October 5, 2022)

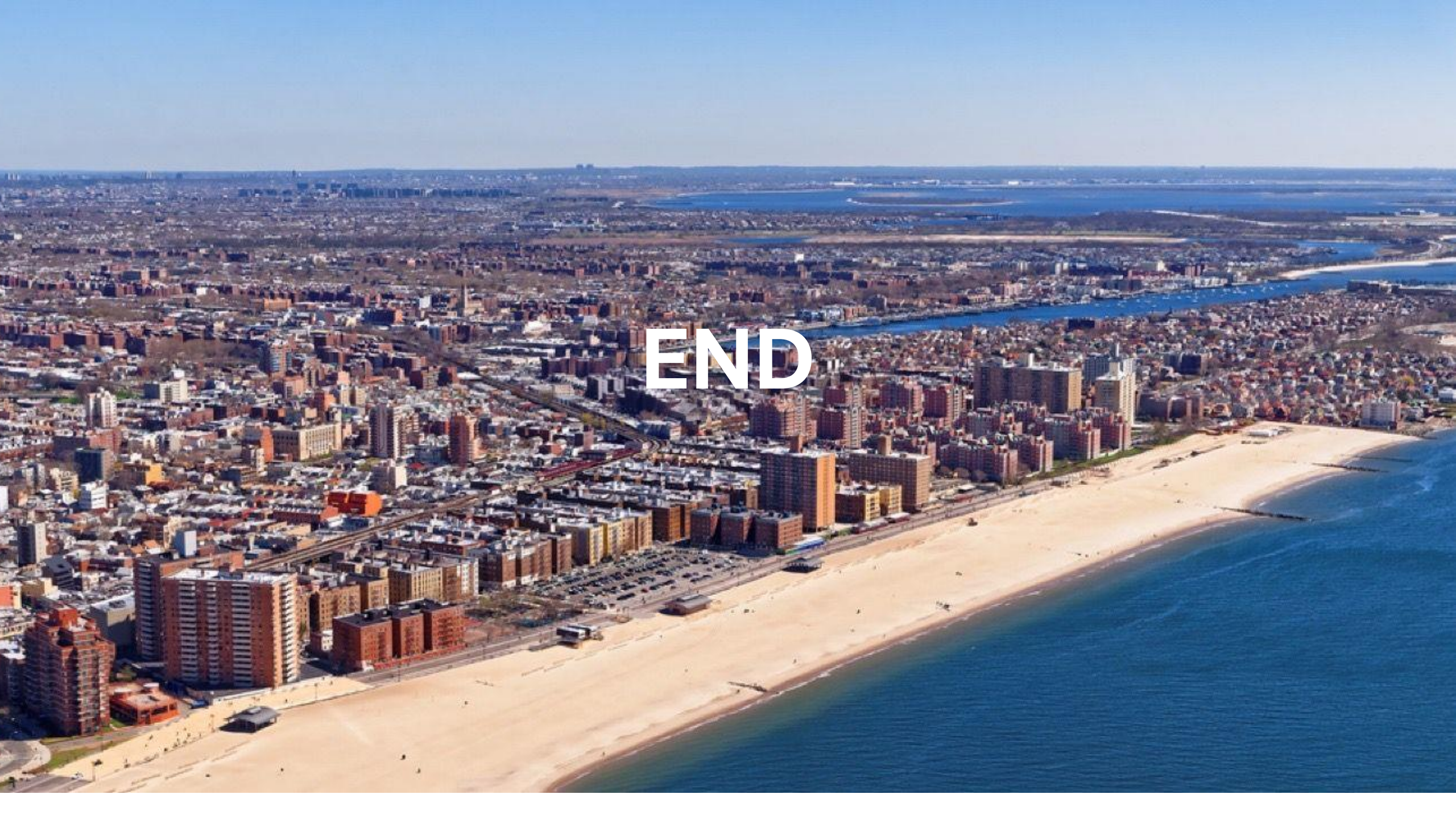
Map
Most Impacted Communities in Nassau County
Most Impacted Communities in Suffolk County
Most Impacted Communities on Long Island

	Number of Businesses (est)	Annual Sales Volume (est)	Number of Employees (est)
<b>VERY HIGH RISK (1% Annual Chance Flood Hazard)</b>	5,903	\$7,090,593,000	70,214
<b>HIGH RISK (0.2% Annual Chance Flood Hazard)</b>	1,457	\$1,475,703,000	11,438
<b>MEDIUM RISK (To Merrick Road / Montauk Hwy-27)</b>	26,818	\$32,563,192,000	200,272
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<b>Total</b>	<b>48,131</b>	<b>\$64,492,488,000</b>	<b>411,471</b>

This GIS (Geographic Information Systems) analysis combines FEMA flood plain data, common landmarks (Highways 27 and 27A/ Merrick Road), and quality-controlled third party business location data to quantify the Economic Flood Risk threatening Long Island Communities in terms of estimated number of businesses, employees, and sales volume.

# Types of Adaptation Projects

	Inland	Coastal	Inland & Coastal
<b>Green Infrastructure</b>	Retention Pond Bioswale Floodplain restoration Rain Garden	Beach nourishment Dune Mangrove Oyster reef Coral Reef Living breakwater Living shoreline	Marshland/wetland creation Marsh/wetland restoration Earthen berm Open space preserve Buy-out Dike
<b>Grey Infrastructure</b>	Pervious pavement Pipe Ditch Flood wall Infiltration basin Weir	Storm Surge Barrier Sediment accretion Seawall Tide gate Valve	Wastewater System Upgrades Culvert Dam Elevated roads Levee Pump, deployable Pump station Stormwater system upgrade Spillway Stormwater vault
<b>Green/Grey Infrastructure</b>	Detention basin		Acquisition



END