

ELECTRIC POWER SYSTEM PERFORMANCE (GIS BASED OUTAGE PREDICTION PLATFORM)

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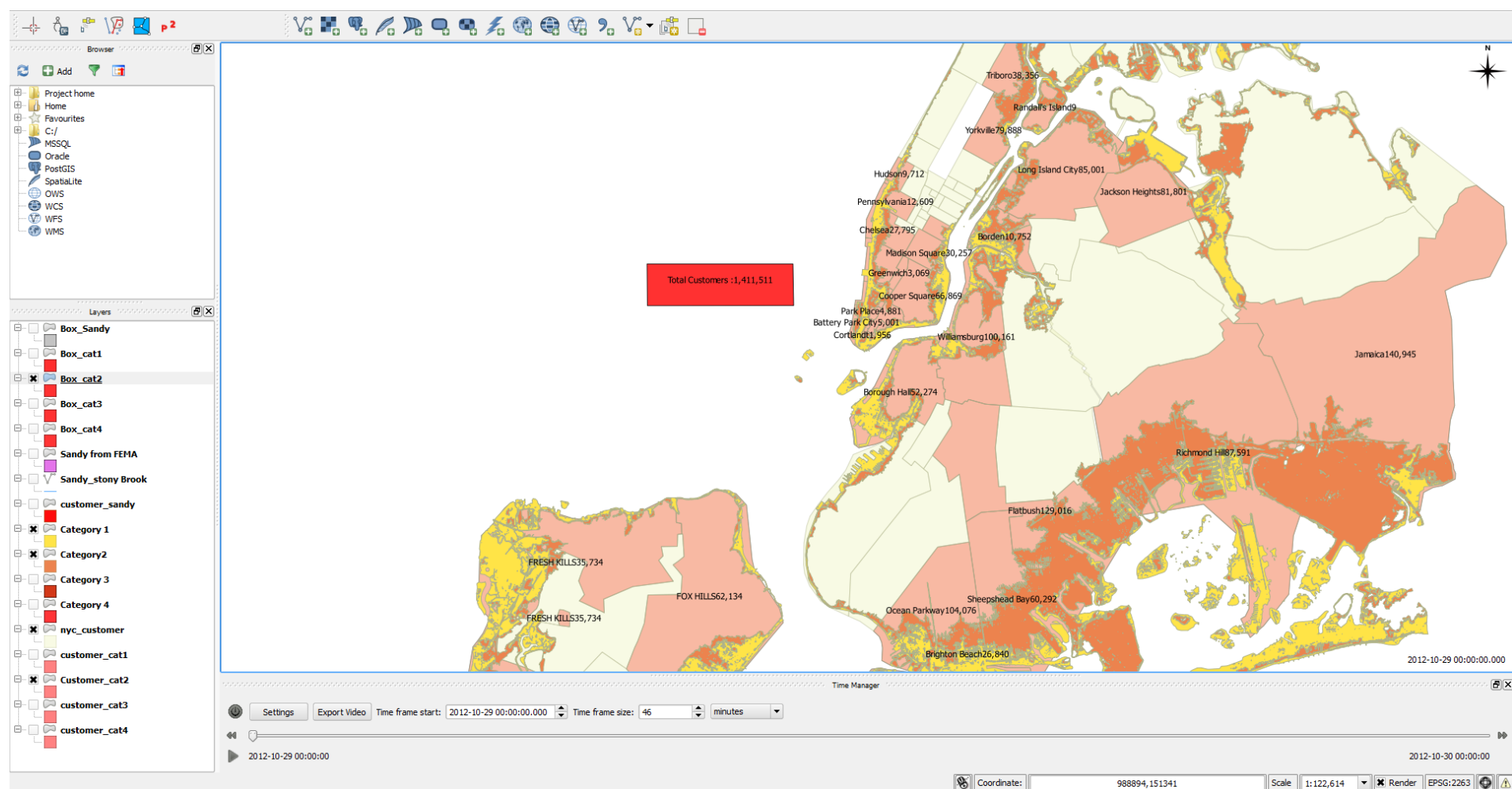


RESILIENCY INSTITUTE FOR
STORMS & EMERGENCIES

MOTIVATION & OBJECTIVES

- Predict how the distribution networks behave in possible future hurricane (category 1 up to 4)
- Which network will be affected and how many customers will be disconnected
- What are the solutions to improve resiliency

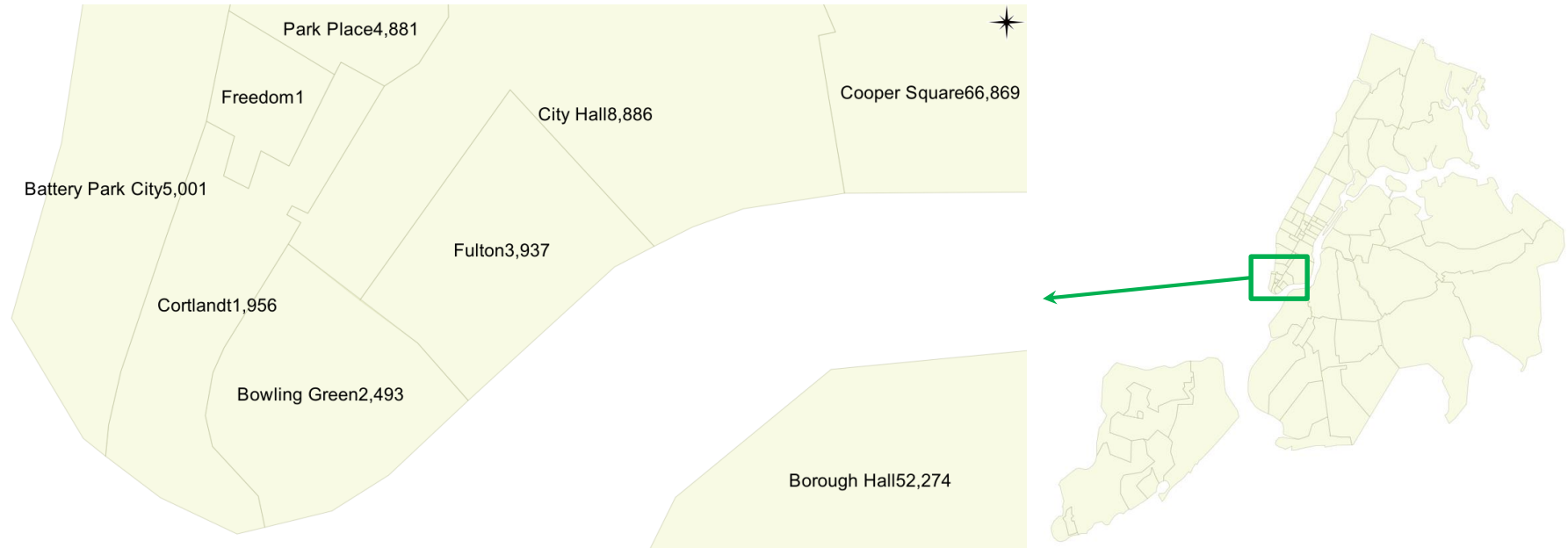
PLATFORM OVERVIEW



- Inundation zones
- Affected networks with outage (red color)
- Number of Customers which will be disconnected in each network
- Total number of customers who will lose power

INPUT DATA (ELECTRICAL)

NYC Electrical Distribution Networks (Con-Edison)



INPUT DATA (FLOODING)

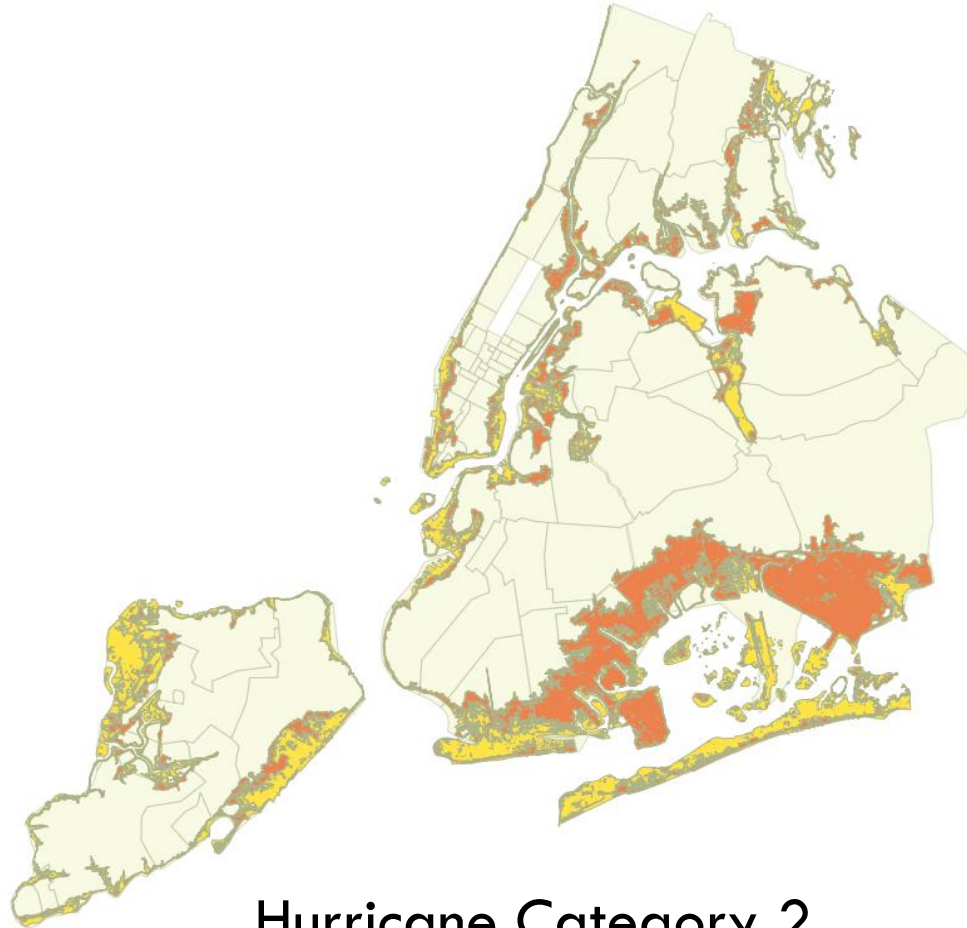
Inundation Zone Shape Files in GIS format



Hurricane Category 1

INPUT DATA

Inundation Zone Shape Files in GIS format



Hurricane Category 2

INPUT DATA

Inundation Zone Shape Files in GIS format



Hurricane Category 3

INPUT DATA

Inundation Zone Shape Files in GIS format



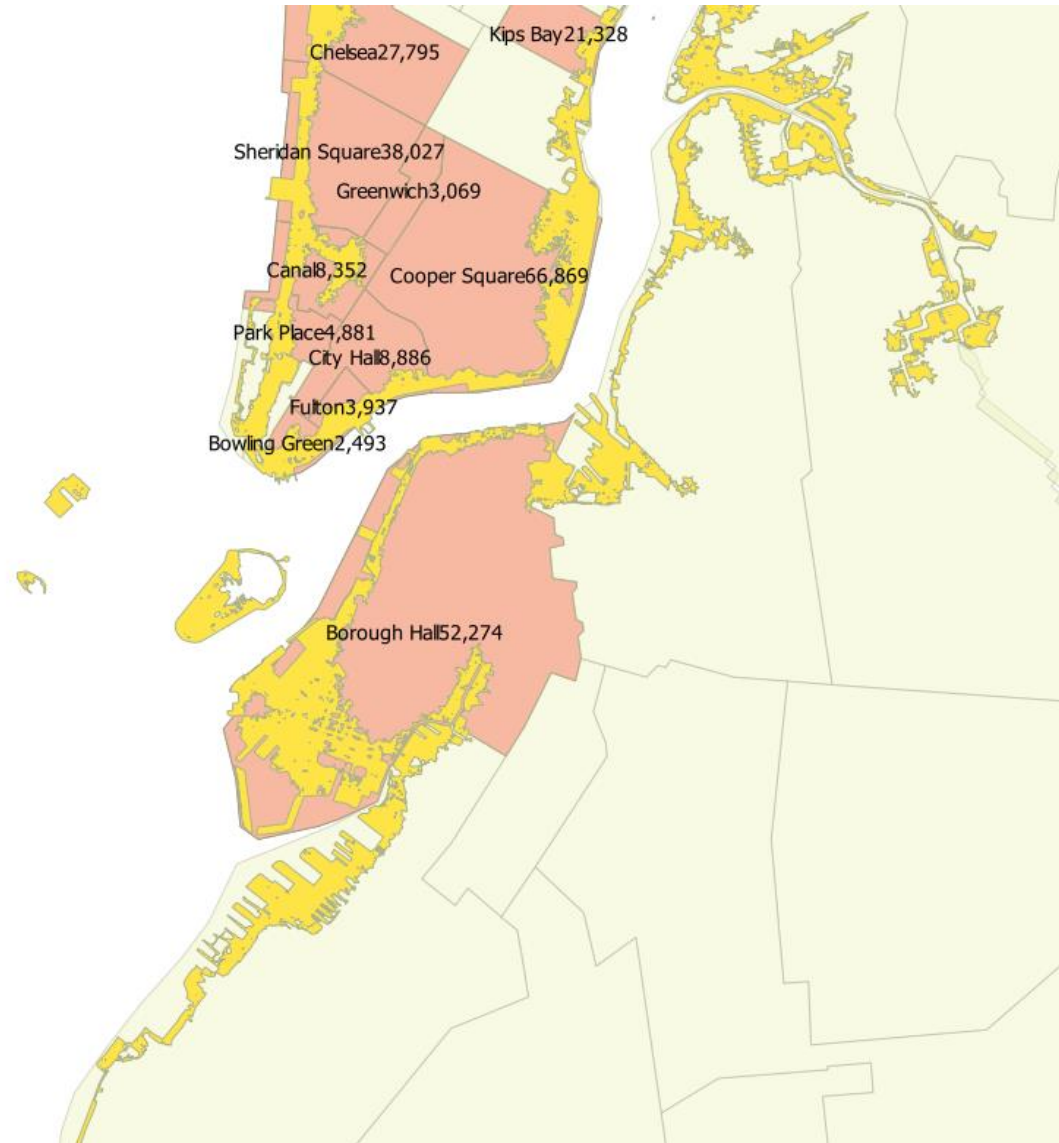
Hurricane Category 4

SOFTWARE OUTPUT

Hurricane Sandy as a Benchmark

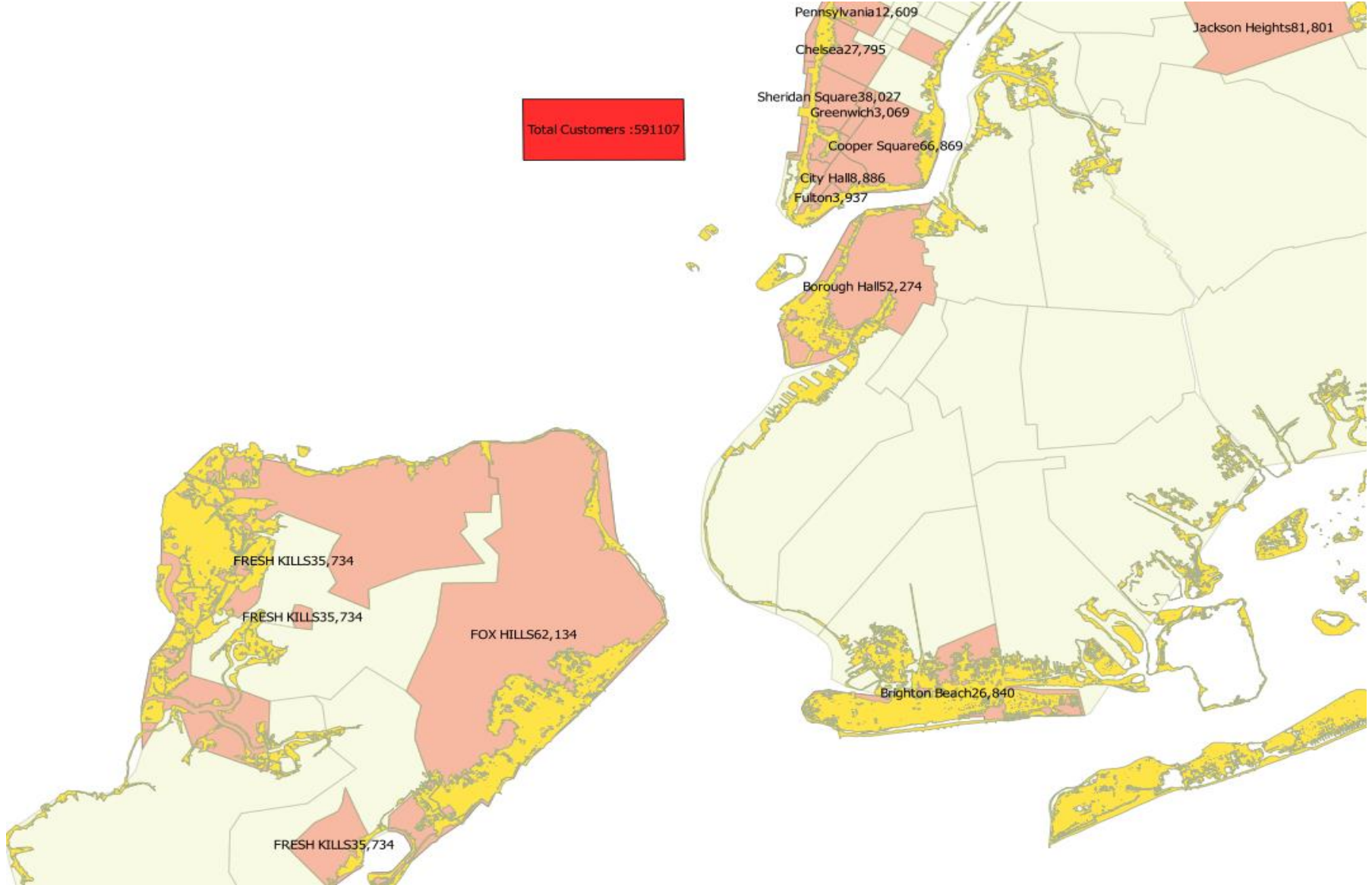
CATEGORY.1 RESULT

Number of Customers :310712



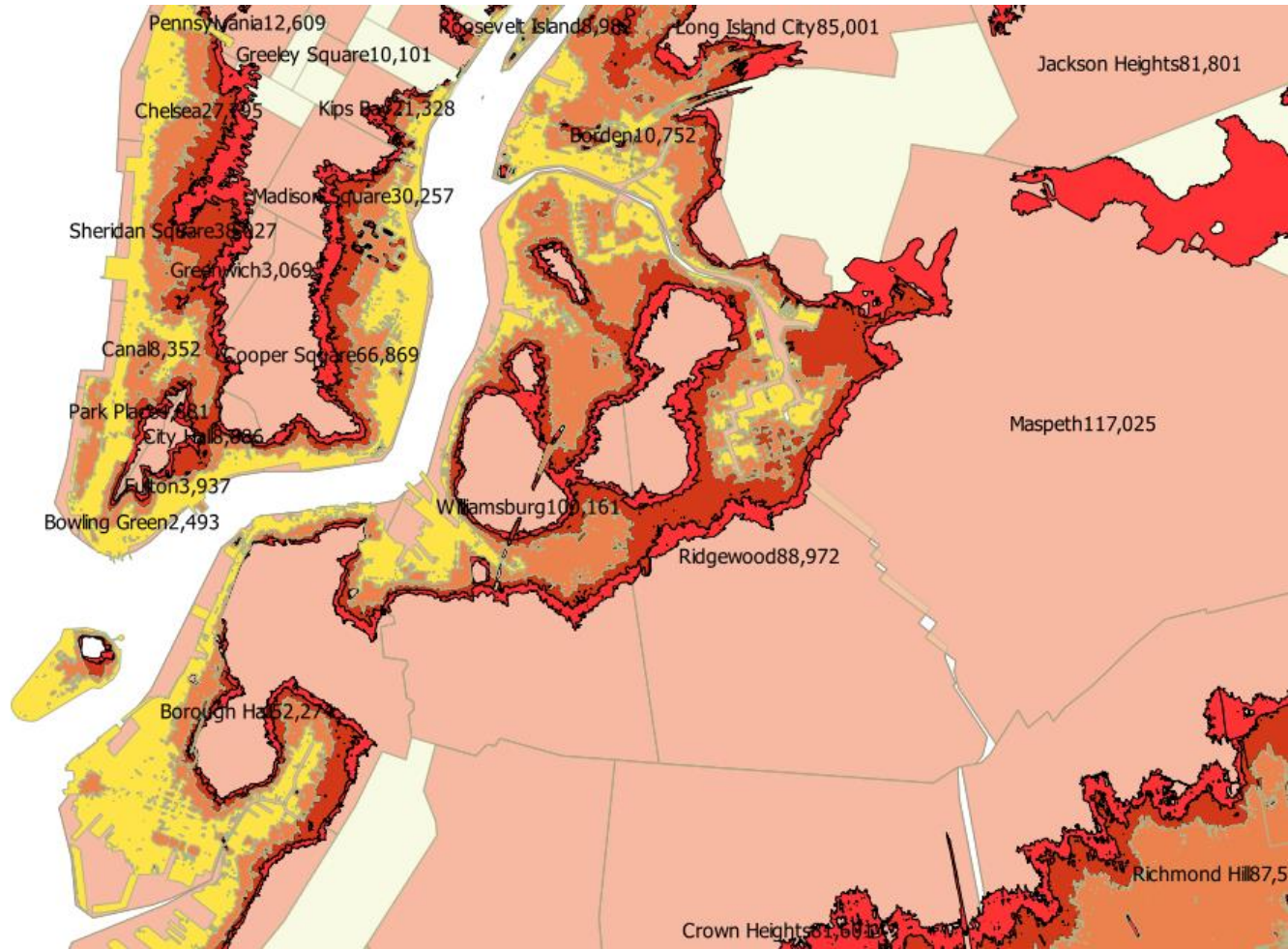
CATEGORY.1 RESULT

Total Customers :591107



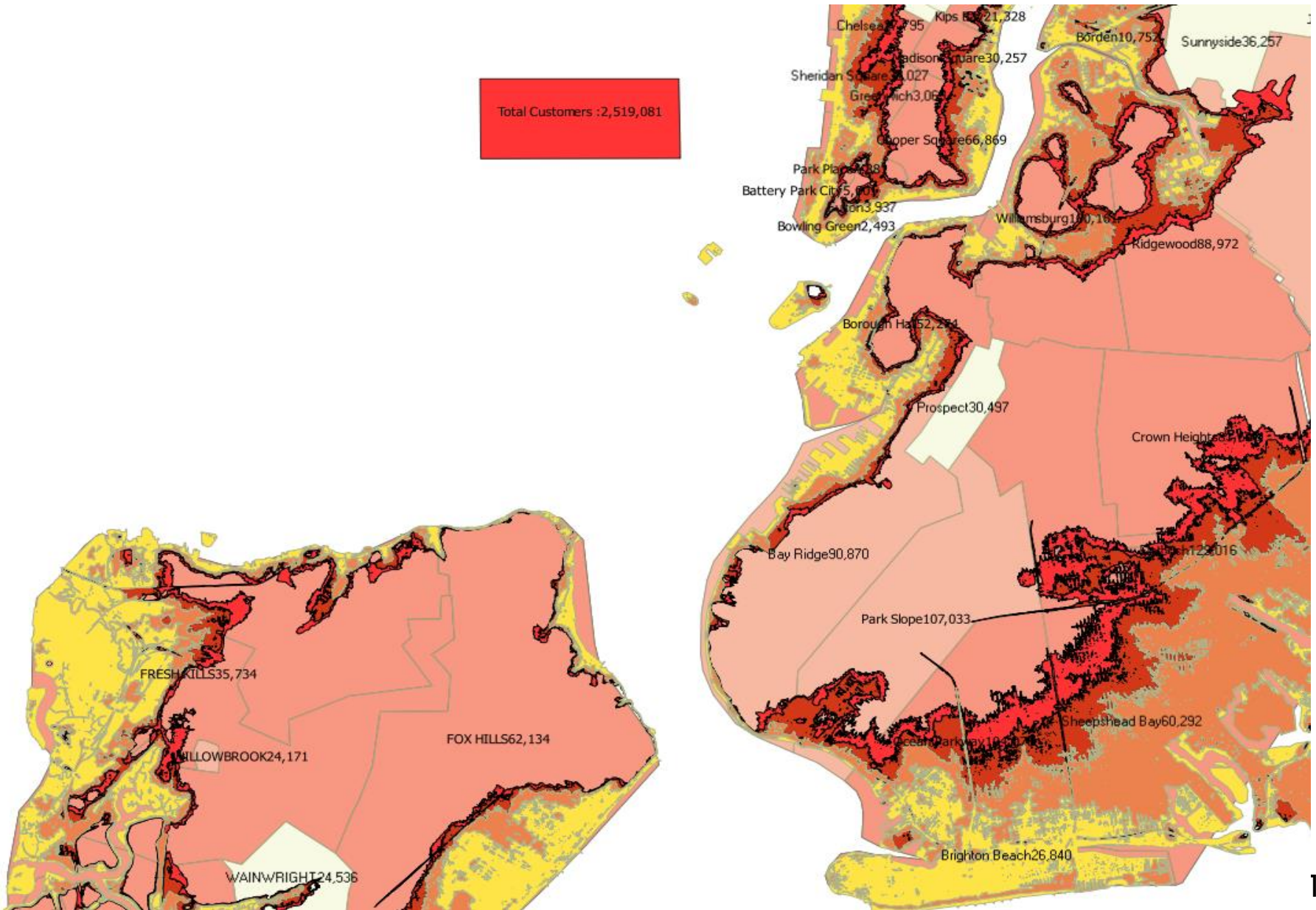
CATEGORY.4 RESULT

Total Customers :2,519,081

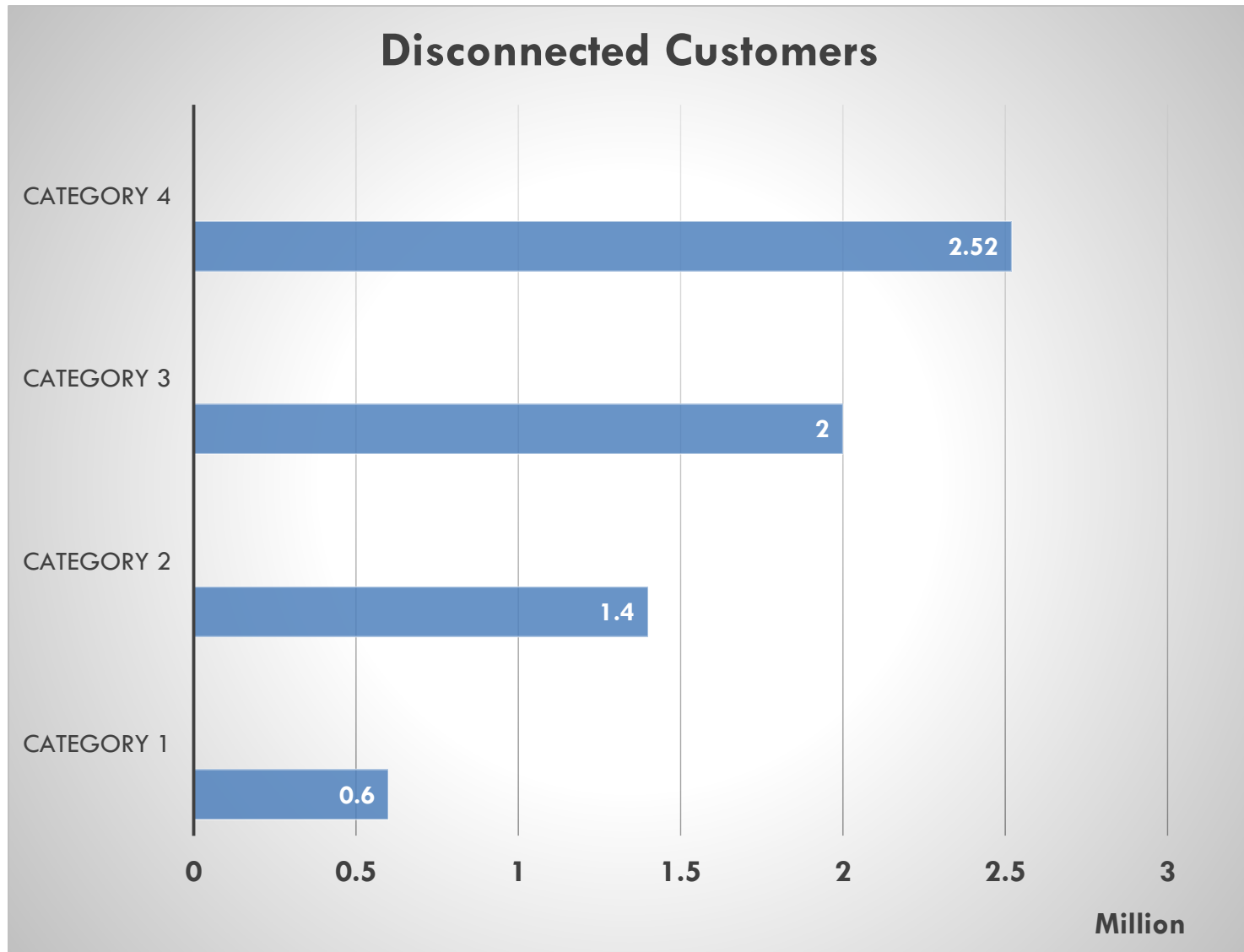


CATEGORY.4 RESULT

Total Customers :2,519,081



RESULTS



FUTURE WORK

- Fine tuning the prediction according to :
 - ✓ Tide level and climate change
 - ✓ Power system (Con-Edison) improvements

CONCLUSION

Improving the Resiliency is a Must

- Sectionalizing the present distribution networks
- Reinforcing substations against flooding
- Use of micro-grids
- Distributed generation
- Smart grid technologies and energy storage