

# The Impact of Hurricane Sandy on Real Estate Prices in Northern New Jersey



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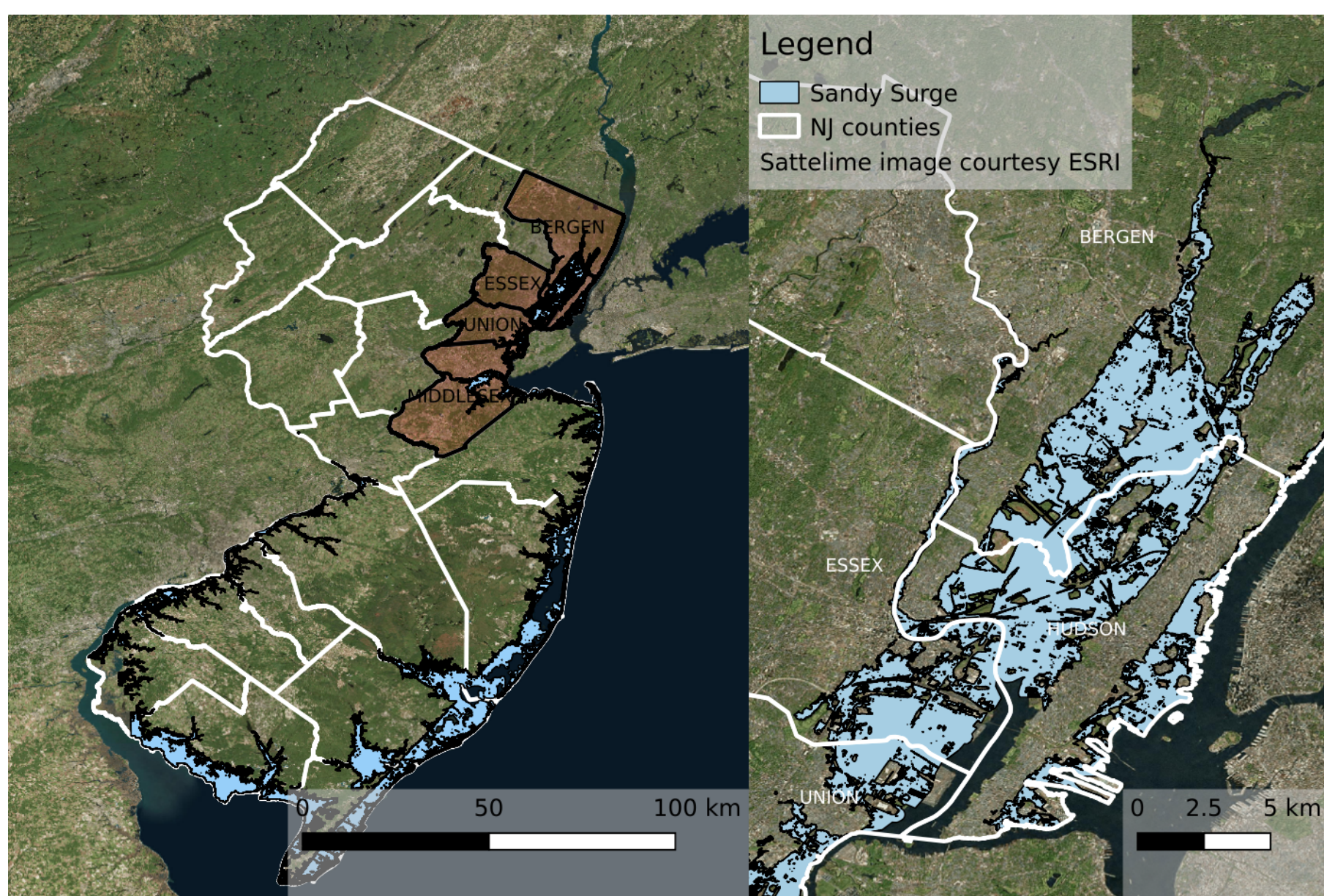
## Introduction

Hurricane Sandy (aka Superstorm Sandy) hit the NJ area on October 29 2012 with devastating results. Media accounts of the hurricane in New Jersey have tended to focus on the Jersey Shore, the ruined boardwalks and the beachfront towns. Perhaps less well documented is the fact that northern New Jersey also experienced significant flooding. This work explores the impact of the storm on those counties that are not directly facing the Atlantic Ocean, but rather are adjacent to New York Bay and the Passaic and Hackensack River estuaries.

Figure 1.

[Left] The extent of Superstorm Sandy surge in the state of NJ.

[Right] Zoom in Northern NJ impacted counties.



When Sandy hit, it generated several competing market forces. On one hand is the “**negative demand effect**”; that is, the surge damaged properties and made them less valuable as a result. Furthermore, both within and near the surge area, the storm represented an **informational “shock”** that these neighborhoods are, in fact, vulnerable to flooding, which likely put further downward pressure on prices. On the other hand, when the surge hit, it reduced the supply of housing in different neighborhoods because it either destroyed entire properties or made them unavailable for sale until they were repaired; this would create upward pressure on the remaining structures (a “shortage effect”).

## Methods

### GIS

We used the officially published data on Superstorm Sandy from state (NJ) and Federal (FEMA - Federal Emergency Management Agency) sources.

Sandy Surge  
FEMA flood maps (2012)  
Elevation  
Shoreline

### Real estate

Comprehensive real estate dataset from 1994 - 2016 from Zillow.com

### Approach

Compare the impact of Superstorm Sandy on real estate values with the known and quantifiable impact of the 2008 housing bubble.

Create an inflation-adjusted real estate price index from 1994 to 2016 with a focus on five northern New Jersey counties: Bergen, Essex, Hudson, Union and Middlesex.

## Methods

Statistical analysis on the real estate values for a host of property specific and location based factors. We ran regressions of the real price per square foot of each property on building-specific controls: square footage, lot size, building age, land-use dummy variables, zip code dummy variables, elevation, distance to the coast, a FEMA floodplain dummy, and year-quarter dummy variables for the sale date.

Real estate prices were first adjusted to real values using the Consumer Price Index for NYC-Northern NJ excluding shelter costs.

## Data

Figure 2.

All (~ 1M) real estate properties involved in this research.

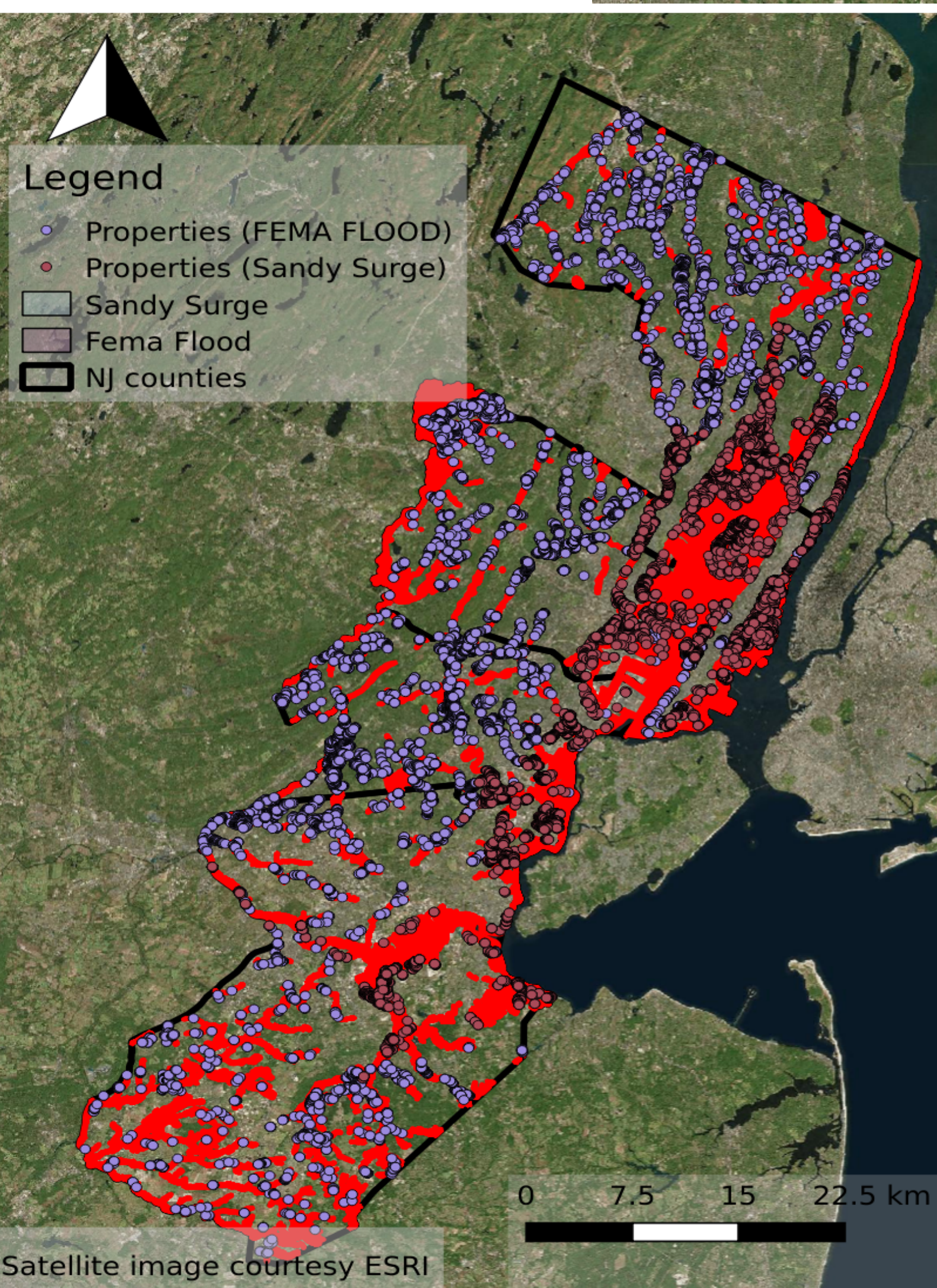
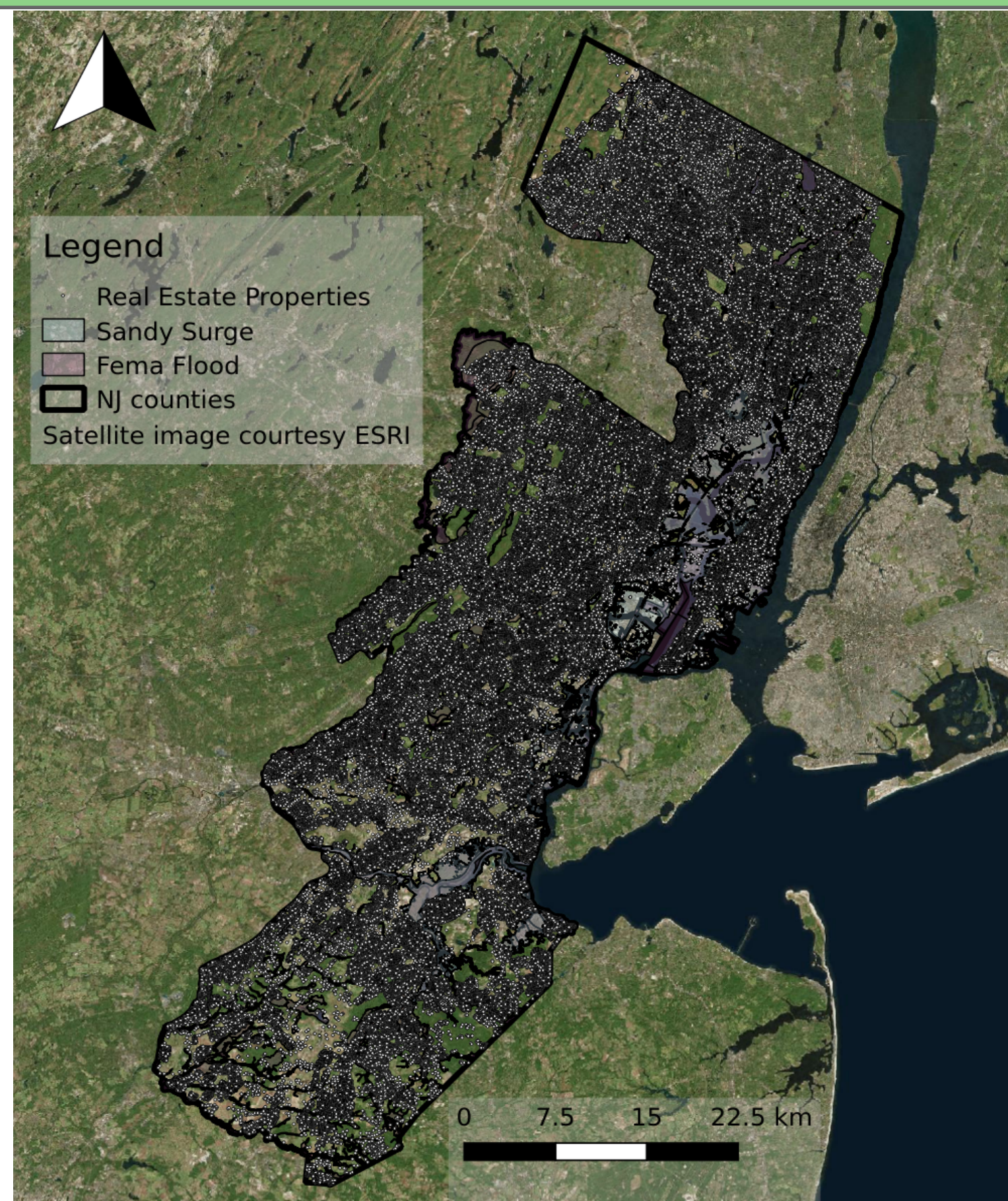


Figure 3.  
Real estate properties that are in FEMA designated flood zones, and were impacted from Sandy Surge.

Red color highlights the FEMA flood zones in 2012.

## Data / Discussion

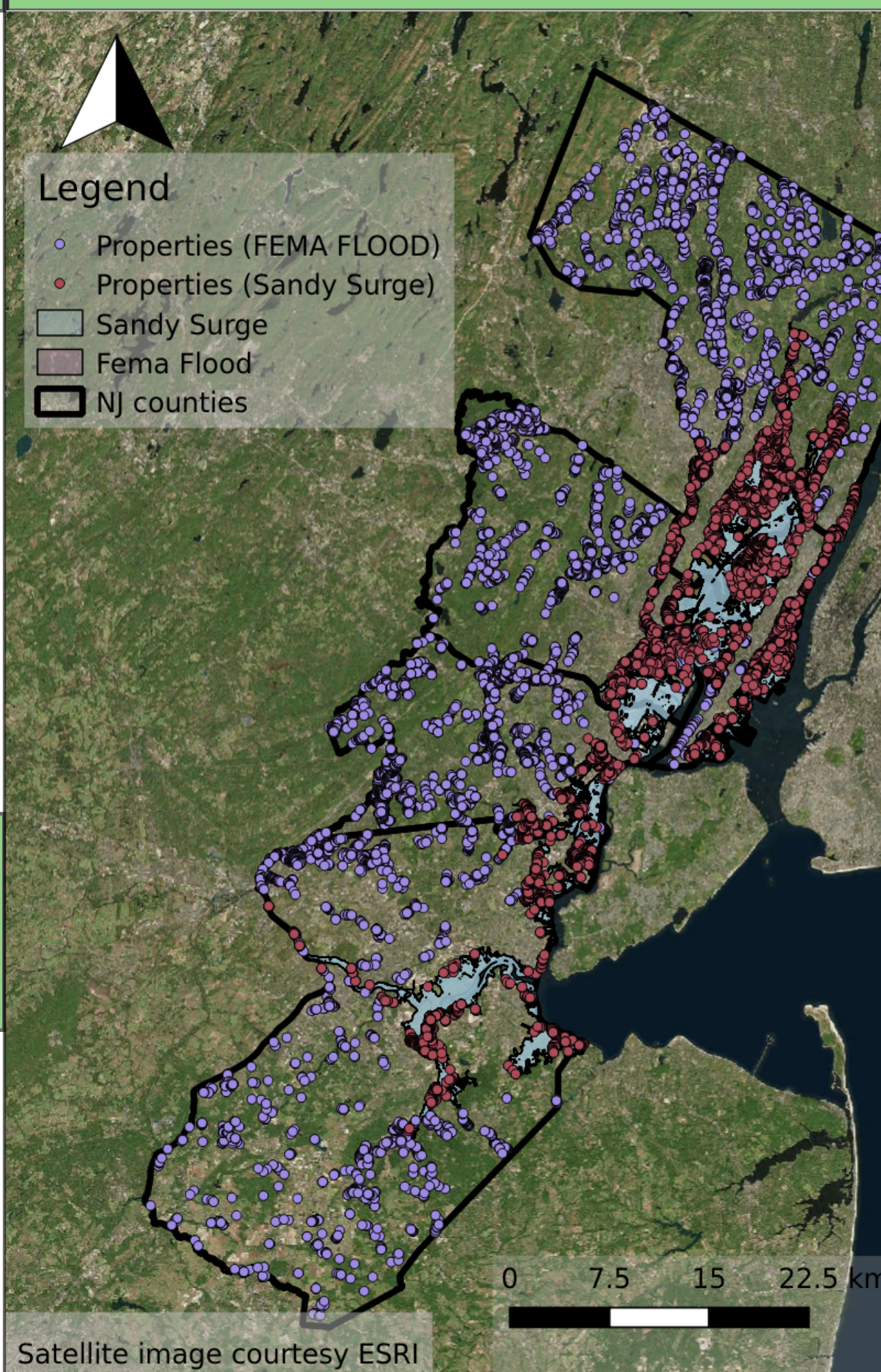


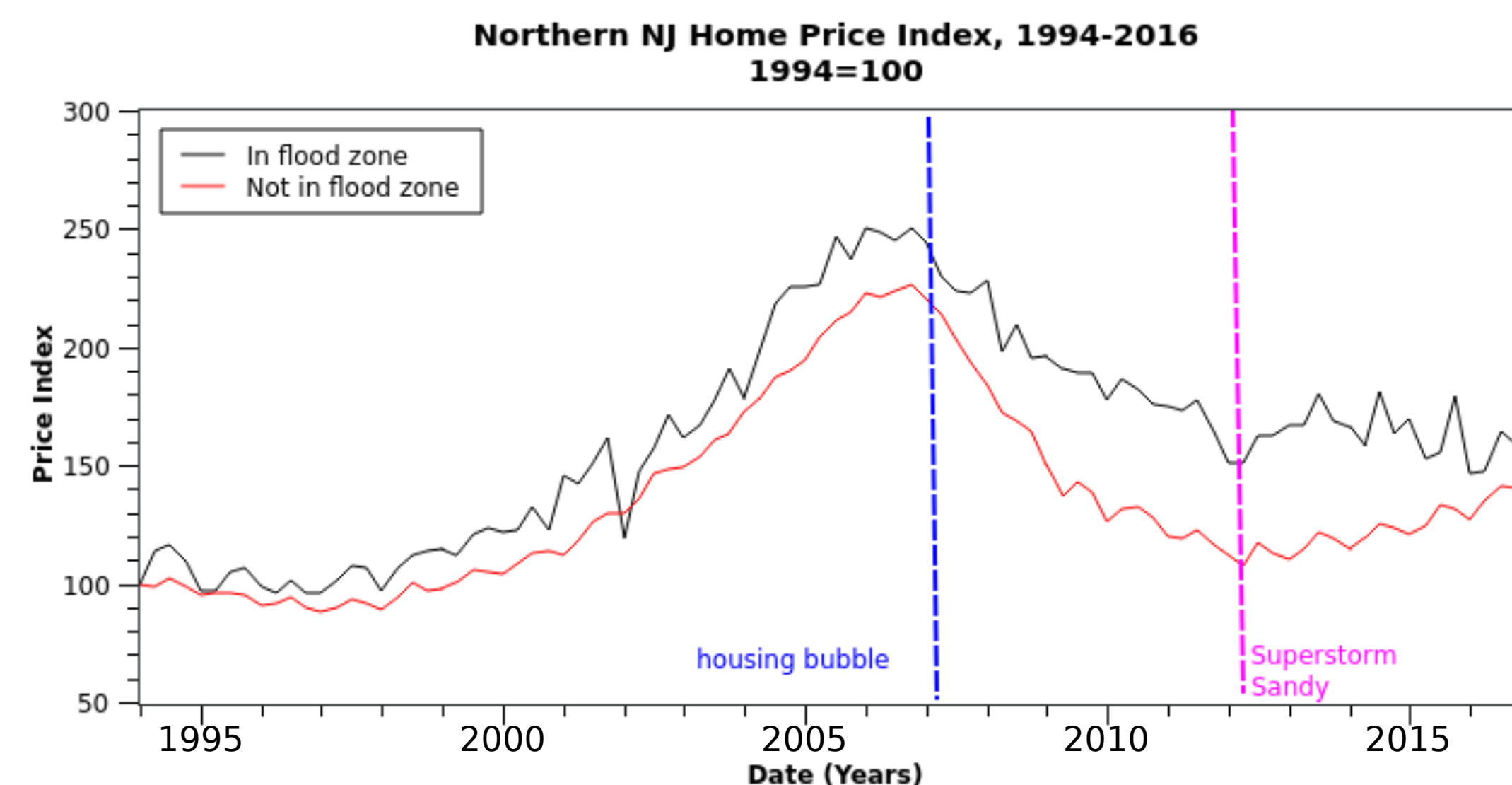
Figure 4.

Real estate properties that are in FEMA designated flood zones, and were impacted from Sandy Surge.

Blue color highlights the extent of Sandy surge.

Figure 5.

Price Indexes for Homes in Northern NJ from 1994 (100) to 2016 for homes in flooded and non-flooded areas, respectively.



This graphs demonstrates that housing prices increased rose and fell dramatically during the housing bubble. Since Sandy the areas that remained dry have seen price appreciation, while the areas in the flooded area (controlling for flood damage) have not

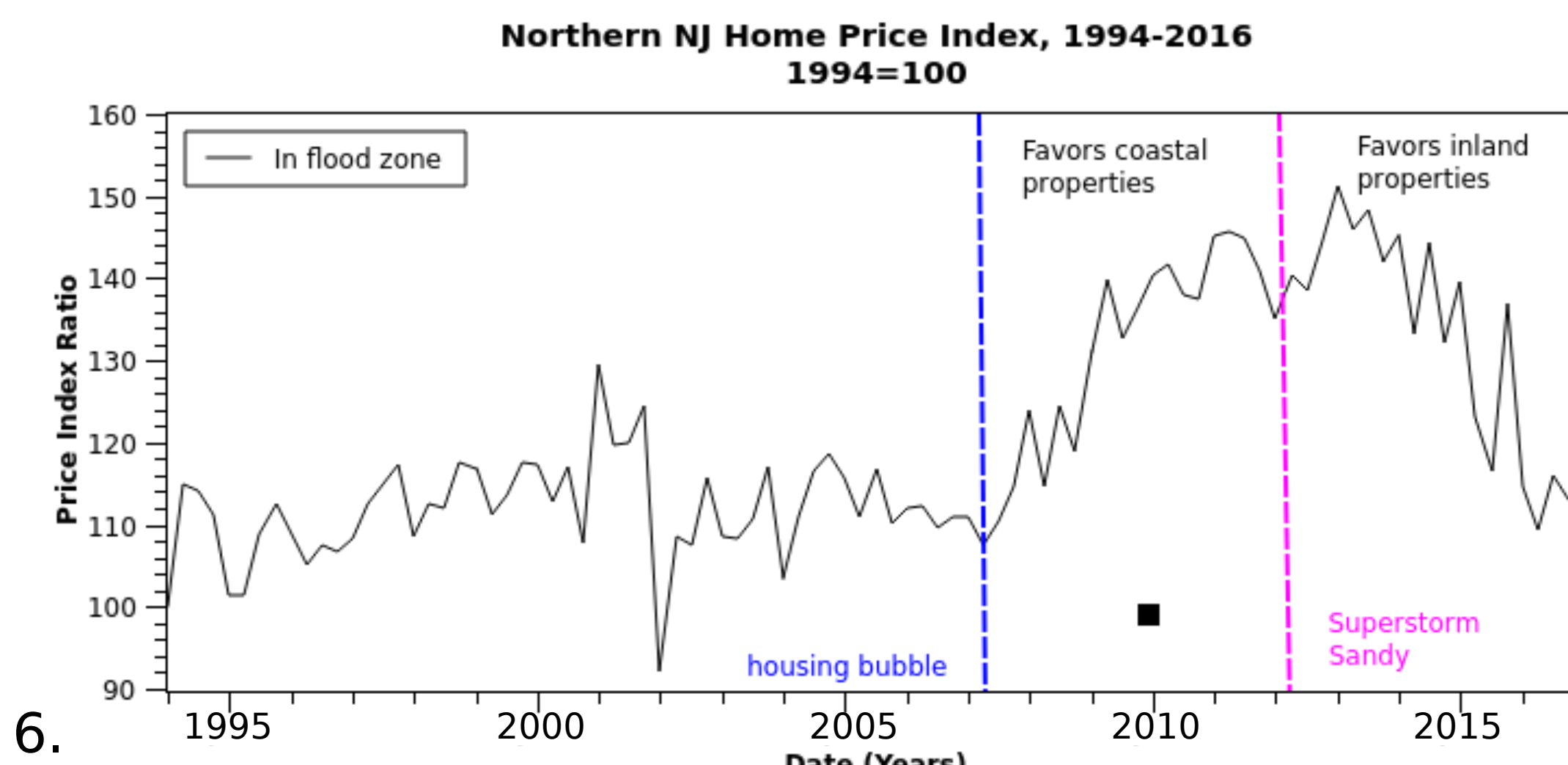


Figure 6.

Ratio of Housing Prices in Flooded Areas vs. Non-Flooded Areas

Until the bursting of the housing bubble, prices in the two areas moved in a similar fashion. After the bubble houses closer to the coast line rise faster. After the storm, the areas in the dry area have seen price appreciation, but not so in the flooded areas. The decline in the price ratio after the storm suggests that prices in the flooded areas are now less valuable because of the flood (even controlling for damage levels).

## Data / Discussion



Legend  
Sandy "Shock" price effect  
-67.6313 - -49.6679  
-49.6679 - -31.7046  
-31.7046 - -13.7412  
-13.7412 - 4.2221  
4.2221 - 22.1854  
SandySurge\_SL  
Counties  
Satellite image courtesy ESRI

Figure 7.

Informational "Shock" effect on house pricing (Hudson county only).

Real estate properties considered safe from flooding (e.g. outside FEMA designated flood zones) were significantly impacted from the informational "Shock".

Real estate property values appear to be negatively impacted if the property is in, or closer to what it was believed, flood zones.

## Conclusion

Storms can impact cities in multiple ways.

Superstorm Sandy had an effect on real estate prices due to direct damage but also due to changes on the perceived safe areas.

**The real estate allocation of values (relative to FEMA designated zones) appears to have been re-arranged due to Superstorm Sandy.**

## Acknowledgement

Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at <http://www.zillow.com/ztrax>. The results and opinions are those of the authors and do not reflect the position of Zillow Group.

## References

Superstorm Sandy and NJ GIS data have been retrieved from:

<https://www.fema.gov>

<http://www.state.nj.us/dep/gis/>