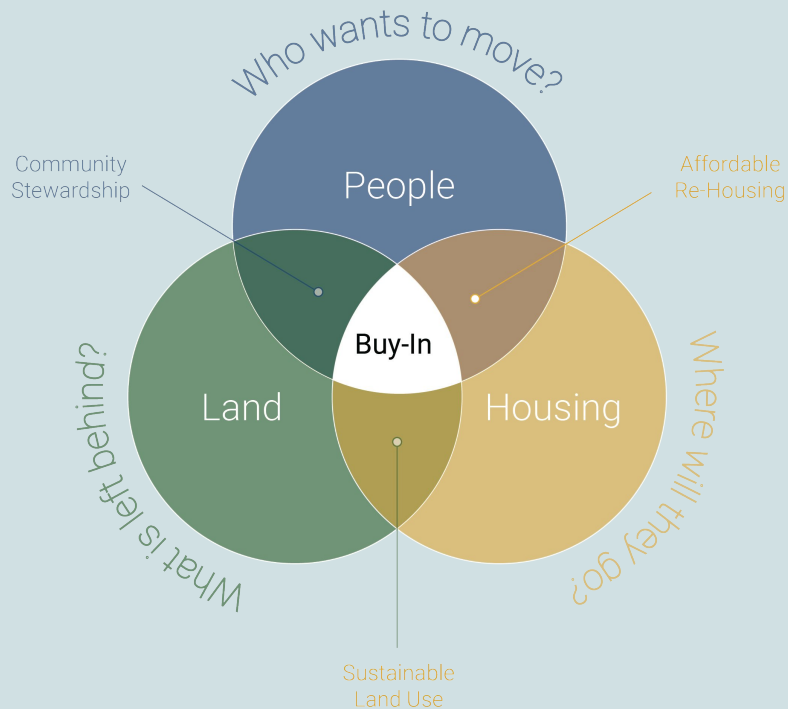


# Pushed, Pulled, or Stranded?

Invisible housing immobility in the climate migration conversation

Kelly Leilani Main, Executive Director, Buy-In Community Planning  
Osamu Kumasaka, Director of Community Action, Buy-In Community Planning

# Buy-In Community Planning



A **Better Buyout** requires a  
**collaborative and comprehensive**  
 approach to assisted relocation that  
 addresses **people, housing, and land**  
 - the foundations of any community -  
 holistically.

# Climate Migration 101

- Ranges from **mobility as a proactive adaptation strategy** to **forced displacement in the face of life-threatening risks**
- Can be **into, within, or out of** a country or region
  - We focused on short-range, internal migration within NYS out of neighborhoods that experienced flooding
  - Many climate migrants have been making (and will want to make) short-range moves, i.e., within or close to the cities or counties where they currently live (Eyer et al., 2018)
- Motivated by both **push** and **pull** factors
  - Environmental shocks or stressors in sending areas
  - Availability of jobs, housing, amenities, kin networks, in receiving areas relative to sending areas – in the New York region, most people live within 8 miles of their mother [\(NYT 2015\)](#)

# Housing security is a foundation of health

- Stable housing is a fundamental platform for individual and collective well-being and a key social determinant of health.
- Research indicates that a significant disruptive effect of severe environmental disasters is residential displacement.
- Housing affects climate migrants' welfare, and climate migrants affect local housing markets in receiving cities (Daepf & Bunten, 2021)
  - Examples include housing shortages in Chico, CA, Holyoke, MA, and Houston, TX

# Moving requires resources.

Climate migration as an adaptive response can be mitigated or exacerbated by the **financial assets** that each household experiencing climate impacts has access to when they want to find and move into a new home elsewhere.

Beyond socioeconomic status, other factors like **physical mobility constraints, tolerance of risk, place attachment, and social cohesion** with one's community also affect our ability or willingness to move to adapt.

Programs like floodplain buyouts can “support” migration by providing resources to fund and otherwise assist households moving out of harm's way.

# Involuntary Immobility (Strandedness)

- Significant attention has been given to “holdouts” (people who refuse to move) and to the harms associated with displacement. While displacement is a highly disruptive effect, we argue that **displacement is not the only effect of housing insecurity, only the most visible.**
- Flood-affected households often experience worsening financial, health, and well-being impacts while they are supposedly rebuilding and recovering in place (Ratcliffe et al., 2019)
- As flood hazards increase and the homes prone to flooding are discounted more deeply, homeowners may start to experience declining home values as a barrier to residential mobility.
- When people want to move but are unable to, we call this state of being **involuntary immobility**, or **strandedness**.



## RESEARCH REPORT

### Insult to Injury

#### Natural Disasters and Residents' Financial Health

Caroline Ratcliffe  
Carlos Martín  
April 2019

William J. Congdon  
Bapuchandra Kotapati

Alexandra Stanczyk

Daniel Teles

Ratcliffe, C., Congdon, W. J., Stanczyk, A., Teles, D., Martín, C., & Kotapati, B. (2019). Insult to Injury: Natural Disasters and Residents' Financial Health. (April). Retrieved from [https://www.urban.org/sites/default/files/publication/100079/insult\\_to\\_injury\\_natural\\_disasters\\_0.pdf](https://www.urban.org/sites/default/files/publication/100079/insult_to_injury_natural_disasters_0.pdf)

# Potential Contributors to Strandedness

- Deteriorating housing quality or discounted housing prices
- Poor or declining health, including disability that limits rehousing options
- Economic burden including mounting debt from rebuilding or increasing flood insurance costs
- Socio-psychological barriers to leaving including social pressure or trauma
- Lack of affordable replacement housing to move into

# Flooding affects NYS's housing stock

- 2011 Tropical Storms Irene and Lee – Upstate NY impacted
- 2012 Superstorm Sandy Response – NYC, suburbs, and Long Island impacted
  - Sandy flooded nearly 90,000 buildings, caused \$19B in damage and left ~2M without power
  - In NYC's Sandy recovery, LMI homeowners faced greater expenses than renters (*Madajewicz, 2020*)
  - The Governor's Office of Storm Recovery offered a buyout program to support climate migration out of some neighborhoods (in "Enhanced Buyout Zones") (*Binder and Greer, 2016*)
  - NYC developed Build it Back, a post-Sandy assistance program, but delays, shoddy construction and bureaucracy caused many applicants to drop out of the program (*Koslov et al, 2021*)
  - Post-Sandy, found robust evidence of a persistent price discount on the trajectories of home prices in NY's flood zone (*Ortega & Taspinar, 2017*)
- 2017 Hurricane Maria – Puerto Rican evacuees [struggle to find housing](#) in NYC and elsewhere
- 2021 Hurricane Ida – Flash flooding across NYS and in NYC
- Future –
  - Over 4,000 units of naturally-occurring and subsidized affordable housing in NYC estimated to be exposed to coastal flooding per year by 2050 (Buchanan et al, 2020)



# NY Climate Migration Policy and Planning

Much of the relevant land use, housing, disaster recovery, and floodplain buyout planning will happen at the local level, though state agencies can provide a standard, guidance, and funding for such efforts.

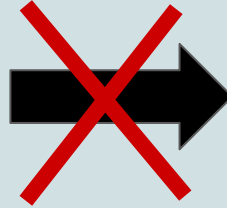
- Existing and ongoing:
  - NYC Comprehensive Waterfront Plan, Zoning for Coastal Flood Resiliency, OneNYC, Resilient Neighborhoods
  - NYSERDA's newly-launched statewide [Climate Impacts Assessment](#) could investigate climate vulnerability of housing stock and the potential impacts
  - NYS Comprehensive Emergency Management Plan (CEMP) and/or Hazard Mitigation Plan (HMP) could shape implementation

# NY Climate Migration Programs

Existing / sunseting programs:

- Though implemented at the local level, **floodplain buyout programs** are administered and supported at the state level using federal funding and locally-raised matching funds.
- In GOSR's post-Sandy program, people received the pre-storm Fair Market Value (FMV) of their home + additional incentive of up to 15% for relocating within the same county (*GOSR Program Manual*)
- This was perhaps the most generous compensation and incentive package offered by any buyout program at the time, yet these incentives “did not necessarily relieve the financial burden for buyout participants, whose primary concern was their ability to secure appropriate, desirable, and equivalent new housing” (*Binder & Greer, 2016*)

**Pre-Storm “Fair Market Value” in  
Sending Area  
\$60,000**



**Comparable Home Value in  
Receiving Area  
\$100,000**



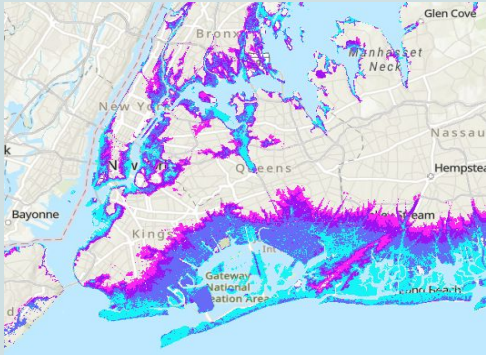
**Rehousing Cost Gap =**

*Home value and other assets - discount from flooding risk - mortgage balance and other debt - price of a comparable home*

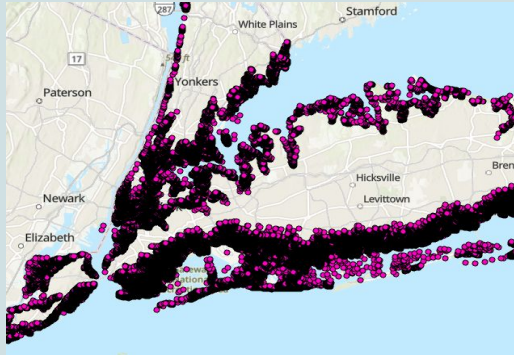
# Geographies of Housing Mobility

- **Affordability:** median home price, avg rental price
  - Using appraisal and housing market data (Redfin, Realtor.com, Zillow)
- **Availability:** how many units are on the market
  - Using housing market data (Redfin, Realtor.com, Zillow)
- **Adaptability:** can, or *should*, the building be adapted?
  - Housing quality: use local assessors and building stock data
  - Housing location: 100 year flood zone

# Using GIS to Identify Potential Involuntary Immobility: Who is at risk?

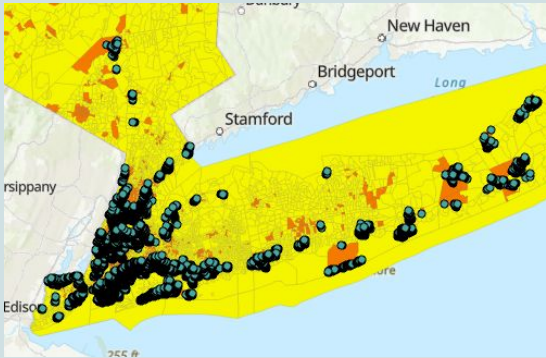


Hurricane Inundation Zones



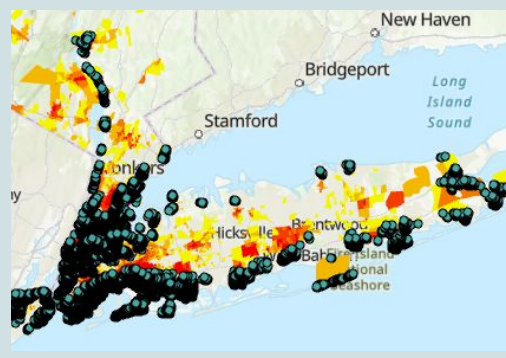
Affected Parcels

Hurricane CATEGORY	Total Cumulative Effect (# OF PARCELS)
1	95,457
2	273,750
3	406,652
4	529,203



Affected Parcels in LMI 30% Tracts

Hurricane CATEGORY	Parcels in > LMI 30% Tracts
1	25539
2	67385
3	109812
4	155420
% of total	29.4%



Affected parcels in 50% Minority Tracts

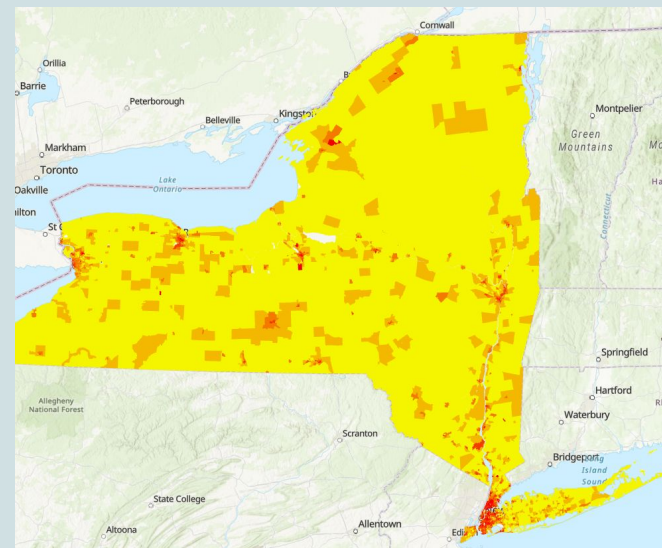
Hurricane CATEGORY	Parcels in Min > 50% Tracts
1	25539
2	67385
3	109812
4	155420
% of total	53.4%

# Additional parameters: Housing Stock

What kinds of housing would be affected in high vulnerability, high minority areas and what would it cost to replace such housing?

PROP_CLASS	FREQUENCY
<Null>	215
01	46806
02	5396
03	125
04	1356
05	782
06	628
07	435
08	560
09	124
10	591
11	1571

U	V	X	AK	AL
LAND_AV	TOTAL_AV	YR_BLT	BLDG_ST	BLDG_STYLE_DESC
11640	21300	1915	A1	Two Story Detached (Small or Moderate Size, With or Wit
11580	39960	1930	B1	Brick
11220	46140	1991	C0	Three Families
9300	47400	2004	C0	Three Families
9900	42240	2004	C0	Three Families
9960	42240	2004	C0	Three Families
8760	44280	2004	C0	Three Families
118350	297000	1991	C3	Four Families
51750	234450	2005	E1	Fireproof
27000	155700	1972	E1	Fireproof
207000	3329100	1973	E7	Warehouse, Self Storage
27000	128250	2008	E9	Miscellaneous
45900	95850	1930	F9	Miscellaneous
117000	154800	1931	G1	Garage - Two or More Stories
37350	322200	2003	G2	Garage - One Story (Semi-Fireproof or Fireproof)
53550	342450	1961	G2	Garage - One Story (Semi-Fireproof or Fireproof)
77400	404550	1935	G2	Garage - One Story (Semi-Fireproof or Fireproof)
34200	138600	1920	GU	Car Sales/Rental without Showroom
136800	1273950	1961	K1	One Story Store Building
36450	281700	2008	K2	Two Story or Store and Office
61200	436500	2003	O2	Ten Stories & Over (Side Street Type)
33750	153000	1930	O2	Ten Stories & Over (Side Street Type)
252	252	0	V0	Zoned Residential, Except Not Manhattan Below 110 St
840	840	0	V0	Zoned Residential, Except Not Manhattan Below 110 St



Counts of affected parcels  
by property class

Building Description and Value

Rental Units by Census Tract

# Research Question

**Key point:** Deciding to move is not agnostic - many people need resources to relocate.

**If homeowners interested in a buyout after Hurricane Sandy received Fair Market Value (FMV) for their home to fund their move, what would their local housing options have looked like?**

## **Data: Governor's Office of Storm Recovery**

- Buyout applications in NYS post-Sandy (n = 2,860)
- Acquisitions (in progress or completed as of 11/2021): (n = 1,289)
- Cancellations and withdrawals (incomplete): (n = 1,571)

## **Housing Market Data**

- 10 years of data from Redfin.com on median listing price by zip code

## **Assumptions:**

- Fair Market Value (FMV) is used to determine buyout offer

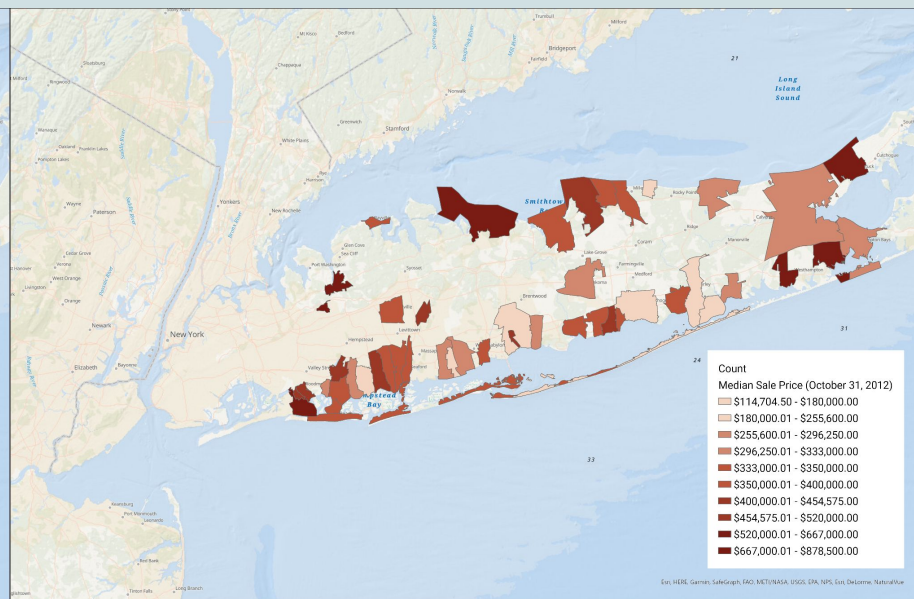
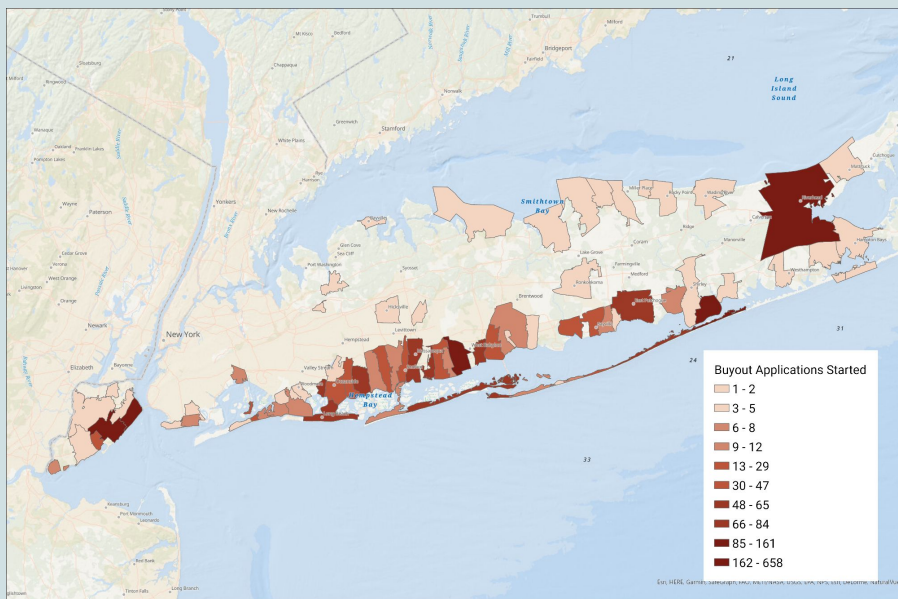
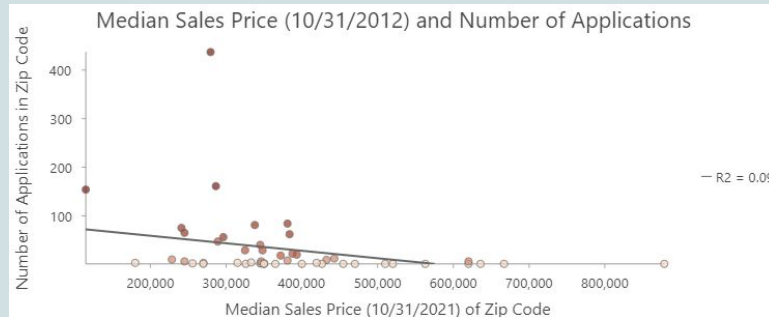
# Methods for Understanding “Geography of Availability”:

1. **In which neighborhoods were buyouts offered?**
  - a. Spatial join: GOSR buyouts + NYS Zip Codes
2. **What was the median listing price in neighborhoods in which buyouts were offered?**
  - a. Join Redfin.Com market data by zip to NYS Zip Codes
3. **What neighborhoods nearby were affordable to potential buyout participants?**
  - a. Buffer: 8 mile radius and/or border share
  - b. Calculate purchasing power of estimated buyout (using median home price) compared to buffer selection
4. *What neighborhoods overall are affordable to buyout participants? (regional, state, national)*
  - a. Select receiving neighborhoods where median listing price is  $\leq$  sending neighborhood
5. **How many homes were available in those neighborhoods in those years?**
  - a. Identify how many properties were on the market in those neighborhoods



# Governor's Office of Storm Recovery + Redfin Data

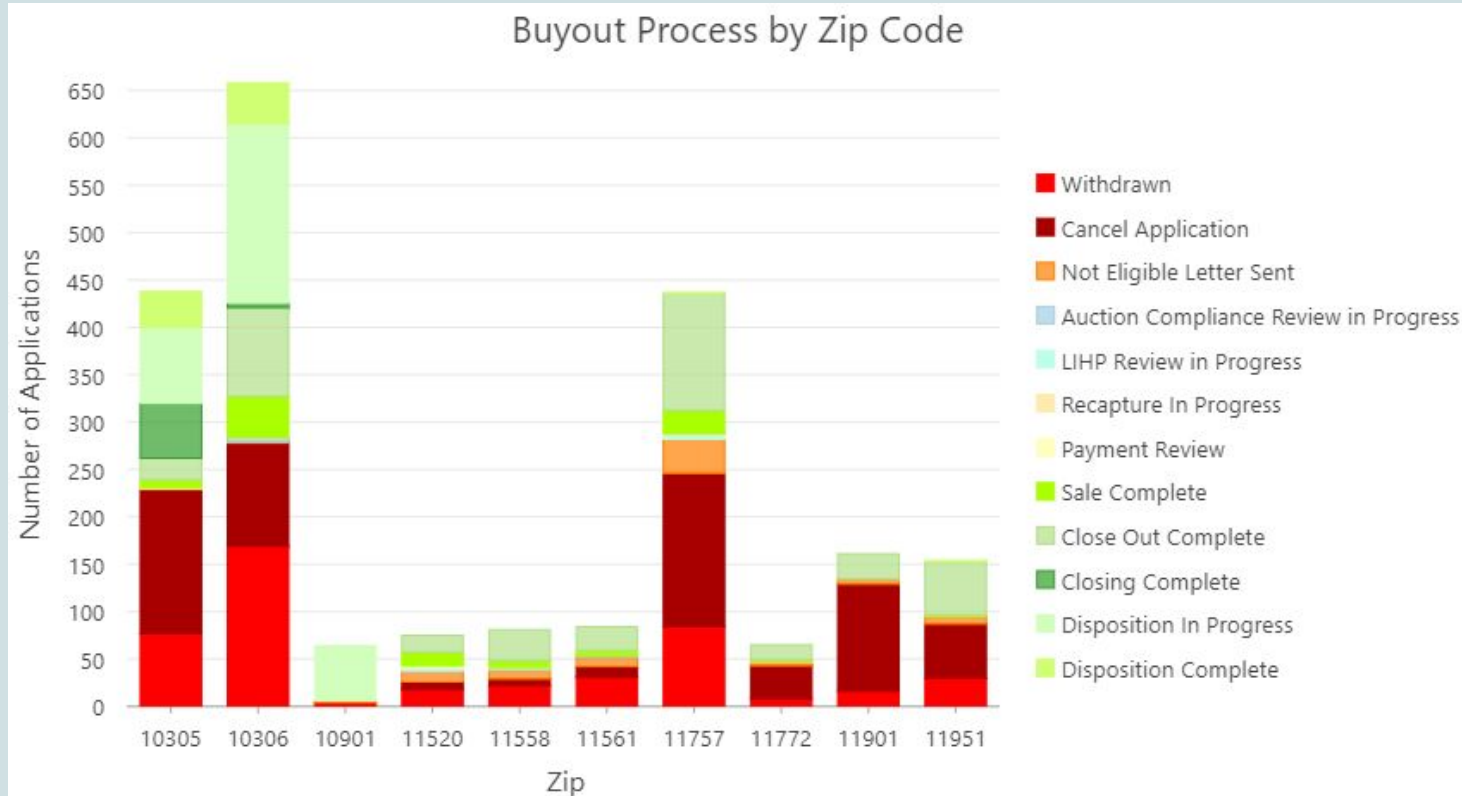
- Were more buyouts conducted in wealthier neighborhoods?
- Does median listing price correlate with the rate at which buyouts were completed?



GOSR Buyout Applications by Zip Code

Median Sale Price - 10/31/2012 (20 days post Sandy)

# Top 10 Zip Codes by Buyout Application Status

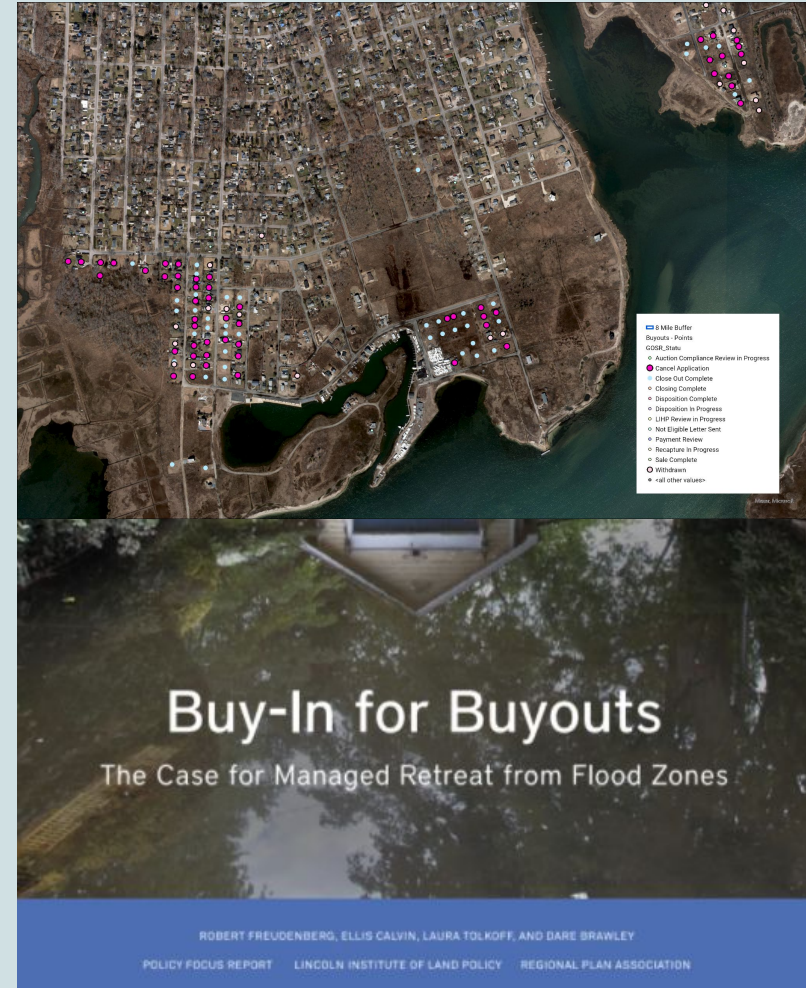


Range from  
47% incomplete to  
87% incomplete

MSP does not appear  
to be driving factor

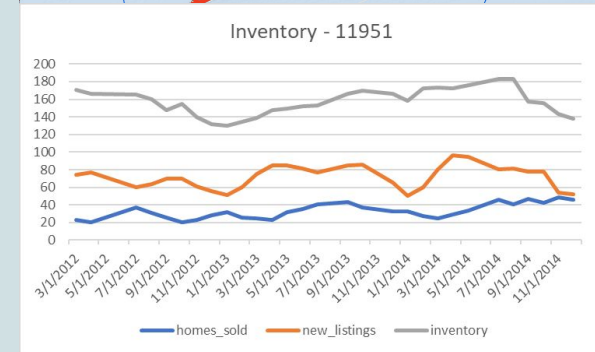
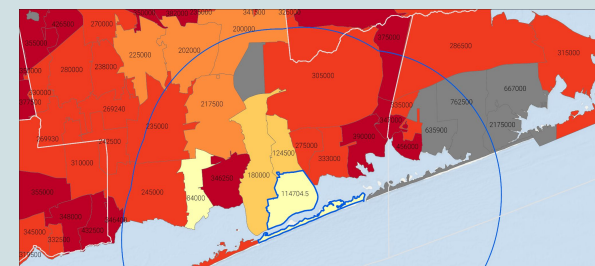
# Closer Look: Mastic Beach

- Beach has the highest percentage of low-to-moderate income households of LILP's five case studies, at 48%  
13% of the population is below the poverty rate. (2015)
- **Median Sale Price on 10/31/2012 was \$115,000**
- Approximately 2,600 people currently reside in the 100-year flood zone. By 2050, an estimated additional 1,200 residents will be at risk. (2015)
- Mastic Beach contains a relatively homogenous housing stock in terms of size and value. (2015)



Town Boundaries  
 8 Mile Buffer  
 Zip Code 11951  
 October/November 2014  
 Purchasing Power v. Median Sale Price  
 100% or less  
 100-150%  
 150-200%  
 200%-300%  
 300-400%  
 Greater than 400%

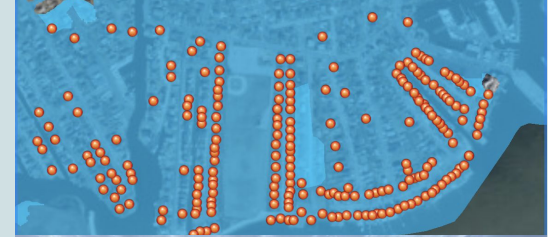
NOAA NGDC, Esri, DeLorme, NaturalVue



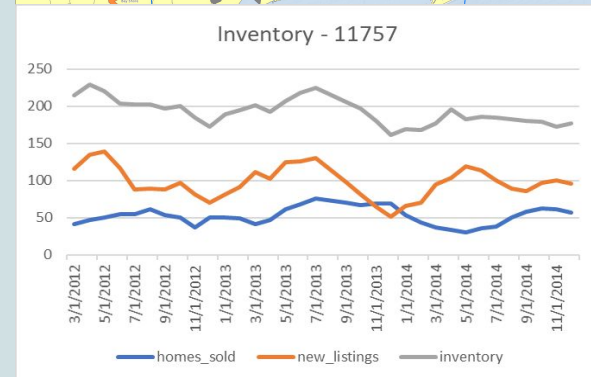
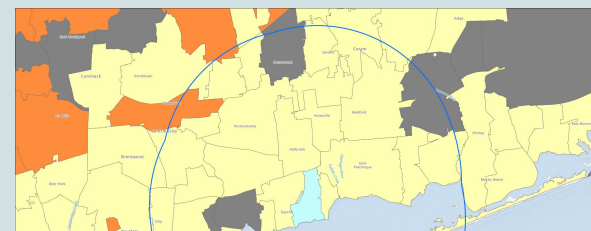
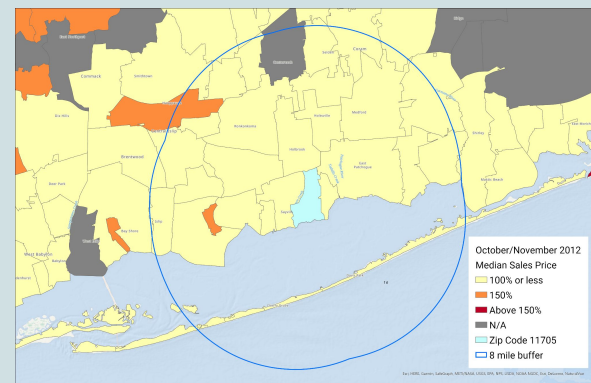
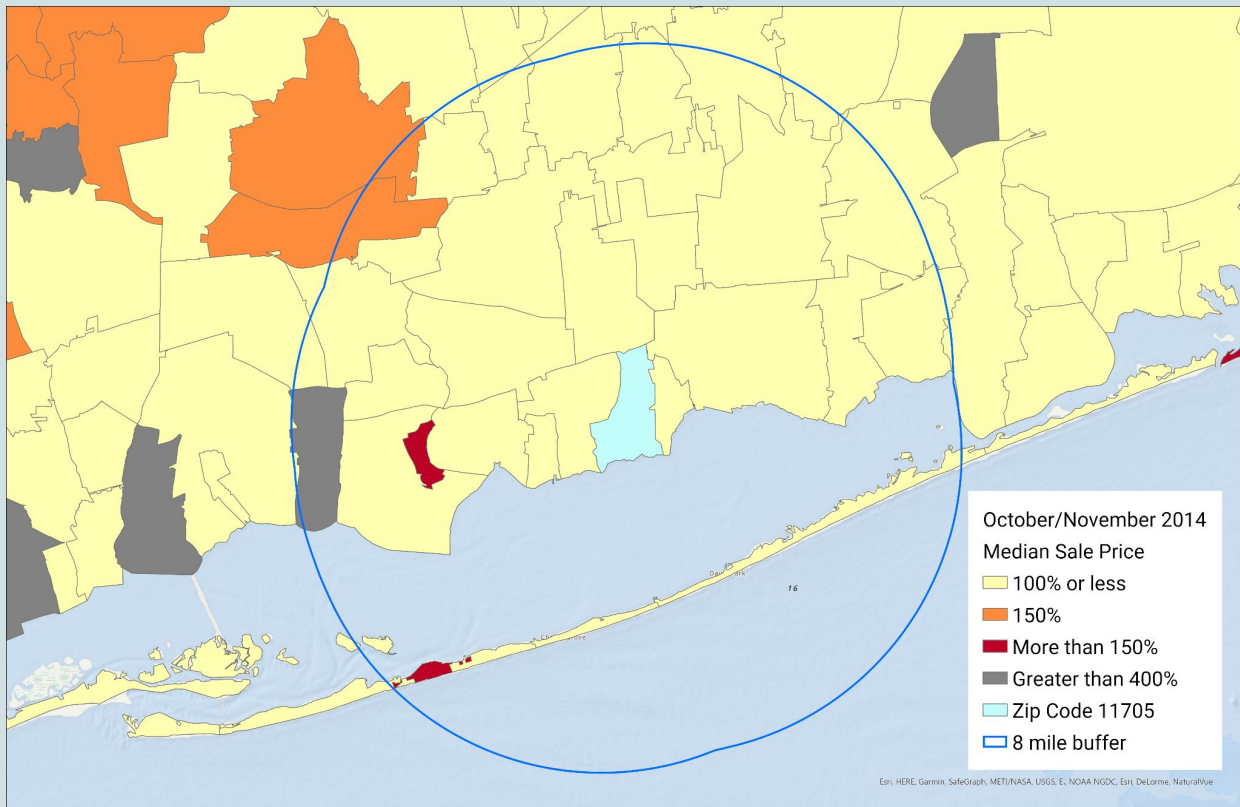


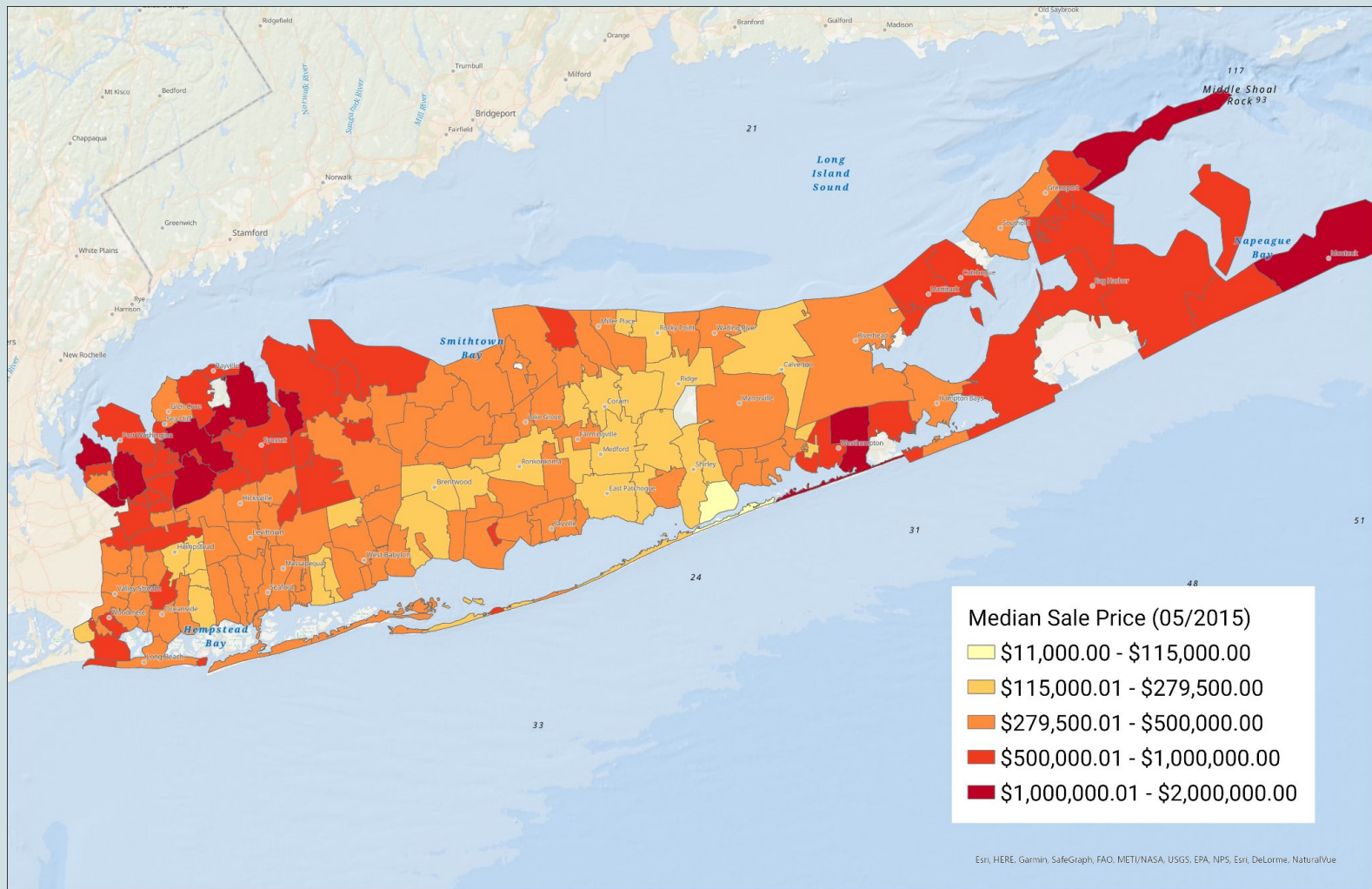
# Closer Look: Lindenhurst (11757)

- 2014 Overall SVI Score: 0.3463, indicating a low to moderate level of vulnerability.
- **Median Sale Price on 10/31/2012 was \$279,500**
- 437 Total Applications Started
  - 162 Cancelled
  - 84 Withdrawn
  - 36 Ineligible
  - 124 Close Out Complete
  - 36 Ineligible
  - 24 Sale Complete



# Purchasing Power of 2012 MSP in 2014





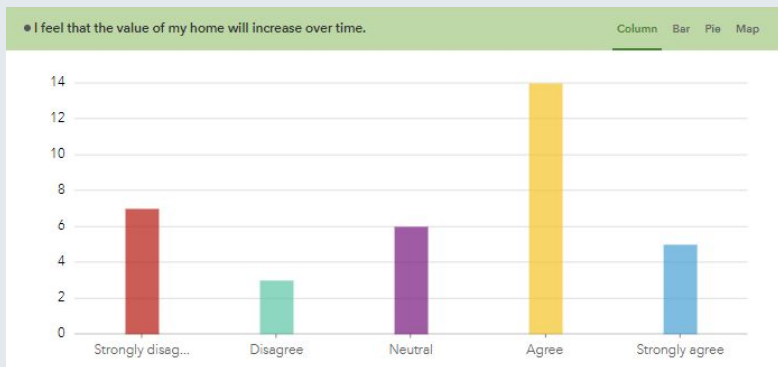
# Findings

- FMV “pre-storm value” is highly variable from season to season.
- So far, this research is speculation, since we don’t have data about:
  - True homeowner choices and preferences for moving
  - How factors like age, race, and income might influence choice
  - Data about other assets like savings and how those improve or reduce mobility
  - How housing type preferences may limit choices
  - How proximity to employment may influence factors
- Future research should dive into those factors, as well as:
  - Ask people more questions! Improve case management for best practices and policy design
  - Identify what price thresholds or incentives may enable relocation
    - “Re-housing cost gap”
  - Fund rehousing options
  - Using data from previous programs to develop models for different buyout offers to reduce attrition

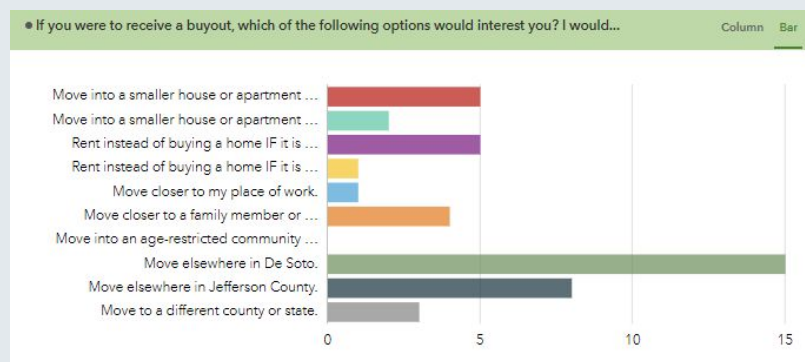




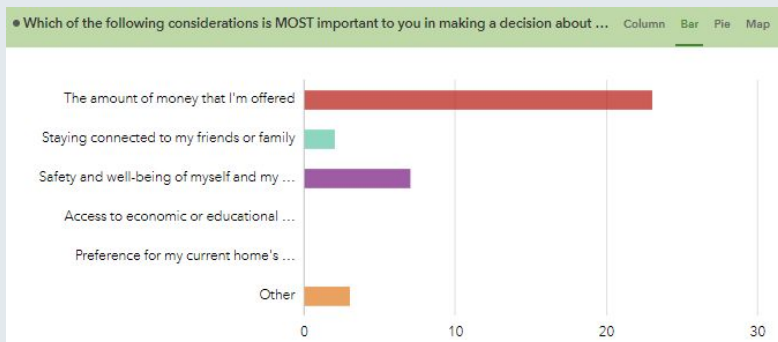
# Re-Housing Case Management



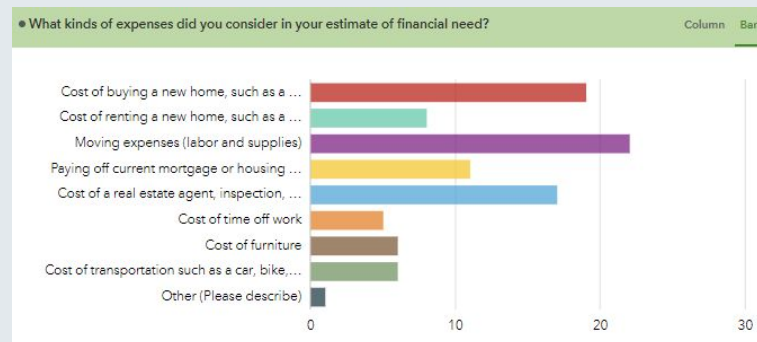
Home Appreciation



Relocation Interest



Decision-making for Buyout Participation



Financial needs assessments

# Discussion

- What are the similarities and differences between ‘demographically stuck’ households (from Hauer) and those that we would call “stranded”? How do the two intersect?
- How do Hauer and Gendler/Plattel’s work inform where households may move beyond our buffer?
- How can policy explicitly address the immobility of households who want to relocate, or what supplementary assistance is needed to enable relocation of households with sunk costs? How do mortgages / housing bubbles create additional immobilities?
- Home values are still increasing in high-risk areas - how does that incentivize or trap homeowners who want out? Will these result in gentrification impacts?
- Will further price discounts of flood-prone homes due to greater knowledge of flooding risk in the market affect homeowner mobility? What about insurance?