

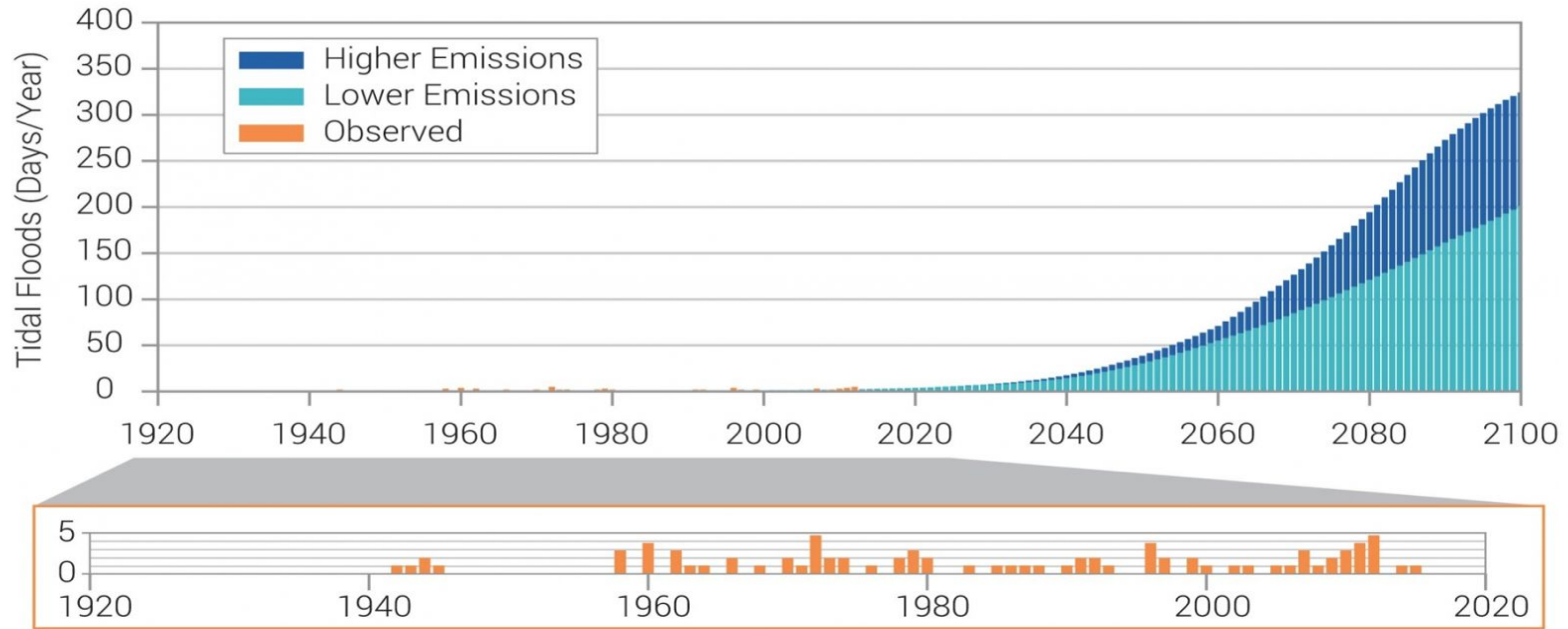
# Risk Perception and Adaptation Strategies in the City of Providence



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# Providence, a City at Risk

Observed and Projected Annual Number of Tidal Floods for Providence, RI



This graph indicates that under continual addition of GHG's or the Representative Concentration Pathways (RCP) represented in dark blue, Tidal Floods (Days/Year) could nearly occur every day of the year.

Source: NOAA, 2016



# State of Rhode Island & Climate Change

- ❖ 2014: RI enacts Executive Climate Change Coordinating Council (EC4)
  - Goals
    - reduce emissions
    - strengthen community resilience
    - prepare for effects of CC
- ❖ One example of Council's Duty:
  - “Identify strategies to prepare effects of CC & communicate them to Rhode Islanders, including strategies that incentivize businesses, institutions, and industry to adapt to CC.”

# Team Research Goals

- ❖ To better understand community's risk and vulnerability due to CC impacts
- ❖ Finding proper mitigation and adaptation strategies used in past
- ❖ Public education projects on anticipated impacts of CC
- ❖ Implement a survey that addresses the language barrier



# Intent of Survey

- ❖ Gauge population's perception on CC
- ❖ Views/understanding on CC
- ❖ Concept of risk due to SLR/flooding
- ❖ Willingness to pay for cost mitigation
- ❖ Knowledge and risk assessment of 100 year storm
- ❖ Views on CC in the future



# Importance of Work

- ❖ Wide range of vulnerability in environment and population
- ❖ Provides knowledge to public
- ❖ Levels of risk individuals face
- ❖ Identify unknown risks
- ❖ Increase education and knowledge
  - Community planning
  - Policy and legislation



# Methodology

Examined a variety of surveys to formulate questions

- Brown University
- Town of Old Saybrook, CT
- Gulf Coast Survey of 2012
- ❖ Extrapolation of pertinent CC data from federal organizations
- ❖ Formulated a focus group to gauge general perception of CC in Providence
- ❖ Drafted questions for understanding amongst the community





# Development

Used a web-based survey tool to conduct survey research: Qualtrics

- Survey Eligibility:
  - Homeowners in Providence & East Providence area
  - 18 +
- Survey Created in English & Spanish
  - Caters to those with language barriers



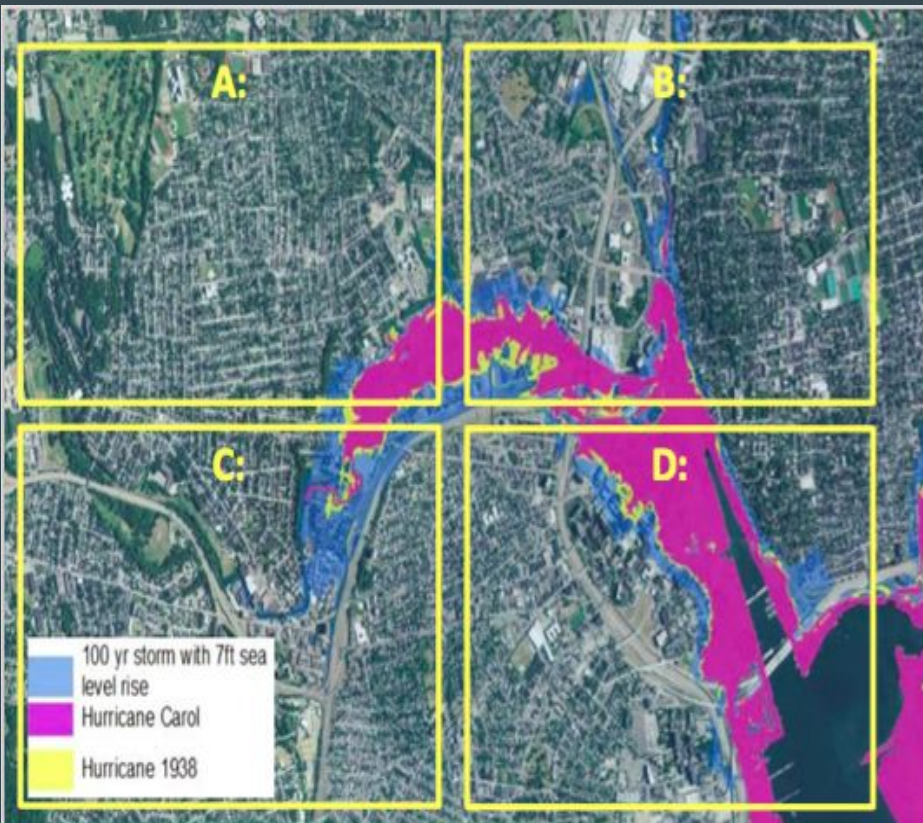


# Implementation

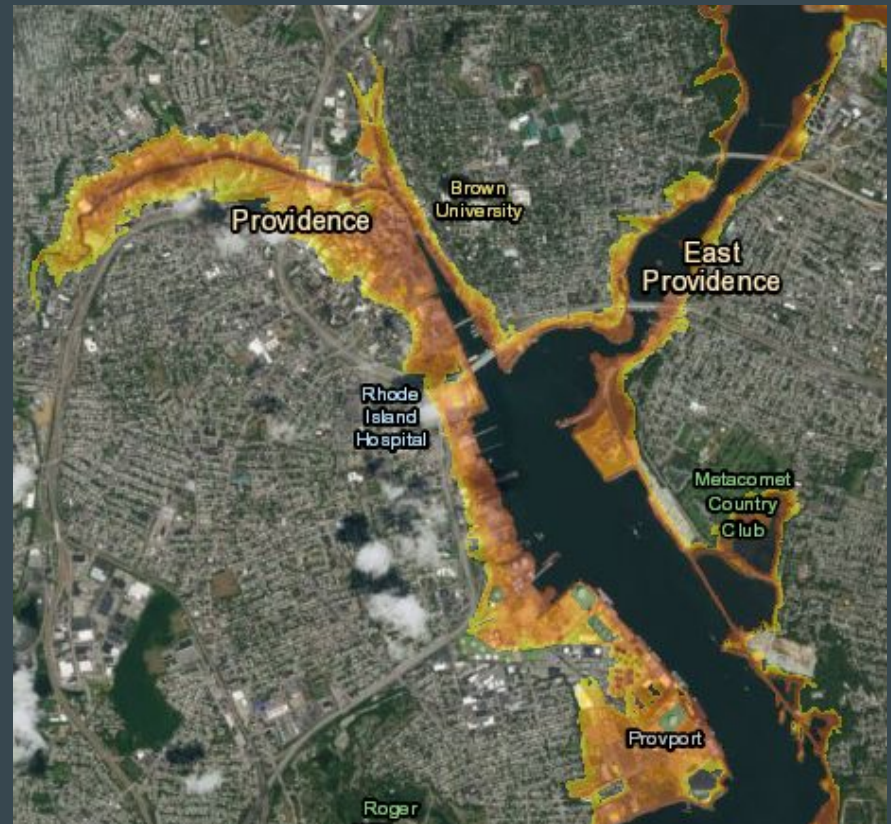
Went out to several locations:

- Providence Place Mall
- Dunkin Donuts Convention Center
- India Point Park
- Brown University
- Handed out tablets to surveyees
- Homeowners surveyed: 73
- Average survey time: 9.35 min
- Outliers: 4 homeowners took between 20 - 30 mins
- Incentive: \$1



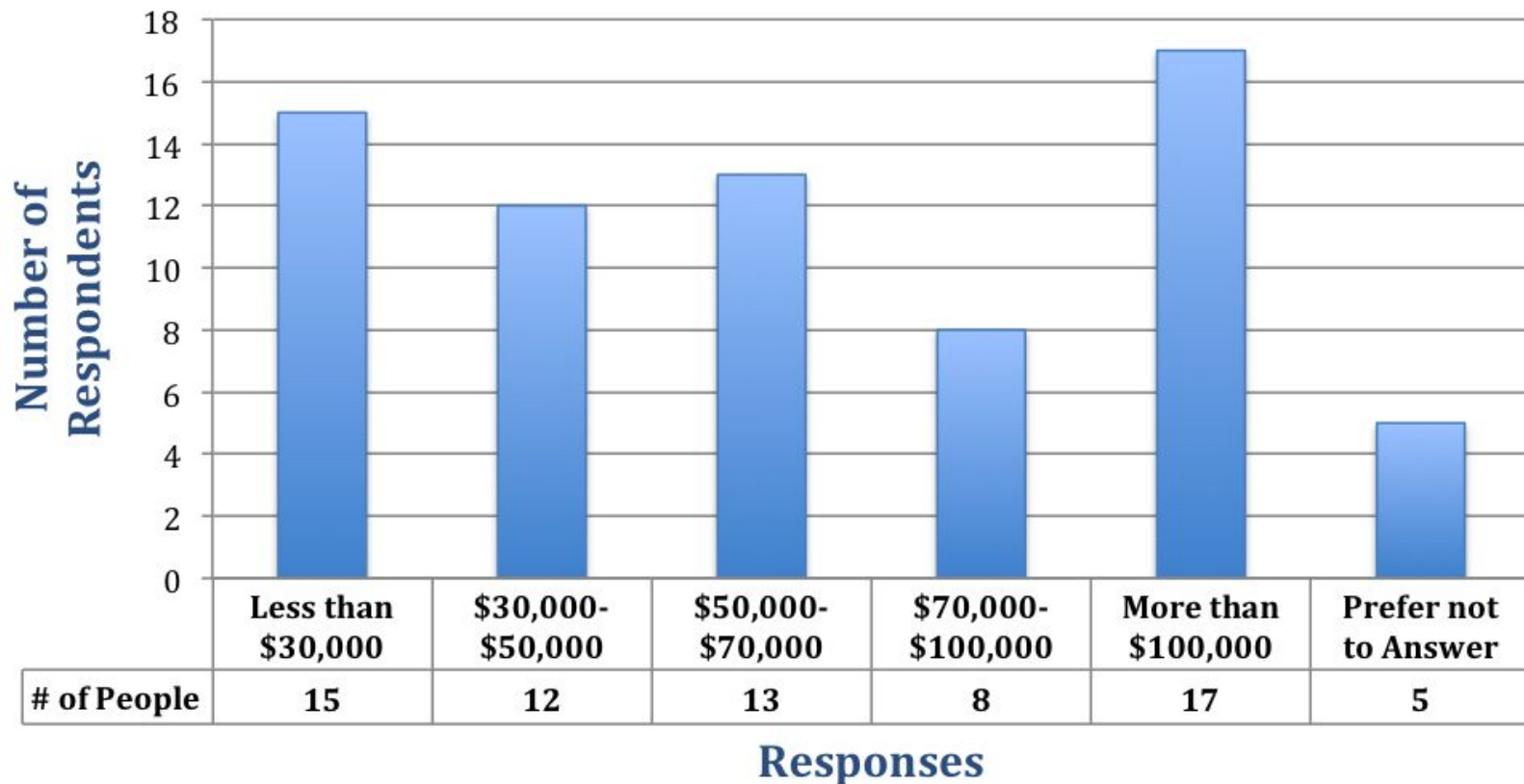


Ocean Engineering Projections

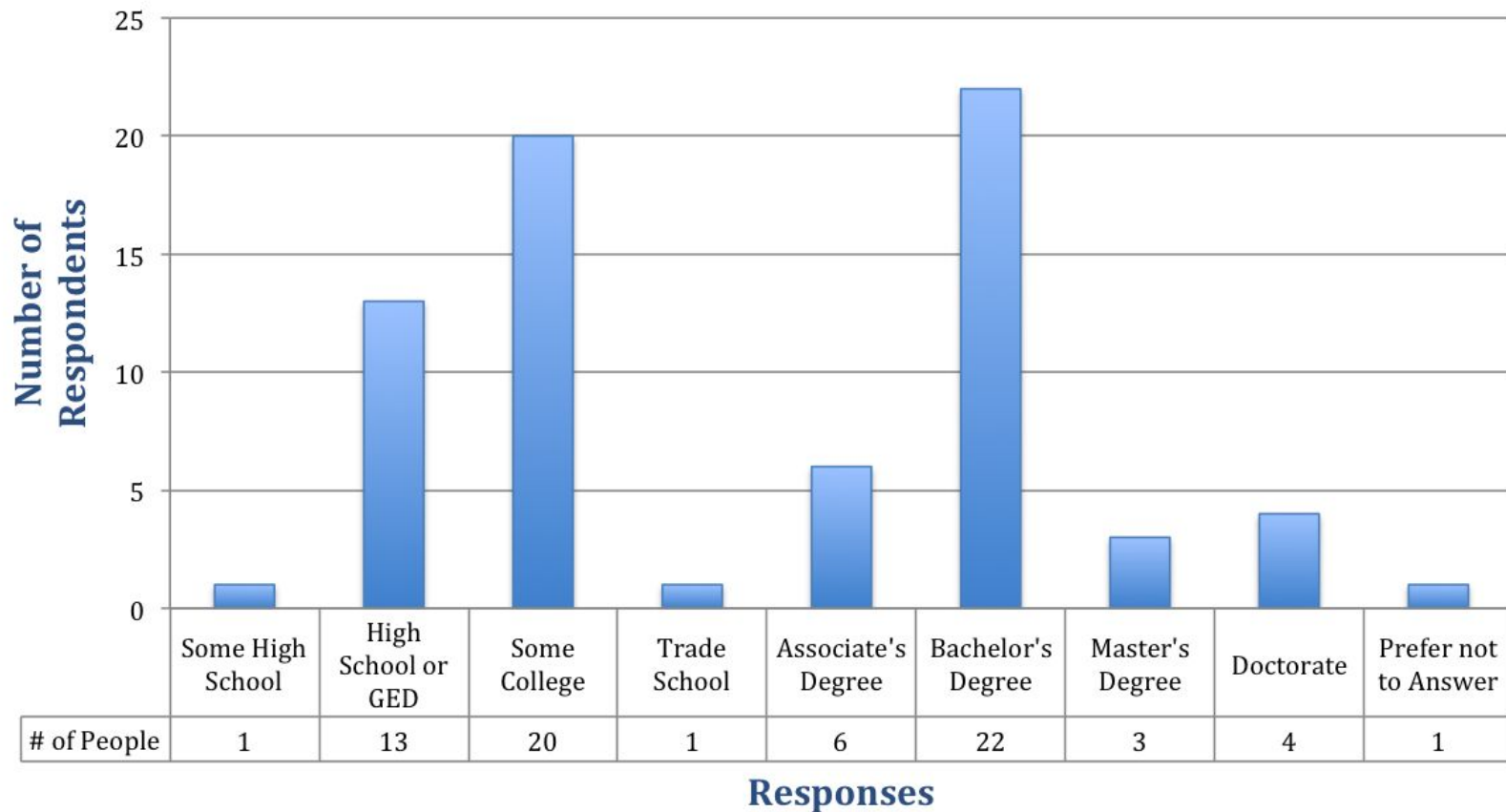


Arcgis Stormtools

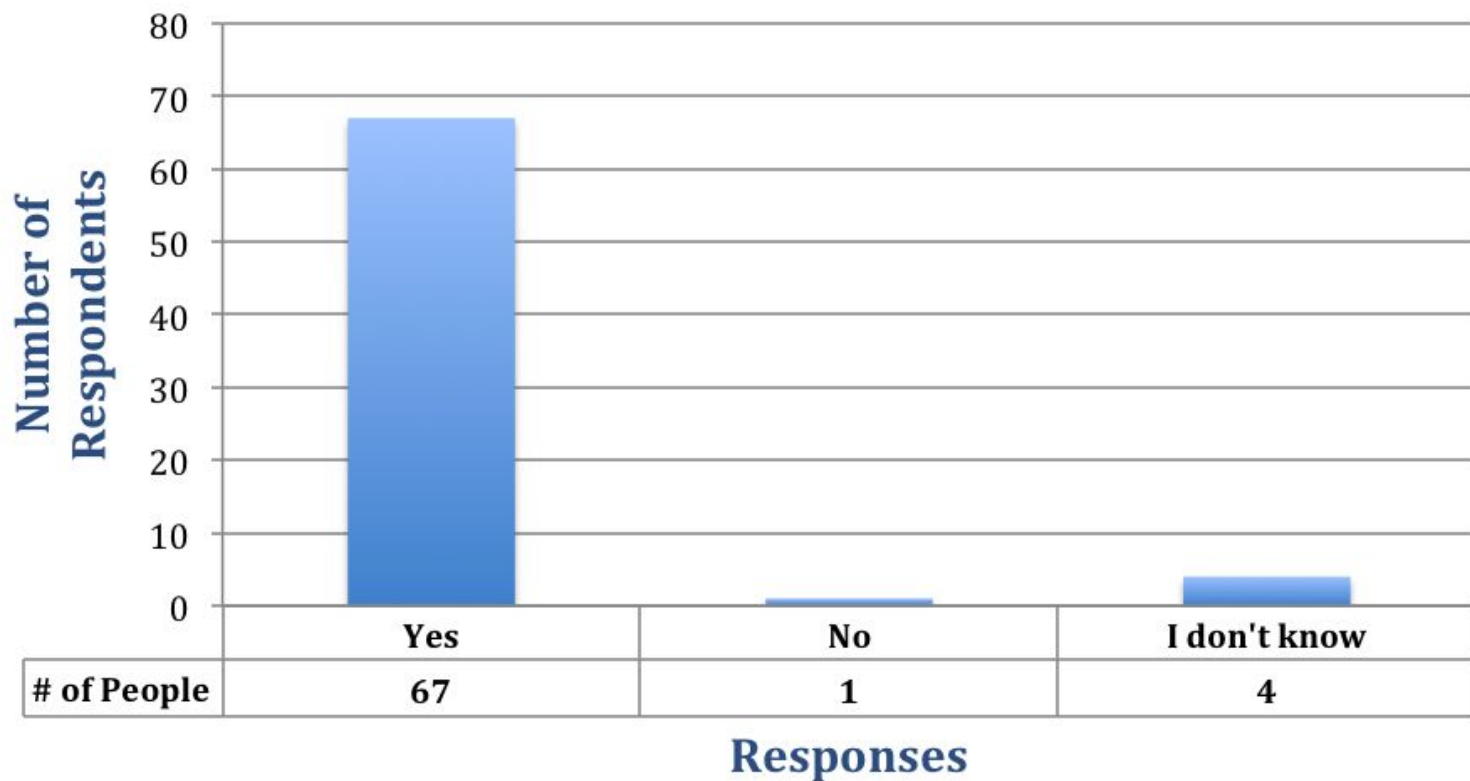
## Level of Income Amongst Residents



## Level of Education Amongst Residents

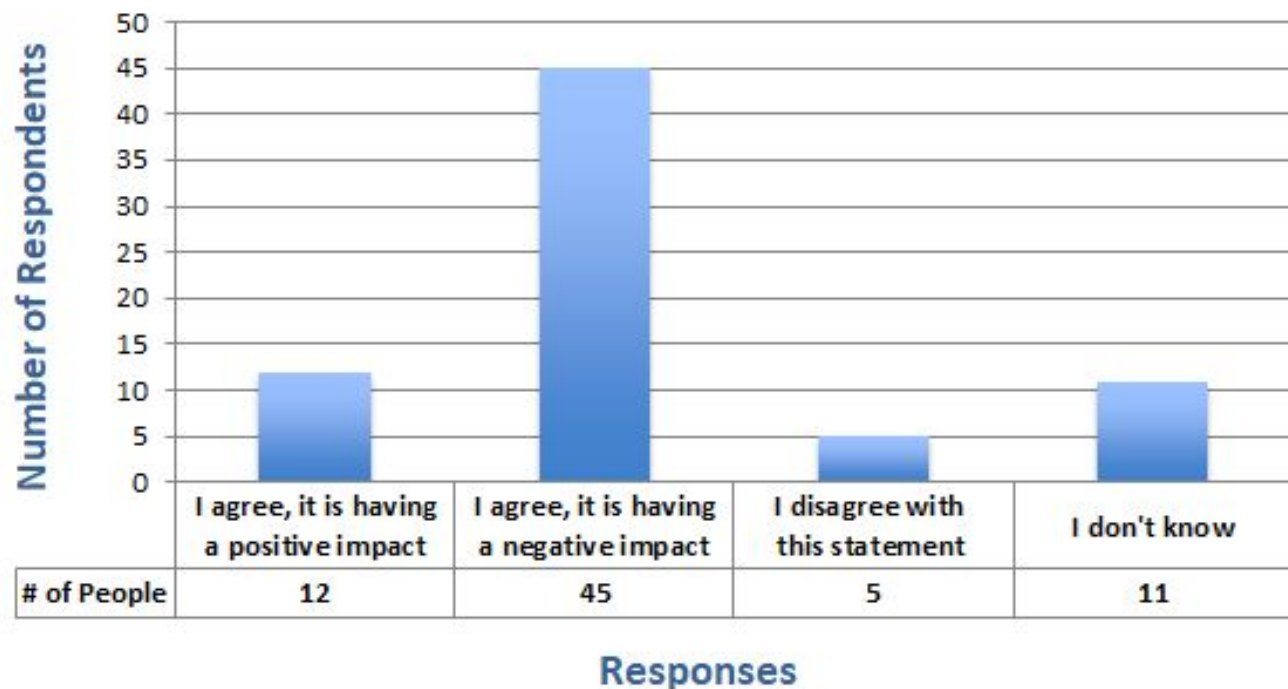


## Do you believe in Climate Change?





Do you agree or disagree with this statement:  
"Climate Change is affecting the natural  
environment in my neighborhood."



# What Types of Positive Impacts have you Experienced?

- ❖ School
- ❖ Warmer Winters
- ❖ Awareness
- ❖ “Our Life”





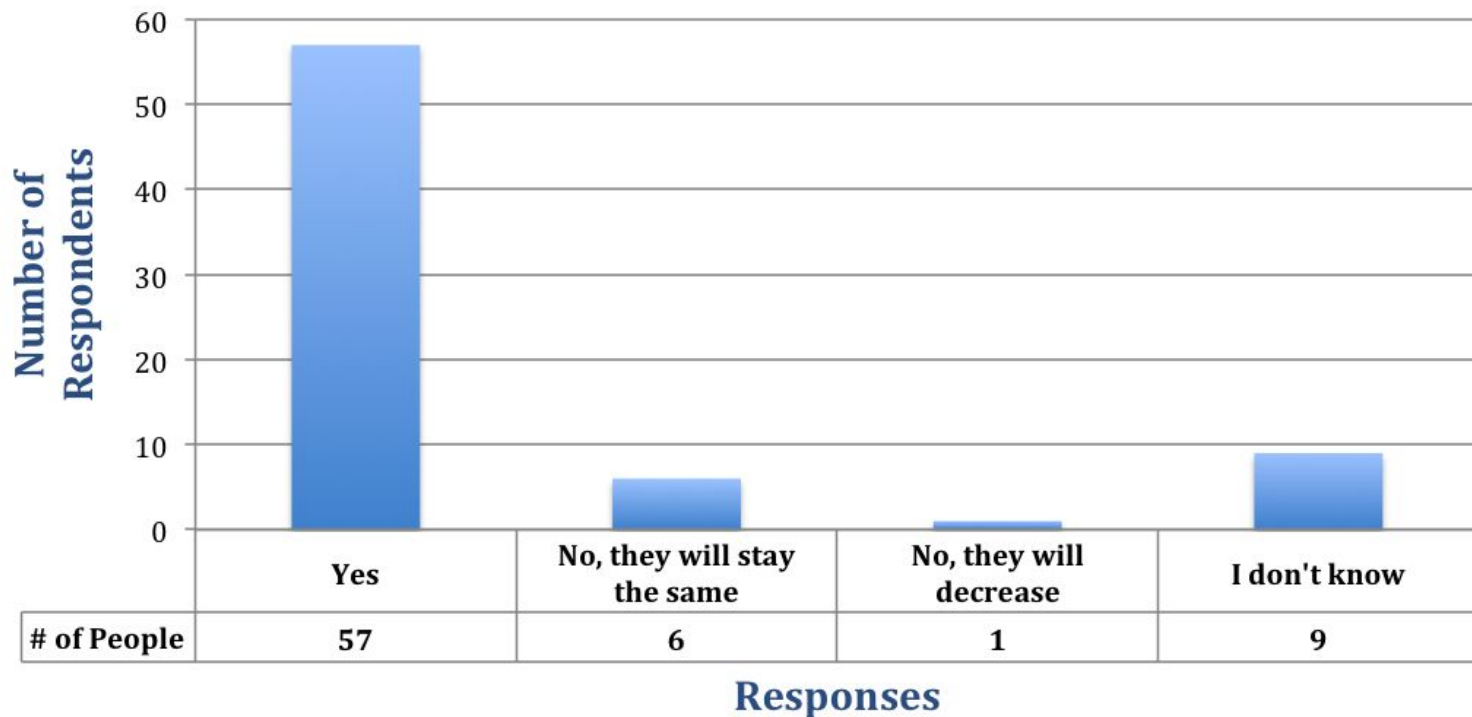
# What Type of Negative Impacts Have you Experienced?

- ❖ Weather changes
- ❖ Increase in Storms
- ❖ Increase in Temperatures
- ❖ Pollution
- ❖ Less wildlife, weird weather patterns
- ❖ Warmer winter
- ❖ Sickness
- ❖ Flooding
- ❖ Personal Experiences
- ❖ Harsher Winters

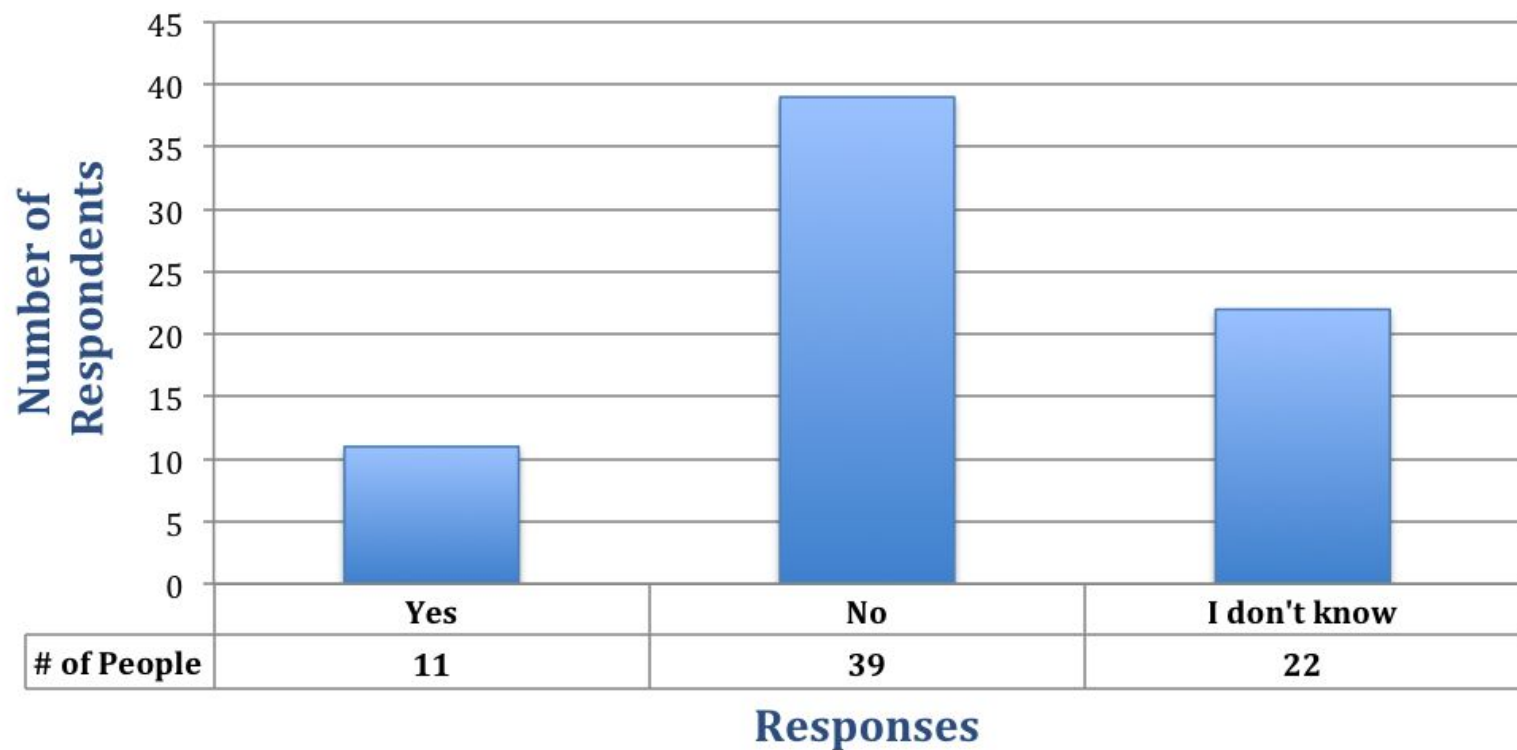


CNN Wire Staff. Rhode Island Flooding Providence

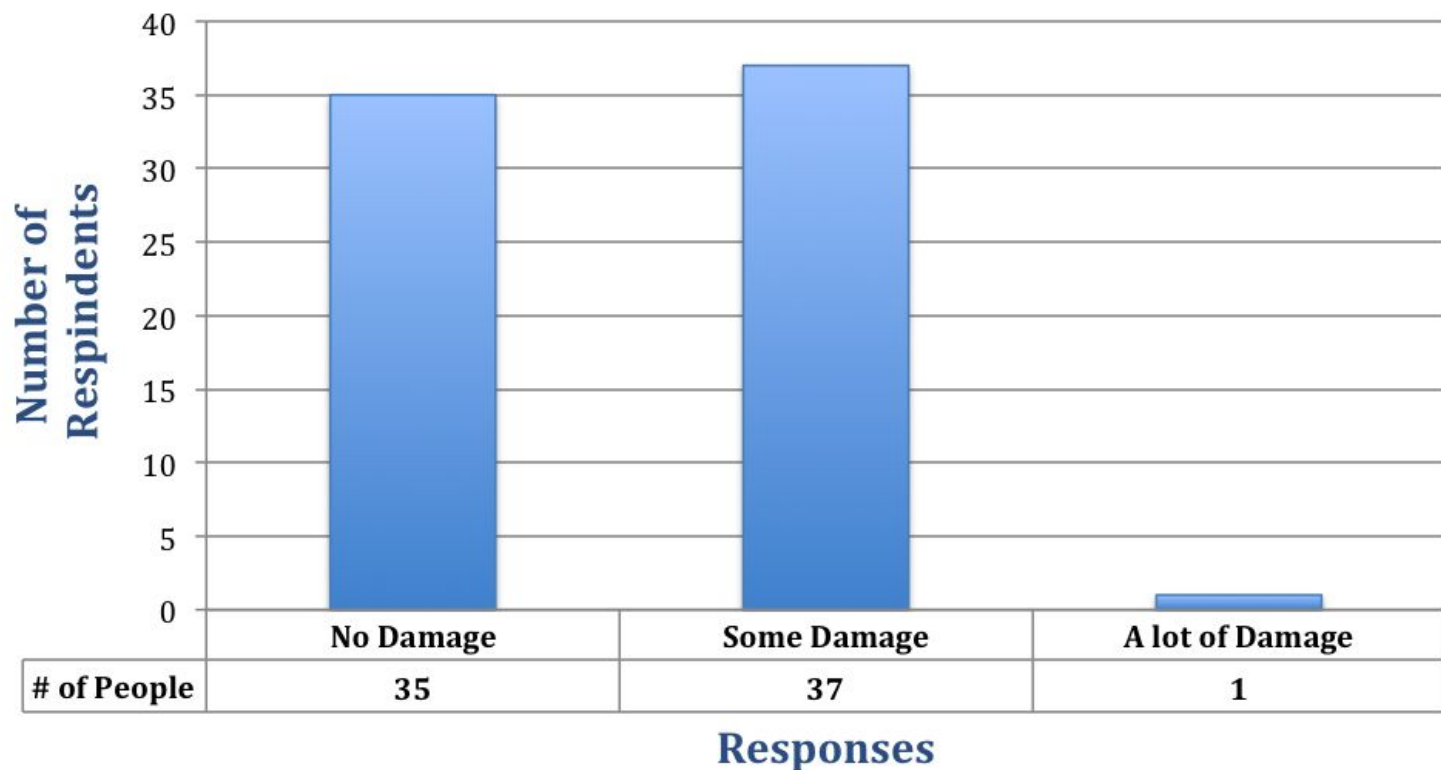
## Do you think the frequency and intensity of coastal storms are likely to increase in the future in the city of Providence (i.e. 20 years)



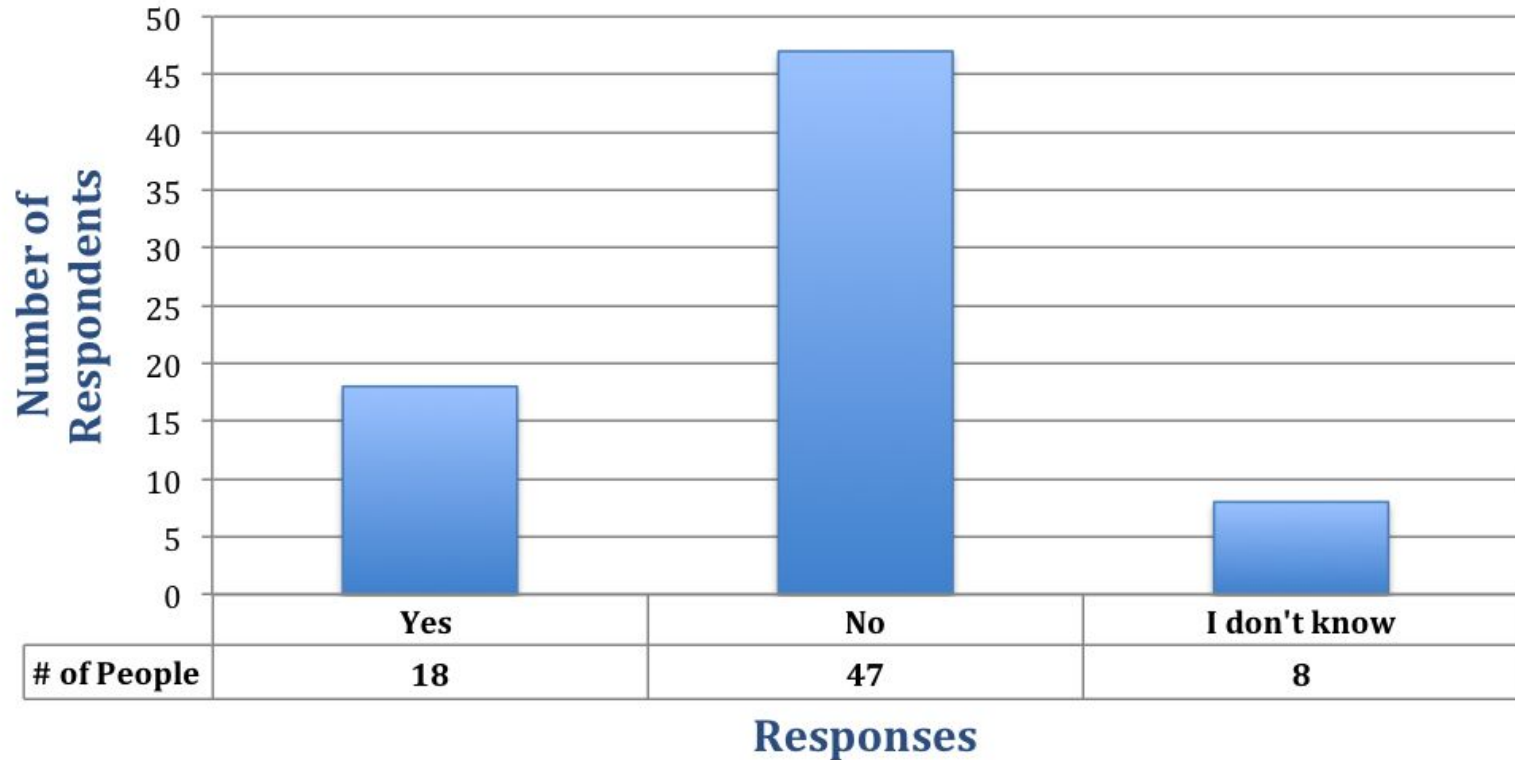
## Do you own flood insurance for your home?



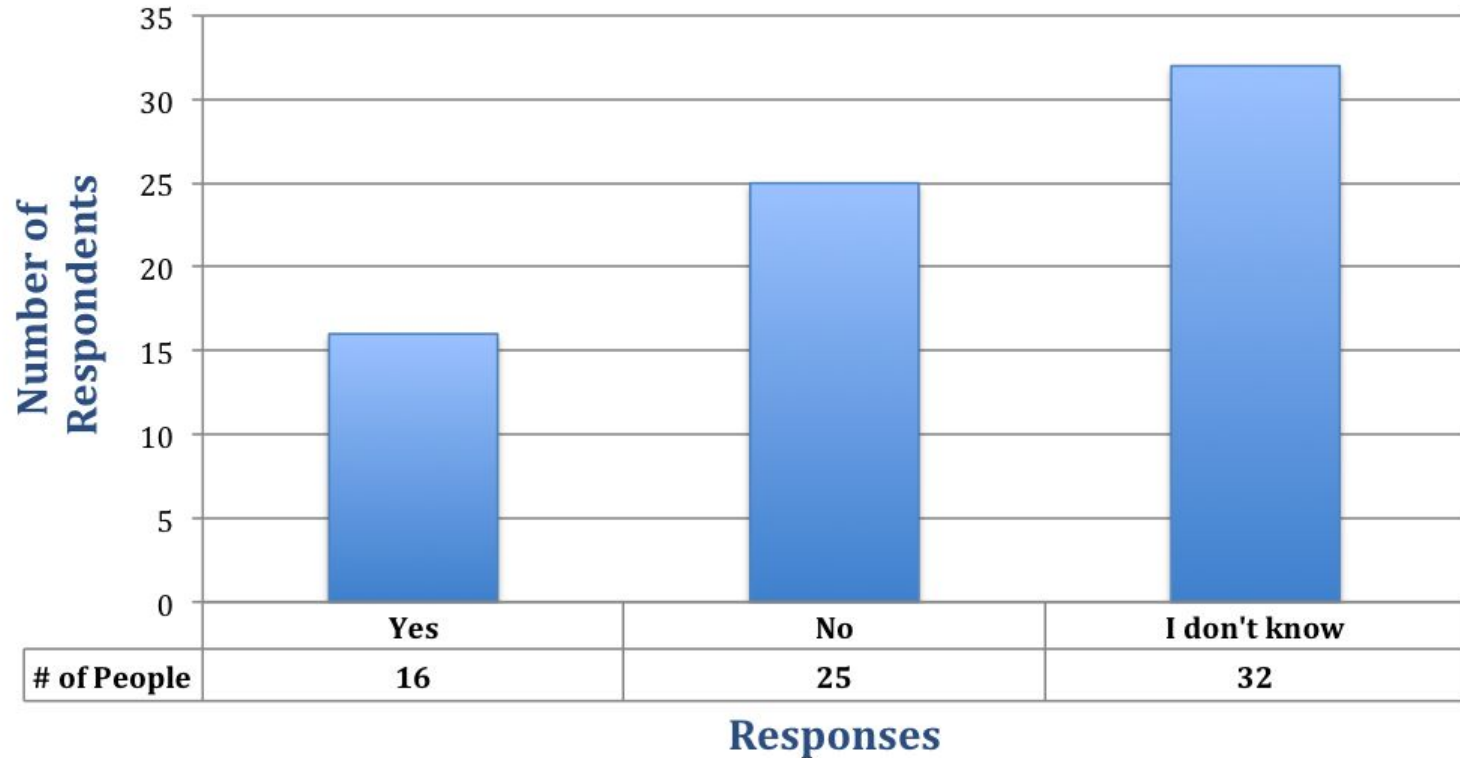
## Did you experience damage during the storms in February and March of 2018?



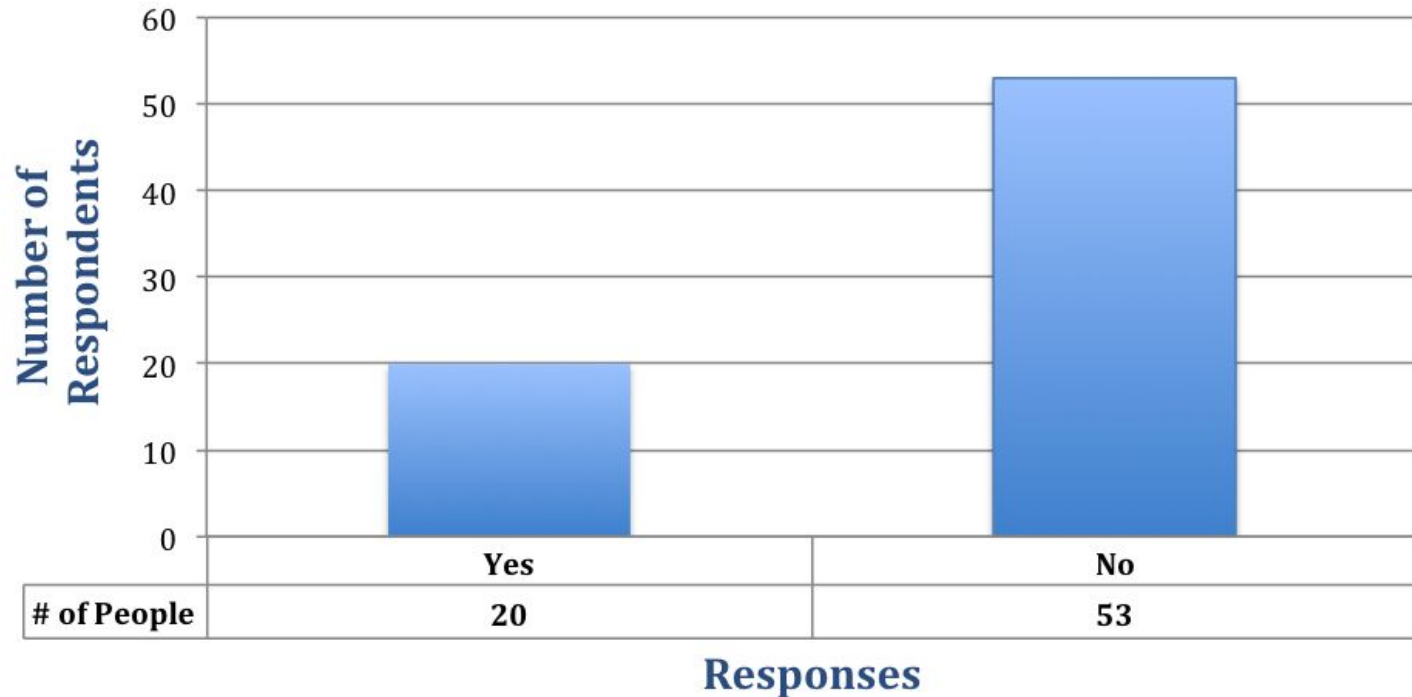
## Are you are aware of Providence's current evacuation plan for hurricanes and flooding?



## Is your house located in a hurricane evacuation zone?

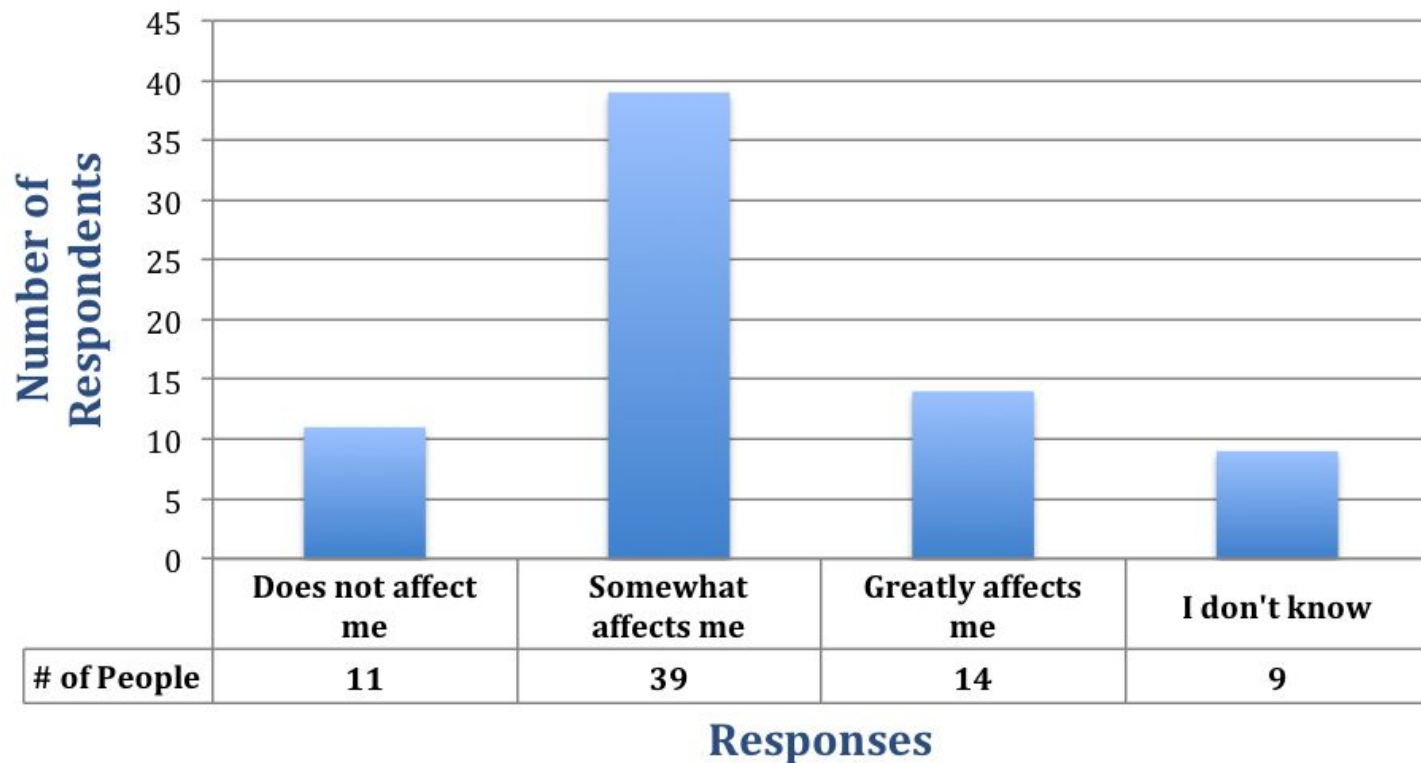


## Have you made changes to your home to combat flooding or intense storms in the last 20 years?

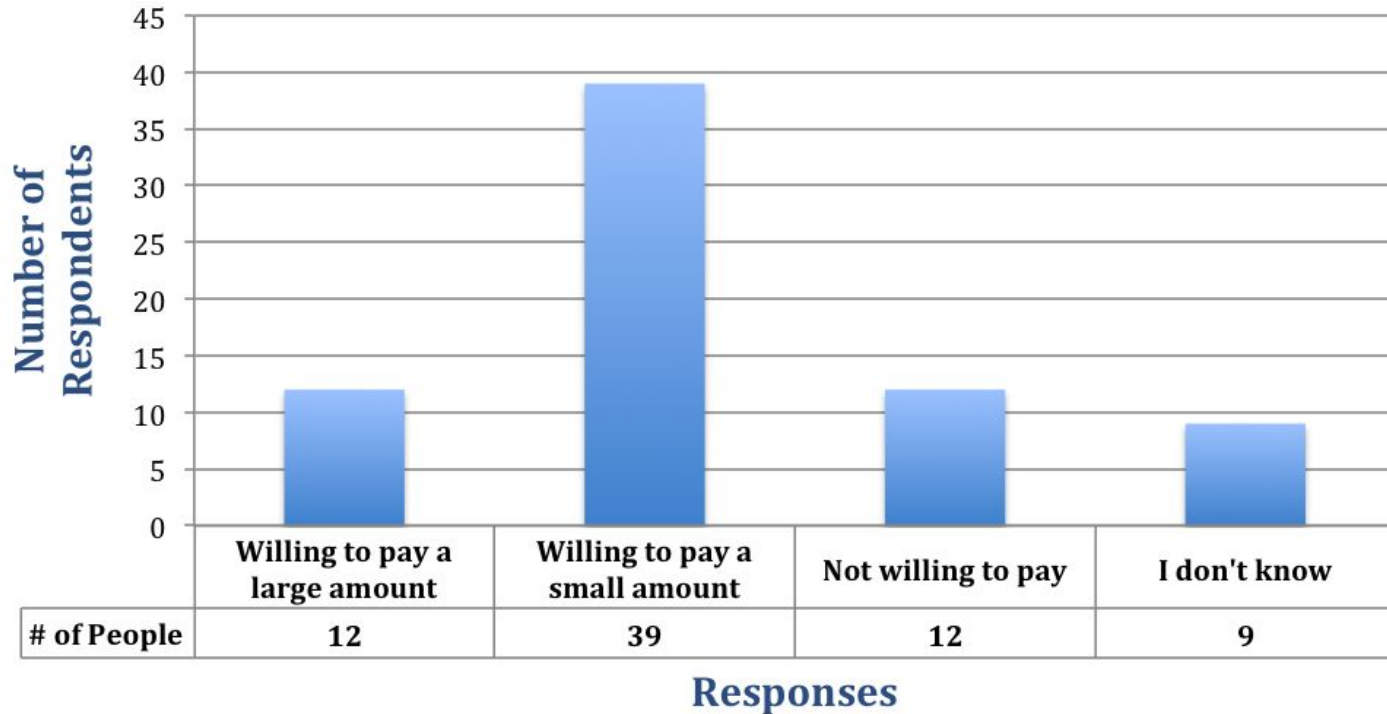




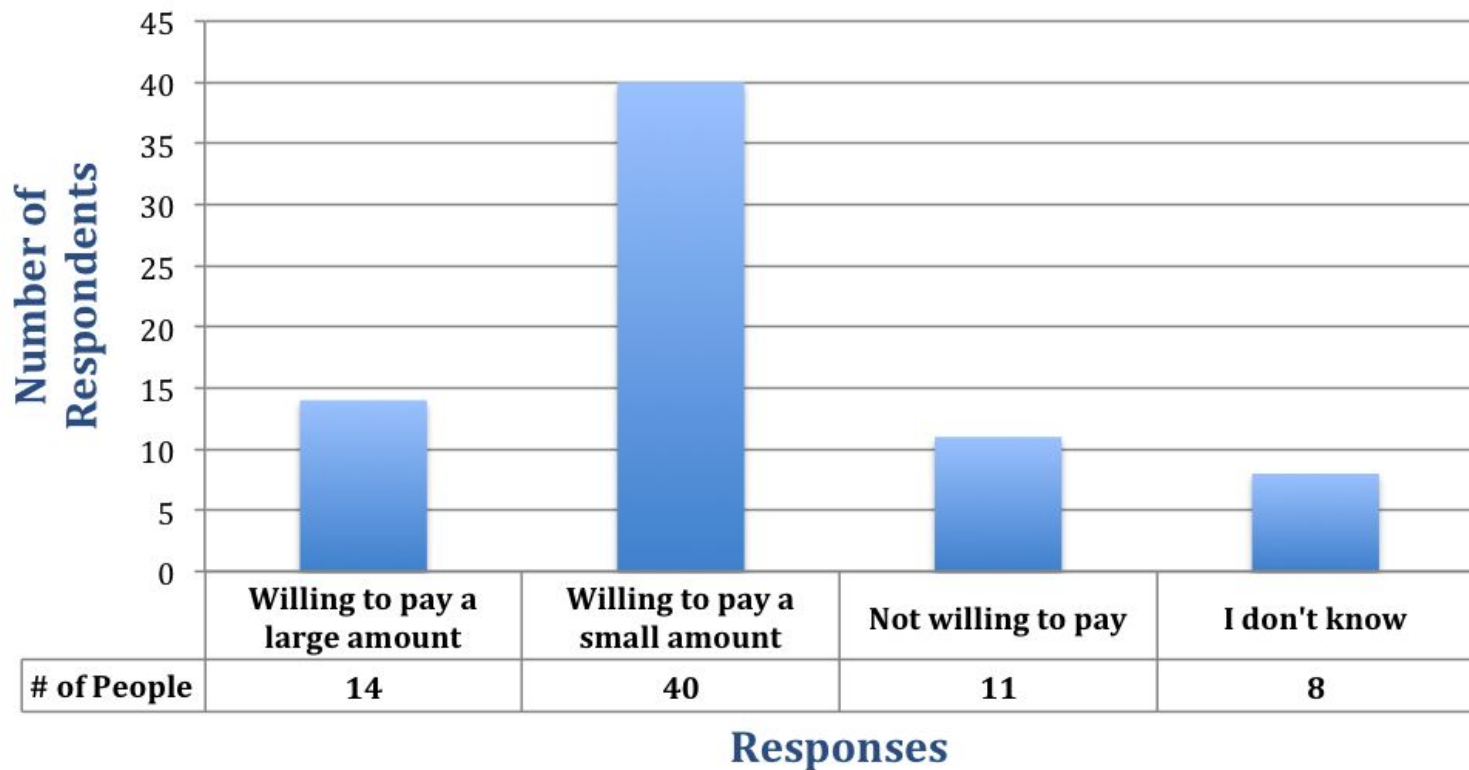
## Would 5 inches of flooding impact you in completing personal daily activities?



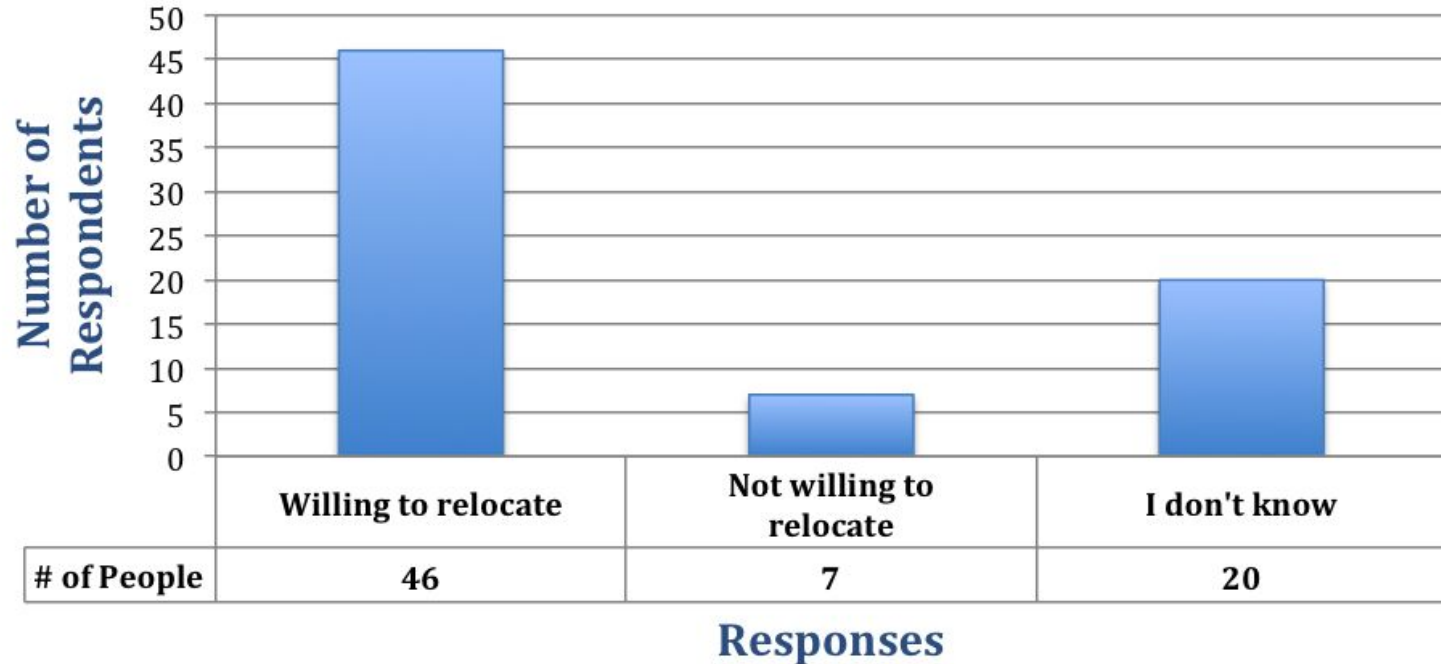
## Would you be willing to pay for home improvements to combat flooding to your home?



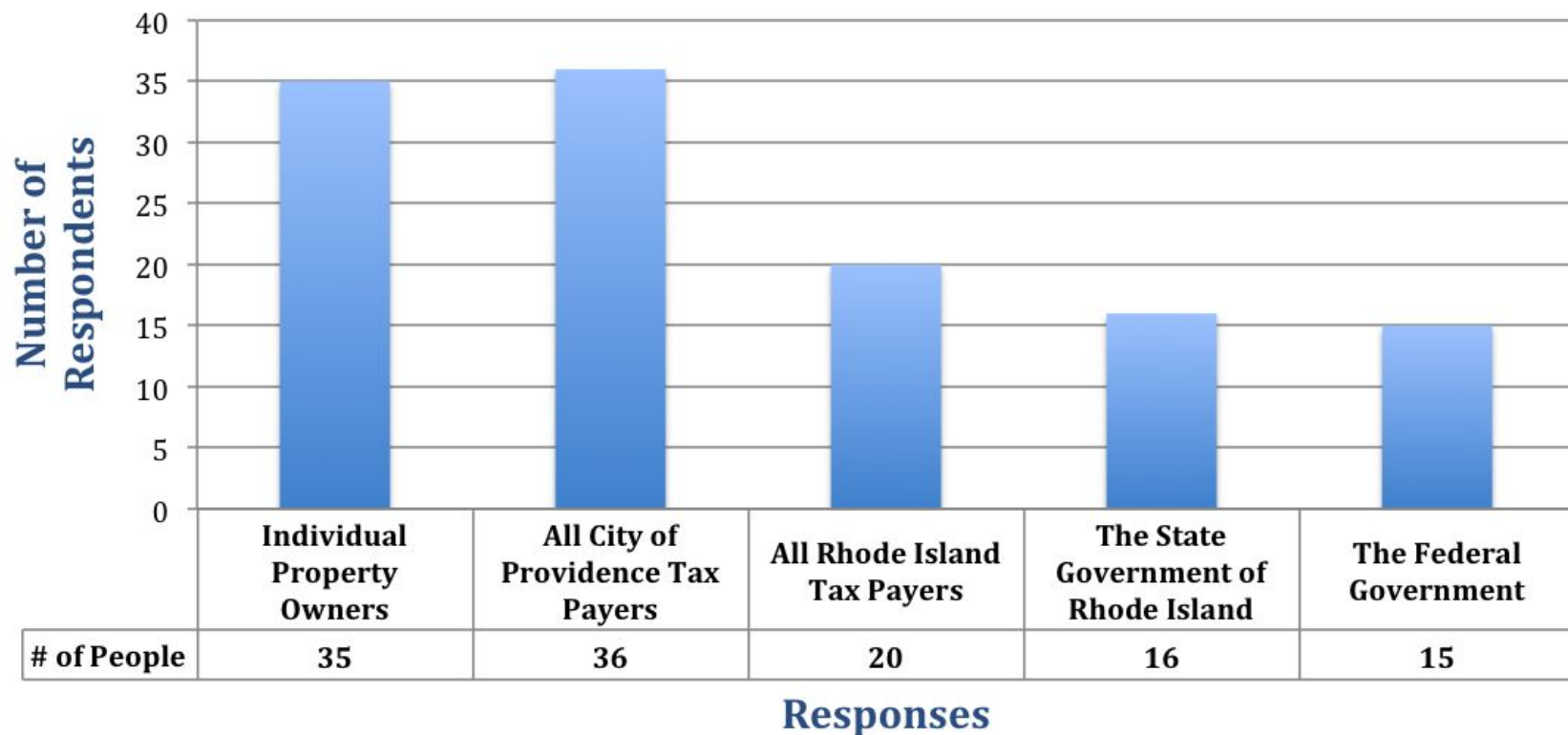
## Would you be willing to pay for community improvements to combat sea level rise?



## Would you be willing to relocate your family to relocate your family if flooding became severe?



## Who do you believe should be Responsible for damages from Sea Level Rise? (Check all that apply)



# Interactive Findings

- ❖ Open-ended focus group discussion
  - General Wording
  - Feet vs. Inches
- ❖ Low response to \$1 incentive
- ❖ Spanish survey
- ❖ Talkativeness



# Key Findings

- ❖ Limited awareness to risks
- ❖ Limited knowledge of area flooding
- ❖ Unaware of the Fox Point Hurricane Barrier
- ❖ Few changes to homes made
- ❖ Willing to pay small amounts
  - No correlation between income and WTP





# Recommendations for future survey efforts

- ❖ Material Incentive
- ❖ Expand survey area
- ❖ Variety of distribution methods
- ❖ Consider limiting jargon
- ❖ Acknowledgement of homeless community



# Recommendations for future survey efforts

- ❖ Rewording of Questions
- ❖ Include dollar amount towards willingness to pay for improvements
- ❖ Develop and suggest specific adaptations strategies within survey
- ❖ Distribute business survey



Questions?