Improving the Understanding of Risk Perception and Communication in the New York City Area Through Surveys, New Partnerships, and Workshops

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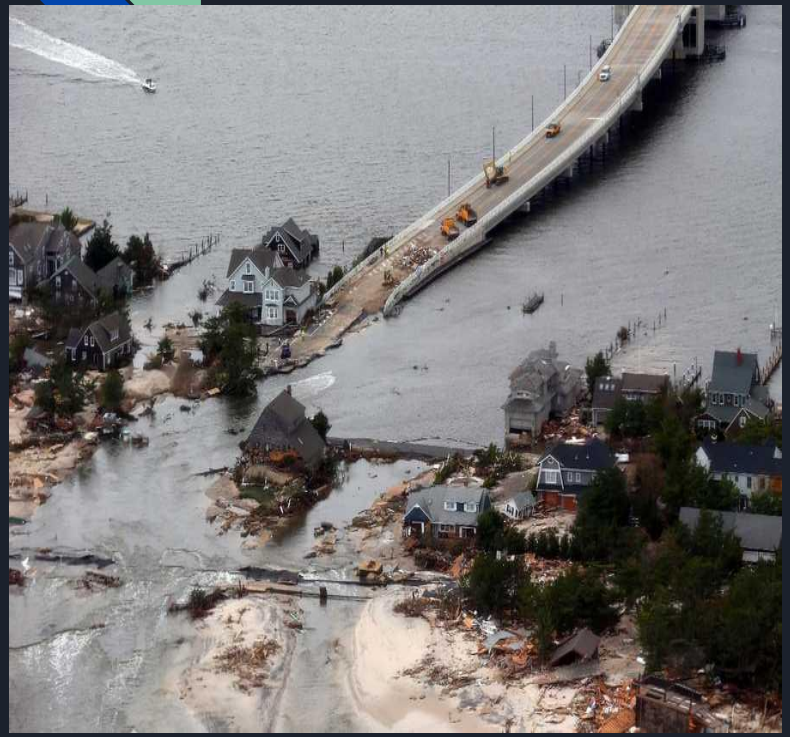
Motivation



AP Photo/Doug Mills, Pool

- Hurricane Sandy in 2012 was one of the most impactful weather events in New York City, causing extensive storm surge flooding in the city, with other subsequent impactful events
- How can we better prepare for the inevitable next one?
- We learned from Sandy and Ida that the NWS needs to better connect and coordinate with community leaders, who are often the ones that help make decisions and create the emergency plans and protocols
- How can we affect community leaders' risk perceptions and intentions to take action?
  -visualizations of storm surge?
- And what communication methods do planners use to disseminate information to residents?

Visualization Workshop

- We had run an online workshop in 2022 with college students with simulation videos of storm surge flooding, with role playing and group discussions, but we did not detect an effect of the visuals
- To investigate the use of novel technologies to help planers, we ran a workshop focusing on visualizations of flooding at the Reality Deck at Stony Brook University

Visualization Workshop contd

- Utilizing the Reality Deck at Stony Brook University, this workshop involved a total of 32 participants in groups of 2-4 at a time
  - emergency managers (n=4, 12.5%)
  - first responders (n=6, 18.75%)
  - community leaders (n=6, 15.63%)
  - religious leaders (n=2, 6.25%)
  - scientists (n=10, 31.25%)
  - meteorologists (n=2, 6.25%)
  - local government officials (n=2, 6.25%)
- These were the main role participants identified, with many having more than one role


POLICE

Visual

- Participants were ved the extent of flooding caused
- Then they used A graphic, infrastructure, and evacuation i

Visualization Workshop contd

- Participants were shown a map of Jamaica Bay, NY which then showed the extent of flooding caused by Hurricane Sandy
- Then they used Augmented Reality devices (iPads) to overlay demographic, infrastructure, and evacuation information
- Then we showed them 2 sea level rise scenarios, 0.5 m and 1 m, in addition to another future Sandy-like storm

Visualization Workshop contd

Animation of flood extent data from Hurricane Sandy (Oct. 2012) (blue) with Sandy +0.5 m Sea level rise extent (green) and +1m Sea level rise extent (red)

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- At each point, we had participants collaborate in a group of 2-3 to assess the vulnerability of 4 selected locations

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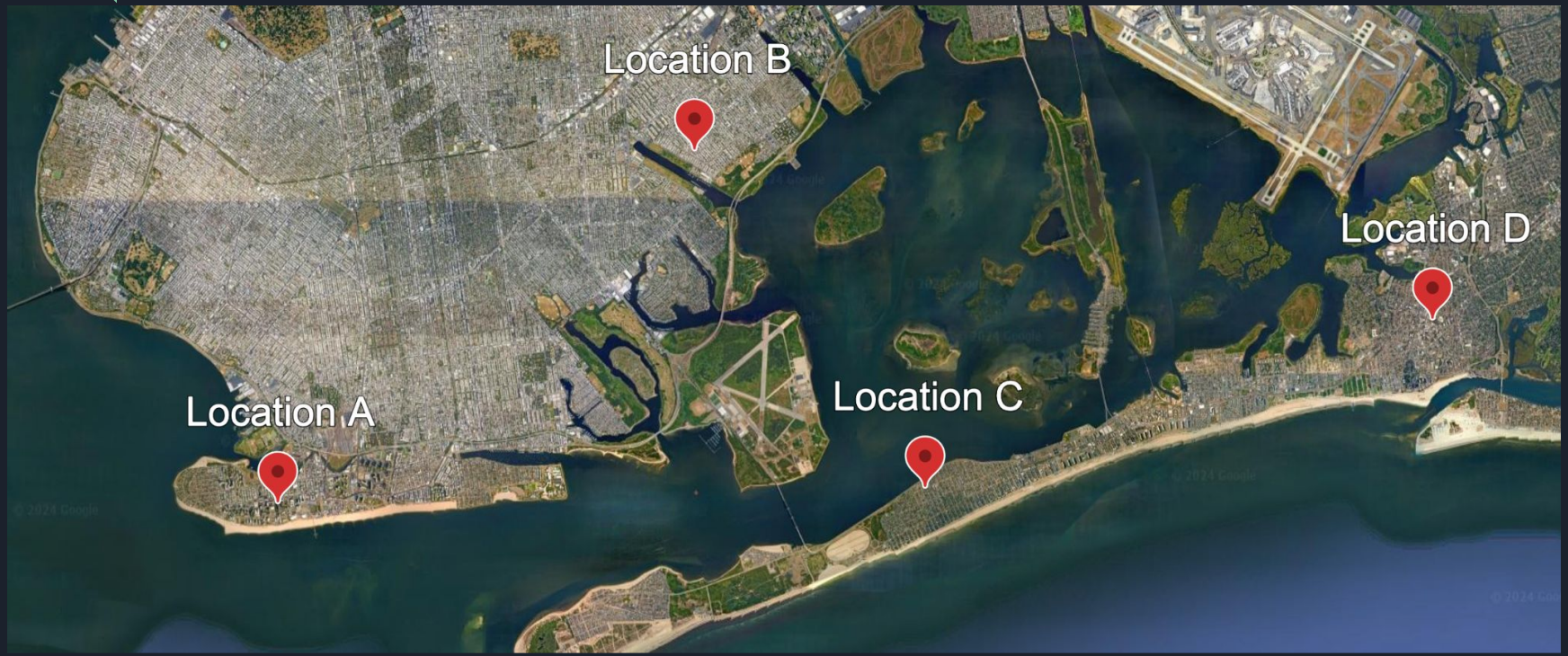
- Participants were surveyed before, during, and after the workshop about their perceptions of risks of coastal flooding, sea level rise, threat of flooding, intentions to take actions in a flood, and how important flooding should be to decision makers in their area

Some preliminary results

- Worry about personal safety **increased significantly**
- Likelihood to take action **increased significantly**
- Self efficacy **increased significantly**
- Impact of resource availability (time, money, skill, help from others) **increased significantly**

- Worry about community safety did not significantly increase
- Worry about Coastal Flooding and Sea Level Rise, seriousness of Coastal flooding did not change significantly
  - Probably because it asked about “in your area” and not everyone lived near the coast
- Likelihood of SLR high, but no significant change
- Other measures, help self/others evacuate; importance of preparing to decision makers; adequate resources in area to plan for CF; all non significant changes

Of the selected locations, D had the most stark increase in rating of vulnerability



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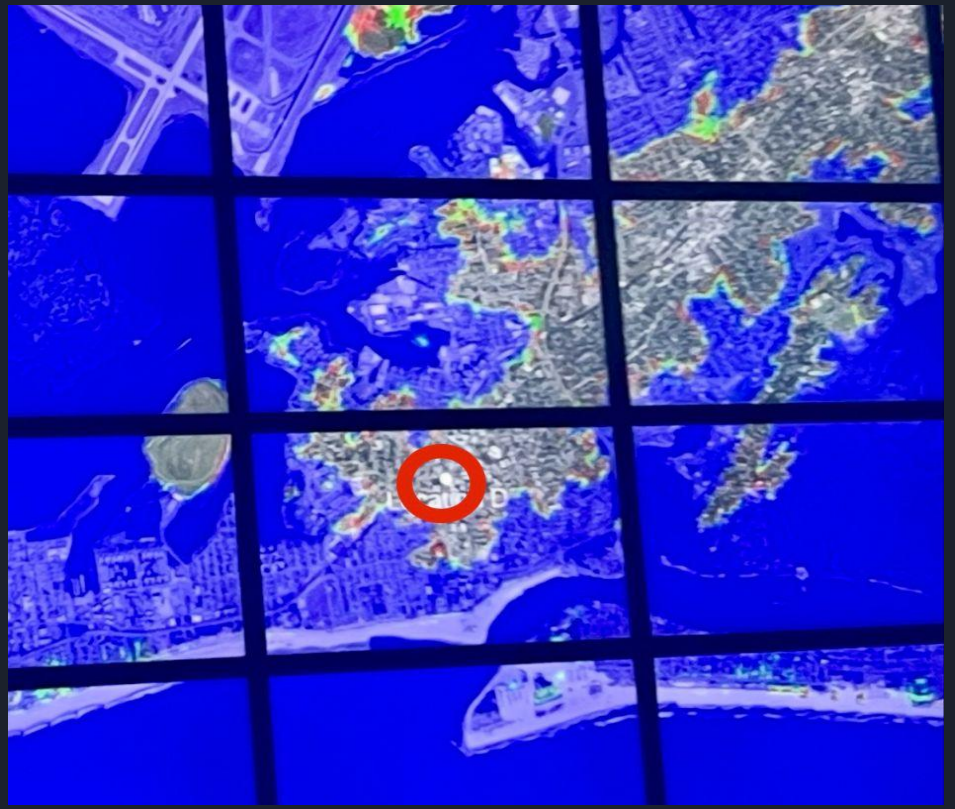
    - High SVI, low English proficiency, limited transportation, etc
  - Participants also thought about flooded evacuation routes



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- Participant 9 (Meteorologist) “My rating changed for Location D based on a high SVI [Social Vulnerability Index], even though they were not in a[n] inundation zone, but still surrounded by inundation areas”
- Participant 10 (Meteorologist) “Yes. Access to resources for those impacted. Location D has the highest SVI and potential to not be able to evacuate. Given the surrounding flooding they could be cut off from necessary resources and needed transportation.”
- Participant 11 (Emergency Manager) “Yes I elevated location D due to the number of non English speaking households”

How do community leaders and residents communicate about weather?

- We finished the online survey of low income residents in New York City we were conducting last year (n=800)
- In interviews conducted with 26 community leaders in New York City, about 50% (n=13) pass on weather information, even if it is not part of their mission statement
- A vast majority of respondents have a smartphone (n=746, 93%) and access to the internet (n=776, 97%)
- Government sources are considered to have a high responsibility for communicating weather information, but are perceived to be less willing, less knowledgeable, and less trustworthy than other sources, but are perceived to be more knowledgeable than community leaders
- The majority of respondents are not familiar with Notify NYC

Conclusions

- The Reality Deck helps participants appreciate the vulnerability of others and themselves, and prioritize the most vulnerable in an emergency situation
- The experience increased participants' intentions to take protective actions and worry about their safety in a flood
- Participants found the technology valuable as a planning tool and operational tool
- Could help community leaders and emergency managers better understand flood forecasts to better communicate that information to residents, as they often do
- One of the main critiques was that there was an overload of information to overlay

Next steps

- Looking at ways to bring the Reality Deck experience to communities without having to come to Stony Brook
- Using multiple screens at different angles to create an immersive desktop experience
- Currently used with medical data, but could be utilized with flood maps and data

Thank you!

My advisor Dr. Colle and Elizabeth Bojsza, Matthew Castellana, Yoonsang Kim, Julia Hathaway, Shadya Sanders, Katherine Rowan, Arie Kaufman, Christine Gilbert, Ruobing Li