

Coastal Resiliency Planning at the City-scale, East-central Florida

Alexandra Otto, School of Psychology

Faculty Advisor: Dr. Ken Lindeman, Dept. of Education and Interdisciplinary Studies, Florida Institute of Technology

INTRODUCTION

Challenges facing the governance of small and large cities of US coastal areas include a combination of geo-physical issues including sea level rise, saltwater intrusion, and increasing storm surge. (CIG et al., 2007). Coastal planning that evaluates and adopts best practices in adaptation can decrease risks, increase resiliency, and save money in the long term (S. Fl. Regional Climate Center Compact, 2011).

One community engaged in climate planning is the City of Satellite Beach, Brevard Co., FL (Parkinson & McCue, 2011). The City, located between the Atlantic Ocean and Indian River Lagoon, partnered with the East-central FL Regional Planning Council in 2014, on a Florida Dept. of Economic Opportunity grant to initiate a community resiliency planning project in the City. One component involved an online survey hosted by the online planning platform, Metroquest, to identify citizen opinions and preferences to increase community resiliency in regards to vulnerabilities associated with coastal changes. The goal of this project was to work with City and EFRPC staff on the processing and analysis of Metroquest survey findings. The objectives follow.

- To tabulate, identify and analyze the highest priority vulnerabilities
- To determine and analyze the most common response strategies.

METHODS

Processing of Metroquest data focused on assisting the stratification and comparison of vulnerabilities and response strategy data from the surveys. The preparation of the survey was done by city staff, other local institutions, and ECFRPC staff. The survey was made available to the citizens of Satellite Beach from November 19, 2014 to January 19, 2015. Residents and business owners in Satellite Beach were sent a letter on November 20, 2014 to inform them of the survey purpose with a link to the survey url.

The survey was composed of five screens with primary data from screens 2, 3 and 4: vulnerabilities, response strategies, & opportunities. For the vulnerability category, citizens selected their top three concerns from a list of six options (Table 1). The Metroquest platform had length constraints on the amount of words allowed for survey descriptors.

Table 1. Vulnerabilities and Response Strategies in Survey.

Vulnerability	Response Strategy
Sea Level Rise	Policy Considerations; Impact Areas; Redirect Development; Protect Public Infrastructure; No Action
Flooding	Stormwater Capacity; At-Risk Properties; Install Pumps; Stormwater Reuse; Roadway Upgrade
None	Education; Disaster Response Only; Do Nothing
Coastal Erosion	Armoring; Dune Protection; Beach Renourishment; Redirect Development; No Action
Storm Surge	Flood Insurance; Raise Elevations; Redirect Development; Increase Shoreline Setback; No Action
Loss of Power/Utilities	Relocate Utilities; Underground Utilities; Alternative Energy; No Action

On the response strategies screen, three to five response strategies were based on the top three vulnerabilities selected initially. The strategies available are shown in Table 1 with the corresponding vulnerability. Participants ranked response strategies using a five point scale.

After participants completed the rankings they moved to the opportunities component (survey screen four). Participants then picked up to five of the eight opportunities listed and ranked them in order of importance. The opportunities included: vibrant business community, do nothing, preserve neighborhoods, eco-friendly, improve highway A1A, restore lagoon, increase river access, and beach preservation. Each page of the survey included an option for open-ended comments.

RESULTS

A total of n = 479 (6% of the city population that is >20yr old) completed the online survey. Most of the responses (90%) were received in the first month the survey was active, subsequent to a community resiliency workshop held in late Sept. 2014 and the notice letter. >98% of the respondents identified coastal vulnerabilities in the community. 87.9% of the citizens expressed concern for the following: loss of utilities/power, flooding, storm surge, and coastal erosion. Less than 1% of the total responses indicated the City had no vulnerabilities (Figure 1).

Figure 1. Vulnerability Importance in Survey Responses.

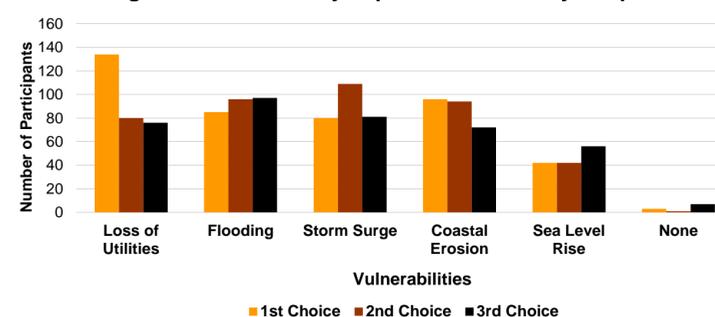


Figure 2 shows relative percentages of vulnerabilities. The results suggest that citizens were concerned with issues that directly affect them personally, including loss of utilities and several issues associated with short- and long-term inundation.

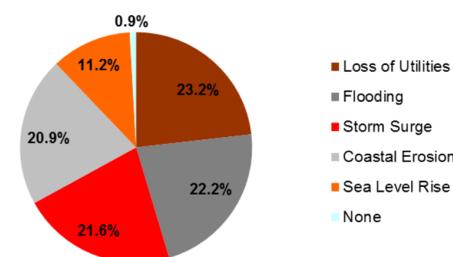
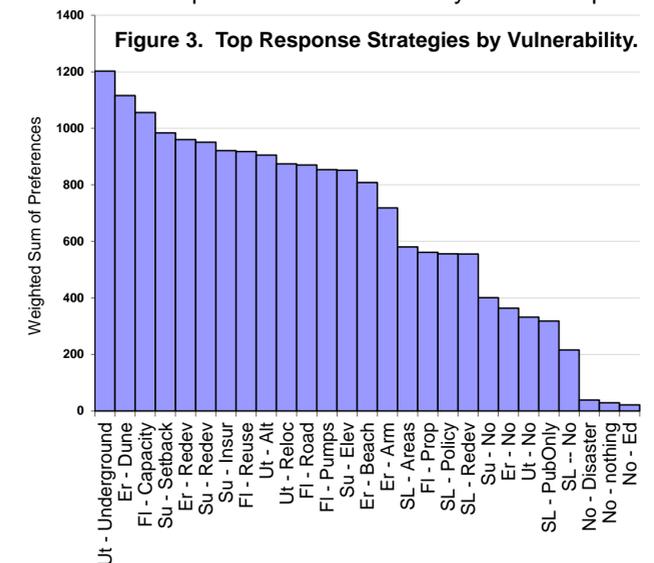


Figure 2. Highest Ranked Vulnerabilities by Percentage.

The 27 response strategy preferences are shown in Figure 3; these represent the possible combinations with vulnerabilities as shown in Table 1 (Ut = Loss of Utilities). Many strategies were chosen by the respondents from all choices except for the no vulnerability and no response options.



Of the eight opportunities available in the survey, the top four were chosen by >69% of the citizens. These included: preserving the beach, restoring the lagoon, preserving neighborhoods, and a vibrant business community. <1% saw no opportunities they would like the City to emphasize.

DISCUSSION

The survey results support the conclusion that a substantial majority of respondents are interested in and supportive of coastal resiliency planning. Certain vulnerabilities scored higher than others, which could be useful for policy makers while scoping options for adaptation policy. Many combinations of response strategies per vulnerability were identified that could be implemented to meet the desires of the community. City-based comprehensive planning was supported by these survey results and can guide long-term adaptation decisions and improve resiliency.

Limitations of this study included the number of survey participants, though a 6% response from a pool of approx. 11,000 residents is considered adequate in many survey studies. Another constraint was the Metroquest limits on the number of words and pictures with differing screen options, this limited the explanation of some complex vulnerability and response strategy topics.

REFERENCES

Center for Science in the Earth System (The Climate Impacts Group. (2007). Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments.

Parkinson, R. W., & McCue, T. (2011). Assessing municipal vulnerability to predicted sea level rise: City of Satellite Beach, Florida. *Climatic Change*, 107(1-2), 203-223.

Southeast Florida Regional Climate Change Compact. (2011). A Unified Sea Level Rise Projection for Southeast Florida.



NORTHROP GRUMMAN

Engineering & Science
Student Design Showcase
at Florida Institute of Technology

