

Climate Change Communication and Perceptions in East Boston

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Word Count: 4,999

ABSTRACT

As climate change effects become more salient in the coming years, coastal communities will need to manage the impact of rising sea level. Accordingly, this study examines perceptions of climate impacts for residents of the coastal region of East Boston, Massachusetts. Through semi-structured interviews, residents were given the opportunity to describe their understanding and perception of climate change and identify what gaps exist in local communication pathways on the issue. Seven major themes were discovered including knowledge, low prioritization of climate change, local communication pathways, uncertainty, infrastructure vulnerability, lack of empowerment, and mitigation through alternative transportation. Findings suggest that although climate literacy exists among members of the East Boston community, there was a disconnect between respondents' understanding of climate change on the global scale and how they see this knowledge as relevant to their community. Further, respondents found local meetings on climate change to be relatively unproductive, and desired greater access to local preparedness plans for future climate impacts. Moreover, residents identified transportation as a realistic opportunity for them to take action on mitigation, which has not been identified in previous studies of the area. This communication of mitigation actions that actually make sense for residents is key in effectively implementing mitigation measures. This study highlights a need for more intentional conversations about local climate change between community members, as well as with local leaders and government organizations.

ACKNOWLEDGEMENTS

We would like to acknowledge our Principal Investigator, Dr. Jennifer Kelly, for her consistent leadership and guidance throughout this process, as well as the contributions of Adelaide Mickelson in the research and writing of our thesis proposal. We would also like to acknowledge the assistance provided by Alice Brown and our non-profit partner, Boston Harbor Now, in focusing our project's direction, as well as Alex DeFronzo and the Piers Park Sailing Center for allowing us space to conduct interviews. Finally, we would like to recognize James White and Boston College Dining Services for assisting us in sourcing participants for our research, and all of our respondents for taking the time to contribute to the success of this project.

INTRODUCTION

According to a 2013 Intergovernmental Panel on Climate Change (IPCC) report on climate change, it is likely global sea level will rise between .26 and .98 meters by late 21st century.¹ The effects of sea level rise (SLR) will be especially felt among coastal communities, and it is estimated coastal residents will account for 48% of the United States population by 2020.² Our research investigates the community of East Boston, which is vulnerable due to its proximity to the Boston Harbor and below-average socioeconomic status. While previous studies in East Boston have assessed residents' knowledge of climate change and explored views on adaptation strategies, further research is needed on governmental climate communication, as well as interpersonal communication between community members.³ Our study differs from existing literature because we examine communication pathways as a means to empower residents of East Boston in regard to climate change.

LITERATURE REVIEW

Research addressing climate vulnerability in East Boston has been done, but further exploration of residents' perceptions of agency in mitigating climate change is needed.⁴ Additionally necessary is studying the effectiveness of various communication pathways, specifically the dialogue between leaders and local stakeholders.⁵ Although there is a long history regarding the science of climate change and community-based participatory research, the need for locally tailored solutions to the issue makes the subject challenging to pursue.⁶ To address such gaps, we uncover how local perceptions of climate change are influenced by communication pathways in East Boston. Below we provide an overview of climate change perceptions, disadvantaged communities, climate adaptation specific to East Boston, interview methods, and background on the neighborhood of East Boston.

Perceptions and Actions of Coastal Communities

As negative climate effects manifest globally, studying knowledge and perceptions of vulnerable populations is necessary. A 2017 study conducted by Thomas and Benjamin in the Bahamas, a significantly vulnerable nation, evaluated residents' perceptions of climate risk. Findings suggest residents were aware of climate change and its global effects, but were not as

¹ John A. Church et al., "Sea Level Rise," IPCC (2013), https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter13_FINAL.pdf.

² USGS. "Evaluating Sea-Level Rise Impacts in the Northeastern U.S.," *United States Geological Survey (USGS)*, https://www.usgs.gov/centers/climate-adaptation-science-centers/science/evaluating-sea-level-rise-impacts-northeastern-us?qt-science_center_objects=0#qt-science_center_objects.

³ Douglas et al., "Coastal Flooding"; Kirshen et al., "Engaging Vulnerable Populations."

⁴ Douglas et al., "Coastal Flooding"; Kirshen et al., "Engaging Vulnerable Populations."

⁵ Sabrina McCormick. "Assessing Climate Change Vulnerability in Urban America: Stakeholder-Driven Approaches." *Climatic Change* 138, no. 3-4 (2016), 408.

⁶ McCormick, Assessing Climate Change Vulnerability, 397.

cognizant of local impacts.⁷ Moreover, residents were unaware of the social impacts, and placed greater emphasis on ways in which climate change would negatively impact ecosystems. Specifically, increased capacity for disease, diminished tourism, and decline in standard of living were not on the forefront of people's minds.⁸ Similar results were found in a study by Lin and colleagues (2018) in Xiamen, China, a coastal community susceptible to flooding, where residents' understanding of local climate impacts was largely limited to temperature rise.⁹ Such findings demonstrate how vulnerable groups perceive themselves as separate from effects of climate change, and have limited understanding of the impact it will have on their lives.

Studies of vulnerable communities also investigated perceptions of action on climate change. Bahamian residents in Thomas and Benjamin's study (2017) reported the government was not doing enough to mitigate climate change; meanwhile, 55% of participants were not taking any mitigation steps themselves.¹⁰ Additionally, there is not a significant willingness to change way of life, as supported by Lin and colleagues (2018).¹¹ Xiamen findings demonstrated low elevation residents, while most at-risk to SLR, were the least likely to uproot their lives and evacuate. Rather, residents were more willing to adapt to impacts, indicating a lack of interest in significant change.¹²

Disadvantaged Communities: Environmental Justice

Populations vulnerable to climate change through SLR also tend to be socio-economically disadvantaged. A 2012 study quantitatively mapped social vulnerability to investigate risks of SLR in low socio-economic communities within the United States. Using U.S. Census data, Martinich and colleagues (2012) employed the Social Vulnerability Index (SoVI) framework, which uses 42 variables reduced to 11 independent factors, such as race, occupation, and density of the built environment, in order to assess social vulnerability on a local level and highlight environmental justice issues.¹³ SoVI results under a mid-SLR scenario (66.9 cm by 2100), demonstrated approximately 1,630,000 people could be affected; socially-vulnerable coastal communities made up around 20% of this group.¹⁴ Such results suggest socially-disadvantaged communities are at the forefront of SLR and will disproportionately face the negative effects.

Similarly, a study by McCormick (2016) investigated climate vulnerability, utilizing interviews to assess cultural knowledge of climate change.¹⁵ The study conducted 65 interviews via purposive sampling of stakeholders located in Boston, Los Angeles, Portland, Raleigh, and

⁷ Adelle Thomas and Lisa Benjamin. "Perceptions of climate change risk in The Bahamas." *Journal of Environmental Studies and Sciences* 8 (2017): 63-72.

⁸ Adelle Thomas and Lisa Benjamin, "Perceptions of climate change risk in The Bahamas"

⁹ Tao Lin, Xin Cao, Ning Huang, Lilai Xu, Xinhua Li, Yu Zhao, and Jianyi Lin. "Social Cognition of Climate Change in Coastal Community: A Case Study in Xiamen City, China." *Ocean & Coastal Management* (2018).

¹⁰ Thomas and Benjamin, "Perceptions of climate change risk in The Bahamas."

¹¹ Lin et al., A Case Study in Xiamen City, China.

¹² Lin et al., A Case Study in Xiamen City, China.

¹³ Susan L. Cutter, Bryan J. Boruff & Lynn W. Shirley, "Social Vulnerability to Environmental Hazards," *Social Science Quarterly* 84, no.2 (2003), 242-261.

¹⁴ Martinich et al., "Risks of Sea Level Rise to Disadvantaged Communities in the United States," 169.

¹⁵ McCormick, Assessing Climate Change Vulnerability, 404.

Tampa.¹⁶ Results found interviewees rarely thought of vulnerability just in the sense of climate; it was often connected with issues of infrastructure, such as buildings in flood zones, or healthcare, such as water-borne diseases.¹⁷ Similar to the results of a 2018 study by Kirshen and colleagues in East Boston, McCormick's research (2016) found vulnerability is understood differently at the local level, which highlights issues of ineffective communication between experts and stakeholders.¹⁸

East Boston Climate Adaptation

In 2009, Douglas and colleagues used three workshops in East Boston to assess cultural knowledge of climate change, perception of potential adaptation strategies, and perceived obstacles to adaptation.¹⁹ Researchers found participants were actively engaged and had good understanding of physical impacts of climate change, such as, flooding, melting glaciers, storms, drought, and rising sea levels.²⁰ When faced with multiple adaptation options, participants were opposed to construction of a sea wall, as well as retreat.²¹ Participants most favored use of natural amenities like wetlands or green space to mitigate flooding.²² The biggest obstacle to taking action was cost, although residents concluded that the City of Boston should pay for adaptation measures.²³

In 2018, Kirshen and colleagues attempted to overcome barriers of East Boston community participation in adaptation planning by creating a Supported Community Planning Process (SCPP).²⁴ Through two workshops, groups made up of the various stakeholders identified the areas and services they felt needed the most protection, which included wetlands, schools, commercial areas, etc.²⁵ Unlike the previous study, participants supported construction of multi-purpose floodwalls, which would be transparent and include greenspaces around them, as a part of a comprehensive adaptation plan.²⁶ The SCPP not only resulted in the development of a widely supported adaptation plan, but also facilitated greater understanding between participants and other stakeholders.²⁷ Kirshen and colleagues (2018) also determined, if local residents are effectively engaged in adaptation planning along with other stakeholder groups, implementation efforts are more successful because of community endorsement.²⁸

Qualitative Research in Climate Change

A common pattern in the examined literature was use of qualitative research, specifically semi-structured interviews seen in Altschuler and Brownlee (2016) and Thomas

¹⁶ McCormick, *Assessing Climate Change Vulnerability*, 397.

¹⁷ McCormick, "Assessing Climate Change Vulnerability," 408.

¹⁸ McCormick, "Assessing Climate Change Vulnerability," 408.

¹⁹ Douglas et al., "Coastal Flooding."

²⁰ Douglas et al., "Coastal Flooding," 550.

²¹ Douglas et al., "Coastal Flooding," 552.

²² Douglas et al., "Coastal Flooding."

²³ Douglas et al., "Coastal Flooding," 555.

²⁴ Kirshen et al., "Engaging Vulnerable Populations."

²⁵ Kirshen et al., "Engaging Vulnerable Populations," 1850013-10.

²⁶ Kirshen et al., "Engaging Vulnerable Populations," 1850013-12.

²⁷ Kirshen et al., "Engaging Vulnerable Populations," 1850013-9.

²⁸ Kirshen et al., "Engaging Vulnerable Populations."

and Benjamin (2017).²⁹ Semi-structured interviews are useful, as they allow participants freedom in how they respond to questions, while still providing researchers a useful guide in framing interviews.³⁰ Both studies found local residents would be interested and receptive to risk communication on climate change, through their communicated desire to receive more information from government entities, a sentiment that might not have been captured with a quantitative method.

Our findings build upon previous research in East Boston by identifying specific perceptions of climate change communication in the area. Furthermore, our research differs from other studies because it will address individual senses of agency on climate change, in regard to willingness to make lifestyle changes. This is an important component in understanding how to empower vulnerable communities in taking action to mitigate the climate crisis, and has not yet been addressed in past literature specific to East Boston.

East Boston Background

East Boston is located in the Boston Harbor. From downtown Boston, East Boston is a two-minute ride on the Blue Line of the Massachusetts Bay Transportation Authority (MBTA). The neighborhood is served by five MBTA stops, six bus lines (lines 112, 116, 117, 120, 121), rapid bus transit (Silver Line Three) and three underwater tunnels for cars.³¹ The area is mainly residential, with some commercial and industrial uses along major roadways and the shore.³² East Boston is also home to Logan International Airport. With low elevation (0 - 160 ft above sea-level), East Boston already sees increased flooding and storm surges. In the next 10 years, local forecasts presume nine inches of SLR, and within the next 50 years, 36 inches.³³ According to the City of Boston's Data Profile Population Demographics (2010), East Boston is home to over 41,000 people, of which 52.9% identify as Hispanic or Latino, 37.2% as White, 3.5% as Asian, 3.2% as Black, and 3.3% as other or mixed race.³⁴ 55% of the population does not speak English as their native language.³⁵

Economically, the average East Boston resident earns a mean salary of \$22,400, which is 66% of Boston's average (\$33,939). 17% of the population lives below the 2019 poverty line (\$25,730 for a family of four), making the area economically and socially underprivileged.³⁶ Additionally, most residents rent their housing; only 27.5% of housing is owner-occupied.³⁷

²⁹ Benjamin Altschuler and Matthew Brownlee. "Perceptions of Climate Change on the Island of Providencia." *Local Environment*, no. 5 (February 2015): 615–35.

³⁰ Altschuler et al., "Perceptions of Climate Change on the Island of Providencia."

³¹ Megan Johnson, "So You Want to Live in East Boston." *Boston Magazine*, July 3, 2018, <https://www.bostonmagazine.com/property/neighborhood-guide-east-boston/>.

³² Kirshen et al., "Engaging Vulnerable Populations," 1850013-6.

³³ USGS. "The National Map." *USGS*, <https://www.usgs.gov/core-science-systems/national-geospatial-program/national-map>

³⁴ City of Boston. "East Boston Data Profile Population Demographics," 2010, <http://www.bostonplans.org/getattachment/28c2e99c-af11-47e0-b65e-b609fbdc44bd>.

³⁵ Neighborhood of Affordable Housing (NOAH). "ClimateCARE." 2015, <https://noahcdc.org/?q=about>.

³⁶ Assistant Secretary for Planning and Evaluation "HHS Poverty Guidelines for 2019," 2019. <https://aspe.hhs.gov/poverty-guidelines>.

³⁷ City of Boston, "East Boston Data Profile Population Demographics."

Moreover, 70% of the buildings in East Boston were constructed prior to 1920, making them ill-equipped to handle climate impacts.³⁸

Boston Harbor Now, our partner organization, is committed to serving underrepresented communities like East Boston. From planning free trips to the Islands to organizing meetings amongst stakeholders, Boston Harbor Now works to ensure the livelihood of people living on the forefront of Boston Harbor.³⁹

METHODS

Participants

Participants were sourced from various East Boston neighborhoods, including Jeffries Point, Maverick, Eagle Hill, Orient Heights and Central Square (see Appendix E).

Instrument

Our semi-structured interview (see Appendix A) comprised of three thematic areas: general knowledge about climate change, sense of agency, and effectiveness of climate change communication. Sixteen questions were explicitly included and probing questions were used to collect further detail. Socio-demographic questions regarding age, gender, and ethnicity were also included. Additionally, information on physical elevation was collected by prompting participants to pinpoint the specific location of their home on an elevation map.

Consent Procedure

We provided all participants with a copy of the consent form (see Appendix C) before participating in the interview. It was required that every participant agree to the terms by checking a yes/no box. If a participant did not agree to these terms, they would not have been interviewed.

Confidentiality

We established confidentiality by ensuring records of this study were kept private. Electronic information including audio recordings was coded and secured using password-protected files. Participant identifiers are limited to age, gender, ethnicity, language preference, and elevation in our results.

Sample

We had a non-random convenience sample, with a small number focus.⁴⁰ We interviewed a total of 10 residents, and our main method of connecting to participants was referrals from Boston Harbor Now, Eastie Farm, and Harbor Keepers, each of which are non-profit organizations in East Boston. We additionally handed out a total of 120 flyers (see Appendix D) at the New Year's Eve event in East Boston (40), as well as in local T stations

³⁸ Kirshen et al., "Engaging Vulnerable Populations," 1850013-4.

³⁹ Boston Harbor Now. "History - Boston Harbor Now," 2016, <https://www.bostonharbornow.org/about-us/history/>.

⁴⁰ Mark Kanazawa, *Research Methods for Environmental Studies: A Social Science Approach*. (Abingdon: Routledge, 2018).

(40), at residential doorsteps (20), and telephone poles (20). Employing characteristics of a snowball sample, participants referred us to other individuals for interviews as well.

Data Collection

Interviews were approximately 30-minutes, and participants were invited via email (see Appendix B) to participate in the interview. During interviews, data was collected through audio recording and note-taking. Interviews were conducted from January 28 through March 1.

Data Analysis

The data was coded by breaking information into categories based on common themes. Coding was completed in two phases. In Phase 1, the Principal Investigator and our team completed the coding of one participant's interview. In Phase 2, four researchers from our team split into two teams to complete the initial coding for the remaining interviews. Then, one member from each team met with a researcher from the other team to establish inter-coder reliability. Finally, all four researchers convened to arrive at final themes based on emergent patterns. This process established coding reliability. Moreover, the teams identified themes that emerged often throughout the data, using an inductive approach. The narratives were also analyzed employing a deductive approach as we drew from pre-existing literature.

RESULTS

To answer the research question of how local perceptions of climate change are influenced by communication pathways in East Boston, seven themes emerged from the data to illustrate common sentiments related to knowledge, agency, and effectiveness of communication within the community. Themes are illustrated in Table 1, and socio-demographic identifiers are shown in Table 2.

Table 1: Results Themes

Theme	Description	Examples
Knowledge	Accurate acknowledgement about the macro-level anthropogenic causes and resulting effects of climate change, but disconnect between these changes and climate change	Causes: human-caused, GHG emissions, deforestation, transportation, agriculture, Effects: sea-level rise, extreme climatic events, flooding, extreme temperatures Seasonal changes: reduced levels of snow in winter, trees blooming early, unusually warm days in winter months, hotter summers

Low Prioritization of Climate Change	Residents tend to rank other daily issues as more pressing than climate change and do not frequently discuss climate change with other community members	Choosing convenience over sustainability (i.e. driving a car rather than taking public transportation when there is no additional incentive), concerns with taking care of family occupy people's time, only top of mind when significant events occur (i.e. flooding, Australian fires), not a topic that comes up in conversation
Local Communication Pathways	Lacking productive communication on climate change via interpersonal communication and during community meetings	High awareness of meetings but low attendance, not demographically representative, many residents didn't know about or found it difficult to get information about the meetings, meetings were not advertised properly, lack of productive conversation
Uncertainty	Lack of information from the City of Boston on climate education and evacuation plans leads to feelings of fear and uncertainty in East Boston residents which is also made worse by conflicting information from news sources	Uncertainty about whether official governmental evacuation plans and flood response plans exist, opposing news sources (Fox vs ABC) and politicians give contradictory information to the public, discontentment with lack of governmental education campaigns on climate change
Infrastructure Vulnerability	High levels of risk. Damage to old buildings as sea level rises and flooding becomes more likely. New, expensive buildings are seen as irrational when considering future flood potential.	Old buildings in East Boston are ill-prepared to handle flooding, lack of investment in fixing the foundations of old homes, significant levels of fear over where residents will go when their houses are inevitably damaged, confusion over why new developments are being constructed right on the harbor

Lack of Empowerment	Individuals feel as though climate change is too complex to address themselves, and only those with power and status can create change	Frustration with inaction expressed from local, national and global leaders, some effort to make personal mitigation efforts, perception that actions like recycling or reduced consumption do not make an impact on the larger scale
Mitigation Through Alternative Transportation	Significant potential for personal and public modes of transportation to serve as a feasible individual mitigation pathway for residents	Widely available T system, some concerns about cost and convenience of public transportation, interest in bike sharing programs, desire for greater incentivization to use public transportation

Table 2: Socio-demographic identifiers

Ethnicity	Sample Size	Male	Female	Average Age	Elevation Range	Attended Community Meeting
Hispanic*	5	1	4	48	22ft-42ft	1
White	2	1	1	28	20ft-31ft	0
African-American	1	1	0	25	22ft	1**
Other	2	0	2	22	24ft-36ft	1**

*Note: Of the Hispanic respondents, one spoke English and the others spoke Spanish.

**Note: These community meetings specifically discussed climate change. The only meeting mentioned by name was a Boston Planning and Development Agency Meeting at La Hacienda restaurant, noted by two separate respondents.

1. Knowledge

This category emerged from respondents' direct responses to the question "What causes climate change?", as well as indirect climate observations made throughout other parts

of the interview. When asked to describe the causes of climate change, many respondents accurately identified it as anthropogenically caused, and attributed it to greenhouse gas emissions, specifically citing “deforestation,” “transportation,” “fossil fuels,” and “agriculture.” In regard to effects, some provided anecdotes about local flooding and temperature change, while others offered more detailed explanations of global impacts; one respondent described glacial melting, commenting the ocean is a “kind of a bathtub, and the level just rises, so the higher the level, the higher the problems”. Respondents also mentioned more extreme seasonality and hurricanes.

Some respondents did not explicitly connect phenomena like seasonal change and flooding to climate change, but simply mentioned their existence, rather than attributing them to climate change. For example, when asked how East Boston residents discuss climate change, one respondent noted, “two weeks ago it was so warm people get shocked and say ‘Wow, we didn’t have a winter. We’re in Spring.’” Although the respondent identified impacts of climate change such as warming temperatures and reduced snowpack, the answer did not mention climate change, and conflated weather anomalies with climate. This suggests, while residents do recognize climate impacts, they often do so without identifying climate change as the root cause.

2. Low Prioritization of Climate Change

This category reflects low prioritization of climate change by East Boston residents in their day-to-day lives. Being part of a largely immigrant community with below-average socioeconomic status, respondents reported considering climate change as unnecessary of their attention when completing daily activities. One respondent reported they “feel like [thinking about climate change is] a luxury only those who are financially secure have, like how can you worry about the climate when you don’t know if you can pay the rent tomorrow?” This point of view is further apparent in respondents’ answers to the question, “What do you see as the largest problems facing your community?” Only two respondents mentioned climate change, while other issues such as gentrification, traffic, and litter took greater precedence.

Residents found addressing climate change as a serious issue can actually serve as a burden. Respondents tended to prioritize convenience, such as driving a personal car; taking public transportation was considered a hassle. The lack of visibility of climate change further impacts the low prioritization of the issue. Respondents reported not seeing significant environmental changes regularly-- only when extreme flooding events or significant global news (i.e. the fires in Australia this past winter) occur do residents discuss climate change as a high-priority issue. However, it was noted that these events are forgotten quickly and business-as-usual prioritization resumes.

3. Local Communication Pathways

The majority of respondents felt local communication on climate change in East Boston is not particularly effective. Respondents did report television news as the most significant source of information on climate change, and noted a high degree of availability of information in Spanish language. However, seven respondents explicitly mentioned how members community members do not or only occasionally discuss climate change. Respondents often

referenced “they” when addressing the conversations that do exist in the community, separating themselves from involvement in discussions. This was often referencing community meetings on climate, which many respondents reported awareness of, but do not actually attend. One respondent cited “laziness” as their reason for not attending, while others reported often not hearing about specific meeting times until they have passed. Many respondents said it requires active research to find opportunities to discuss climate change, which can be frustrating: “sometimes there are community meetings that I don’t even hear about until after they’d have them...I would have loved to have attended that meeting so I could express my concerns.” Only one respondent reported often receiving notices of local meetings via flyers delivered in the mail. Finding news sources useful in gaining climate knowledge, residents suggested local television and Telemundo news as pathways for event outreach.

For those who do attend meetings, they described them as unproductive. Respondents noted the same people often attend meetings, and they are not demographically representative of the East Boston community. Another respondent reported that residents who do show up usually “don’t want anything to change, they go to these meetings to argue.” Rather than utilizing meetings to educate, spread awareness, and discuss issues residents are facing, they tend to be an outlet for frustration. Additionally, residents expressed uncertainty and skepticism over whether opinions and issues discussed at local meetings are relayed to the City of Boston so they can be addressed.

4. Uncertainty

This category encompasses respondents' desire for consistent communication about climate change from various levels of government. Respondents identified mixed messages on climate change from different news sources, as well as the current administration. One respondent noted, while she gets her climate change news from “ABC, sometimes [she’ll] read ones sort of against [climate change] from Fox News.” Respondents were aware of the biases on climate change, and seek out opposing views to be holistically aware of the issue. However, such sentiments led to frustration over inaction from those who deny the significance of climate change. One respondent mentioned how President Trump “acts like nothing is going to happen,” and another described this as a significant barrier to action: “I’d say like the current political discourse is a barrier in itself. It’s really difficult to get people talking about climate change when our president doesn’t understand what it is and constantly denies it.”

On a local level, a significant number of respondents expressed fear and exasperation with no clearly communicated flood evacuation plan. One respondent expressed, “They don’t give us information. If the sea level rises, or there’s a hurricane, where are we going to go?” Potential displacement was a consistent source of anxiety among respondents. Another respondent admitted, while she knew the elevation of her home, she didn’t understand how it related to her vulnerability to flooding.

I know I’m like ten feet above sea level, you know what does that mean? If we do get an event coupled with three feet, is my house, is it going to get flooded? Or is it okay? I have no idea. So information like that would be helpful for someone like me to understand what’s projected and what we’re doing about it,

if anything. Or, if nothing is being done about it, who's going to tell me to get the hell out of here?

Her response encapsulates residents' collective anxiety due to uncertainty surrounding climate change in the community.

5. Infrastructure Vulnerability

This category discusses residents' concerns around aging and vulnerable infrastructure. Many respondents described living in old homes, and reported general certainty that their houses are going to flood one day. When asked about climate impacts to their households, one respondent said, "my house is going to flood. When it happens, I will be the first whose house will be underwater." In conjunction with their perception that the City of Boston is ill-prepared for SLR, significant damage to homes seems to be an inevitability.

Residents are also cognizant of the continued new development along the harbor, and are confused by its continuation when considering flooding potential; one respondent discussed how "they keep building on the harbor. There've been a lot of new buildings that've gone up in the past few years, so even though there's more awareness [of flooding potential], they keep building, so." Respondents identify this development as further proof Boston is not considering how SLR will affect the area in years to come. However, residents also have the sense this new construction would be safer than their current homes because they are more flood-resistant. One respondent noted they keep lobbies of new buildings relatively empty so there is less damage if flooding does occur. Another respondent argued "the development needs to stop, or at least expand for low-income housing," serving vulnerable community members rather than wealthier newcomers. Similar to the Uncertainty Theme, respondents reported feeling resentment towards the city for their efforts to "protect their beloved new developments" while failing to communicate with current residents about flooding potential to existing infrastructure.

6. Lack of Empowerment

This category reflects respondents' perceptions that only people in positions of power can make meaningful change. One respondent conveyed, "only the people in power can do anything, like they're the ones responsible for setting the emissions" and "ultimately people listen to people with status." However, respondents noticed a lack of action from leaders. This frustration applied to global leaders (as mentioned in the Uncertainty Theme), as well as local politicians; one respondent addressed disappointment that current Mayor Walsh doesn't "show up" and interact with community members to address concerns.

Furthermore, respondents illustrated a limited sense of individual agency in addressing climate change, believing individual actions would not make an impact on the larger scale. One respondent called their individual contributions "a drop of water in the bucket," alluding to the fact "there's not much we can do." Many respondents answered, "To what extent do you feel you can individually do something about climate change?" with either limited individual actions related to consumption and waste, or sheer dismay. One respondent discussed individual actions they take, such as recycling, but followed up by stating, "Individually, you

can do these things but it won't be useful if one out of 100 people do it. There wouldn't be a big change." Many respondents communicated attempting a degree of individual action, but were not confident in the results it would have in the broader context of climate change mitigation.

7. Mitigation via Alternative Transportation

Six respondents referred to either public transportation or biking in their interview, often in reference to how to make sustainable changes in their lives. Their views were generally positive, with many interviewees citing public transportation as something they felt they could do to make an actual difference. Many respondents made note of the high availability of public transportation throughout Boston. One respondent said "especially the blue line is pretty good and the MBTA buses are pretty good," while another went as far as to say "[East Boston is] the easiest place to access the T, and it's the most consistent line." However, there is some hesitancy (reflected in the Low Prioritization of Climate Change Theme), as some respondents reported driving a personal car because "the trains and buses just like take longer most of the time." Additionally, price was an issue, as one respondent explained, "if parking downtown is \$4 for like two hours, and the train is \$2.90 only one way, then it's cheaper for me to drive and park downtown. And it's more convenient, so like it just ends up making more sense, even though it's not good for the environment." Respondents suggested incentivizing increased use of alternative transportation through reduced costs.

In addition to public transportation, respondents identified biking as a transportation method sometimes chosen over driving a car. Two respondents mentioned bike-sharing programs, such as Bluebikes, as a familiar alternative transportation method. One respondent mentioned riding her bike around Boston, in part because she hopes seeing more bikers will encourage the city to implement more bike-friendly programs and infrastructure projects: "the more the city starts to see that people are actually using the bikes, the more we'll have these projects implemented in the city, like more bike lanes, more areas to park your bike." Residents consistently viewed transportation options as realistic opportunities for climate mitigation, but required greater incentivization and investment from the City of Boston to take advantage of these options.

DISCUSSION

Summary of Results

The results from qualitative interviews of 10 East Boston residents indicated seven major themes: *individual consciousness*, *low prioritization of climate change*, *local communication pathways*, *uncertainty*, *infrastructure vulnerability*, *lack of empowerment*, and *mitigation through alternative transportation*. We explored how local perceptions of climate change are influenced by communication pathways in East Boston, related to knowledge, agency, and effectiveness of communication. Themes such as *local communication pathways*, *uncertainty*, and *lack of empowerment* explicitly relate to the original research objective; these three themes explore the limitations that East Boston residents experience with obtaining information about and understanding local climate change. Themes like *individual consciousness* and *low prioritization*

of *climate change* stress individual perceptions, relating to the knowledge and agency subsections of the research questions. The themes of *infrastructure vulnerability* and *mitigation through alternative transportation* illustrate concern regarding the built environment, and also help to delineate residents' sense of agency.

Consistency with Literature Review

Similar to Douglas and colleagues (2011), East Boston residents had a clear understanding of physical climate impacts. For example, our theme of *knowledge* illustrated how residents accurately identified causes of climate change (i.e. greenhouse gas emissions), and named several physical manifestations, including SLR and increased temperatures. Our findings were also consistent with Thomas and Benjamin's (2017) discovery that residents of the Bahamas understood climate change broadly, but less so its local impacts. East Boston respondents mentioned extreme seasonality, but did not explicitly connect it to climate change. Consequently, we found cognitive dissonance between climate change and daily life resulted in the emergence of our second theme, *low prioritization of climate change*. This theme is congruent with Lin and colleagues (2018) findings that residents of Xiamen did not consider climate change to be one of the most significant global issues, and thus were not willing to change their lifestyle to help mitigation. Many residents in our study reported other pressing issues, such as rising housing costs and busy schedules, preventing them from dedicating time or resources to adjusted habits.

Our themes of *local communication pathways* and *uncertainty* offer insight into why residents do not prioritize climate change. Local meetings on climate were seen as ineffective, especially because residents do not feel their input is utilized by the City of Boston. Our study additionally unveiled a collective anxiety among residents due to the city's lack of communication on evacuation plans and local climate change impacts, reflected in the *uncertainty* theme. This is consistent with Douglas and colleagues (2011) study, where East Boston residents did not feel the city kept them well-informed on community adaptation plans. Our respondents also noted not knowing the extent of expected SLR in East Boston, or if they would be given assistance with evacuation in the case of an extreme flooding event. Thomas and Benjamin (2017) established that Bahamian residents would be receptive to greater communication on climate risk, which is reflective of our findings.

The *infrastructure vulnerability* theme demonstrates East Boston residents feel particularly unprotected for climate change because of its impact on infrastructure, which emerged in McCormick (2016). As Kirshen and colleagues (2018) established, a majority of buildings in East Boston are nearly a century old and more susceptible to damage from climate events, which further highlights the need for communicated evacuation plans. On the other hand, East Boston infrastructure provides a possible mitigation pathway, as highlighted in our theme *alternative transportation*. This reflects a finding from Lin and colleagues (2018), describing how transportation infrastructure plays a direct role in the daily life of residents, making it easy to engage with. Public transportation is a mitigation strategy that does not require extensive behavioral change, which garners greater public support. This pathway is especially powerful in consideration of the lacking sense of individual efficacy in mitigating climate change, as seen in our *lack of empowerment* theme.

Unexpected Findings

While several themes are consistent with previous literature, certain findings were unexpected. Douglas and colleagues (2011) and Kirshen and colleagues (2018), found local meetings and workshops were beneficial and highly regarded by residents, whereas our research found residents did not regard community meetings as valuable. Additionally, our theme *mitigation through alternative transportation* does not align with previous literature, indicating potential for public transportation to assuage limited feelings of personal agency.

Strengths and Limitations

Our study was valuable in establishing space for respondents to discuss community concerns, ranging from littering to transportation. When the topic of climate change arose, respondents had extensive examples of insufficiencies with present systems of communication, particularly in reference to neighborhood meetings and local development projects. The interviews allowed for an open dialogue where each respondent could speak freely about problems they felt were important, the causes of those problems, and propose solutions that make sense for them. One limitation was the small sample, which was not representative of the entire community. Additionally, the lack of diversity in respondent's home altitudes did not allow for a comparison of climate cognizance between those more and less at risk to SLR.

Implications

While there are sufficient English and Spanish language options for gaining global climate literacy, there is a need for greater emphasis on local climate impacts. Residents suggested greater advertising through television programs like local news stations and Telemundo Boston programming. Also, our study highlights residents' desire for more intentional communication from members of local government, developers, and community resources. Some residents perceived a lack of communication from local city government and Mayor Martin Walsh to mean their community was not valued. We recommend the presence of local officials at community events to show residents the city wants to engage with residents on solutions. Residents want access to evacuation plans and greater opportunities to interact directly with local leaders, and ultimately have their opinions valued by persons of authority. To this end, the respondents made it clear that public transportation is a realistic pathway by which they can act to mitigate climate change, but request monetary incentivization from local government to do so.

Recommendations for Future Research

Future research should focus directly on local climate meetings, and best practice for successful community outreach and garnering greater event attendance. Additionally, perspective from residents on how to make meetings productive, rather than argumentative, would be useful. Using a larger sample would ensure participant responses are fully representative of the East Boston community. Researchers should be sure to take note of meeting names, sponsors, and in which neighborhoods they occur.

Future research should also build upon use of transportation as a realistic mitigation pathway in other regions. While respondents had low perceptions of their own ability to meaningfully mitigate climate effects, transportation was a lone, consistent source of promise. Boston has a well-established public transportation system; it would be helpful to understand if

other US and international cities with similar infrastructure view transportation as a potential solution as well, if there are barriers in other spaces, or potentially better solutions.

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APPENDIX

A: Research Instrument

Knowledge: What information are communities in East Boston getting, who they are getting it from, general knowledge about climate change

1. “What do you see as the largest problems facing the world today?”⁴¹
 - a. “What do you see as the largest problems facing your community?”⁴²
2. “What are the environmental impacts to your household?”⁴³
3. “What is your perception of climate change?”⁴⁴
4. “What causes climate change?”⁴⁵
5. “Where do you learn about climate change from? Please name specific sources or organizations”⁴⁶
6. “How do members of the East Boston community discuss climate change?”⁴⁷

Agency: sense of acting on climate change, perception of vulnerability based on residential elevation and other sources

1. “What is, or could be, done to address climate change in East Boston?”⁴⁸
2. “Do you feel that East Boston is prepared for sea level rise?”⁴⁹
3. “To what extent do you feel you can individually do something about climate change?”⁵⁰
4. “Are there barriers that prevent you from addressing climate change? Please explain.”⁵¹
5. “How have you adjusted your lifestyle to mitigate climate change?”⁵²
6. “To what extent do you feel like the needs of your community are heard by larger organizations?”⁵³

⁴¹ Created by authors

⁴² Created by authors

⁴³ Modified from Tao Lin, Xin Cao, Ning Huang, Lilai Xu, Xinhua Li, Yu Zhao, and Jianyi Lin. “Social Cognition of Climate Change in Coastal Community: A Case Study in Xiamen City, China.” *Ocean & Coastal Management*, 2018. <https://doi.org/10.1016/j.ocecoaman.2018.02.025>.

⁴⁴ Robert Gifford and Louise A. Comeau. “Message Framing Influences Perceived Climate Change Competence, Engagement, and Behavioral Intentions.” *Global Environmental Change* 21, no. 4 (2011): 1301–7. <https://doi.org/10.1016/j.gloenvcha.2011.06.004>.

⁴⁵ Gifford and Comeau, 2011.

⁴⁶ Created by authors

⁴⁷ Created by authors

⁴⁸ Ellen M. Douglas, Paul H. Kirshen, Michael Paolisso, Chris Watson, Jack Wiggin, Ashley Enrici, and Matthias Ruth. “Coastal Flooding, Climate Change and Environmental Justice: Identifying Obstacles and Incentives for Adaptation in Two Metropolitan Boston Massachusetts Communities.” *Mitigation and Adaptation Strategies for Global Change* 17, no. 5 (December 28, 2011): 537–62. <https://doi.org/10.1007/s11027-011-9340-8>.

⁴⁹ Modified from Michelle Mycoo. “Communicating Climate Change in Rural Coastal Communities.” *International Journal of Climate Change Strategies and Management* 7, no. 1 (March 16, 2015): 58–75. <https://doi.org/10.1108/ijccsm-04-2013-0042>.

⁵⁰ Modified from Gifford and Comeau, 2011.

⁵¹ Modified from Gifford and Comeau, 2011.

⁵² Modified from Gifford and Comeau, 2011.

⁵³ Created by authors

Effectiveness of Communication: What's working and what's not- who is it working for?

1. How do you think climate change in East Boston is being addressed?⁵⁴
2. "How likely are you to seek out more information on climate change?"⁵⁵
3. Is there adequate attention going to the issue of sea level rise?⁵⁶
4. Do you feel that there are sufficient opportunities to discuss climate change in your community?⁵⁷

Socio Demographic Identifiers (will be written on a piece of paper and used as a survey not asked):

1. What is your age?
2. What gender do you identify with?
 - a. Female ____
 - b. Male ____
 - c. Other ____
3. What is your ethnicity?
 - a. Asian or Pacific Islander ____
 - b. Black or African American ____
 - c. Hispanic or Latino ____
 - d. Mixed Race ____
 - e. Native American ____
 - f. White ____
 - g. Other ____

B: Sample Email to Potential Participants

Hello _____,

We are a group of Boston College students conducting research on Climate Change in East Boston. As part of our research we would like to conduct short interviews with residents and hear about their experiences in the neighborhood. You've been recommended by someone at a local non-profit as someone who may be interested in participating. The interviews are at most thirty minutes long and will be located in a convenient space in East Boston. If this sounds interesting to you and you would like to participate, please refer to the google form attached to this email to specify your availability and language preference.

Thank you in advance for your time! Do not hesitate to reach out to our team if you have any questions, comments or concerns.

With gratitude,

⁵⁴ Modified from Mycoo, Michelle (2015)

⁵⁵ Modified from Leila Scannell, and Robert Gifford. "Personally Relevant Climate Change." *Environment and Behavior* 45, no. 1 (2013): 60–85. <https://doi.org/10.1177/0013916511421196>.

⁵⁶ Created by authors

⁵⁷ Created by authors

Boston College Senior Thesis Research Team.

Contact information:

bcresearchclassof2020@gmail.com

Attachment: <https://forms.gle/CCGDjQvsRRqijmqPA>

Spanish Version

Hola _____,

Somos un grupo de estudiantes de Boston College. Estamos haciendo un estudio en East Boston sobre el cambio climático en el vecindario. Como parte del estudio, quisiéramos hacer unas entrevistas breves con residentes para escuchar sus experiencias. Usted ha sido nominado/a por una organización de East Boston como alguien que podría estar interesado/a en participar en el estudio. Las entrevistas van a durar treinta minutos y tomarán plazo en un sitio conveniente en East Boston. Si esto le parece interesante y le gustaría participar, por favor llene el formulario en este correo electrónico y escoja su disponibilidad y preferencia de lenguaje.

Gracias de antemano por su tiempo! Si tiene alguna duda o pregunta por favor no dude en contactarnos.

Atentamente,

Estudiantes de Boston College

Información de contacto:

bcresearchclassof2020@gmail.com

Adjunto: <https://forms.gle/CCGDjQvsRRqijmqPA>

C: Sample Consent Form



Boston College Consent Form
Informed Consent to be in study: Climate Change Communication and Perceptions in East Boston

Researcher: Jennifer Kelly PhD (Principal Investigator), Casey Maslan, Kate Meyer, McKenzie Stevens, Daniela Pasturczak, Manuela Villa Gomez (Class of 2020)

You are invited to participate in a research study. You were selected to be in the study because of location. Taking part in this research project is voluntary. Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

The purpose of the study is to study the sense of agency in residents in East Boston with regards to climate change. The total number of people in this study is expected to be 18.

If you agree to take part in this study, you will be asked to answer interview questions, and whether or not you would be willing to be audio-recorded. We expect each interview to take about 30 minutes. Although you will not directly benefit from being in this study, others might benefit because it will help the community and NGOs get a better understanding of how they can be more helpful in aiding residents' comprehension and sense of agency over climate change relating directly to East Boston, specifically related to sea level rise.

There are some risks you might experience from being in this study. They are the potential feelings of agitation or anxiety, because you will be asked to think about how climate change, specifically sea level rise, will impact your life. We will try to minimize these risks by reiterating that this study is completely voluntary and that you are able to leave at any time.

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify you. Research records will be kept in a locked file. The interview does not ask you to identify yourself, and the researchers will have no ability to learn the identities of the people who participate. All electronic information will be coded and secured using a password-protected file. An audio recording may be made, with your permission, and only me, the PI, and the other researchers will have access to it. It will only be used to provide accurate data that may have been missed when taking notes during the interview. It will be destroyed once it is no longer needed.

Mainly just the researchers will have access to information; however, please note that a few other key people may also have access. These might include government agencies. Also, the Institutional Review Board at Boston College and internal Boston College auditors may review the research records. Otherwise, the researchers will not release to others any information that identifies you unless you give your permission, or unless we are legally required to do so.

We will keep your research data to use for future research. Your name and other information that can directly identify you will be deleted from the research data collected as part of the project. We may share your research data with other investigators without asking for your consent again, but it will not contain information that could directly identify you. You will not receive any compensation for your participation in this study.

It is up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You

do not have to answer any questions you do not want to answer. If you decide to withdraw before this study is completed, your answers and any identifiers will be destroyed. If you choose not to be in this study, it will not affect your current or future relations with the University.

The researcher may dismiss you from the study at any time for the following reasons: (1) it is in your best interests (e.g. side effects or distress have resulted), (2) you have failed to comply with the study rules.

If you have questions about this research, you may contact Jennifer Kelly, at kellyajf@bc.edu. If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the following: Boston College
Office for Research Protections, Phone: (617) 552-4778, Email: irb@bc.edu.

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. I/We will give you a copy of this document for your records. I/We will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I understand what the study is about and my questions so far have been answered. I agree to take part in this study.

Printed Subject Name

Signature

Date

Consent to be Audio/video Recorded

I agree to be audio/video recorded.

YES _____ **NO** _____

Signature

Date

Consent to Use Data for Future Research

I agree that my information may be shared with other researchers for future research studies that may be similar to this study or may be completely different. The information shared with other researchers will not include any information that can directly identify me. Researchers will not contact me for additional permission to use this information. (Note: This separate consent is not necessary if you will only store and share deidentified data.)

YES _____ **NO** _____

Signature

Date

Consent to be Contacted for Participation in Future Research

I give the researchers permission to keep my contact information and to contact me for future research projects.

YES _____

NO _____

Signature

Date

D: Sample Flyer

East Boston Climate Research

Participate in our
undergraduate research
study on climate change in
East Boston.

Additional Information

Boston College Environmental Studies
Undergraduate study in partnership
with Boston Harbor Now

We would like you to participate in a
short, 30-minute interview

Interview location and time will be
announced at a further date

If you are interested in participating
please let us know by January 26th

Contact information

If you have any questions,
comments or concerns feel
free to reach out to:

bcresearchclassof2020@gmail.com

thank you!

Estudio de cambio climatico en East Boston

**Participe en nuestro estudio
universitario sobre el cambio
climatico en East Boston.**

Información Adicional

Estudio hecho por estudiantes de Boston
College en colaboración con la
organización Boston Harbor Now

Nos gustaría contar con su participación
en una entrevista corta de 30-minutos.

Entrevistas se realizarán en Piers Park
Sailing Center durante el mes de
Febrero.

Déjenos saber si podemos contar con
usted antes de Enero 26, 2019

Contacto

Si usted tiene alguna
pregunta, duda o
comentario por favor
escribanos al correo
electronico abajo:

bcresearchclassof2020@gmail.com

¡Gracias!

E: Map of Participants' Neighborhoods

