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Word Count: 4,999

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.

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

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

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 change away of life. Such findings by Lin et al. (2018) demonstrated that community groups perceive themselves as separate from effects of climate change, and have limited understanding of the impact it will have on their lives.

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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

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 widely supported adaptation plan, but also facilitated greater understanding between

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 n

Moreover

(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.

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.

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

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

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.

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.

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.

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.

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

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.

Similar to Douglas and colleagues (2011), East Boston residents had a clear understanding of physical climate impacts. For example, our theme of *knowledge* illustrated

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.

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.

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 highlighted the importance of community

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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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 ____

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 feel that an interview would be beneficial to you.

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>



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.

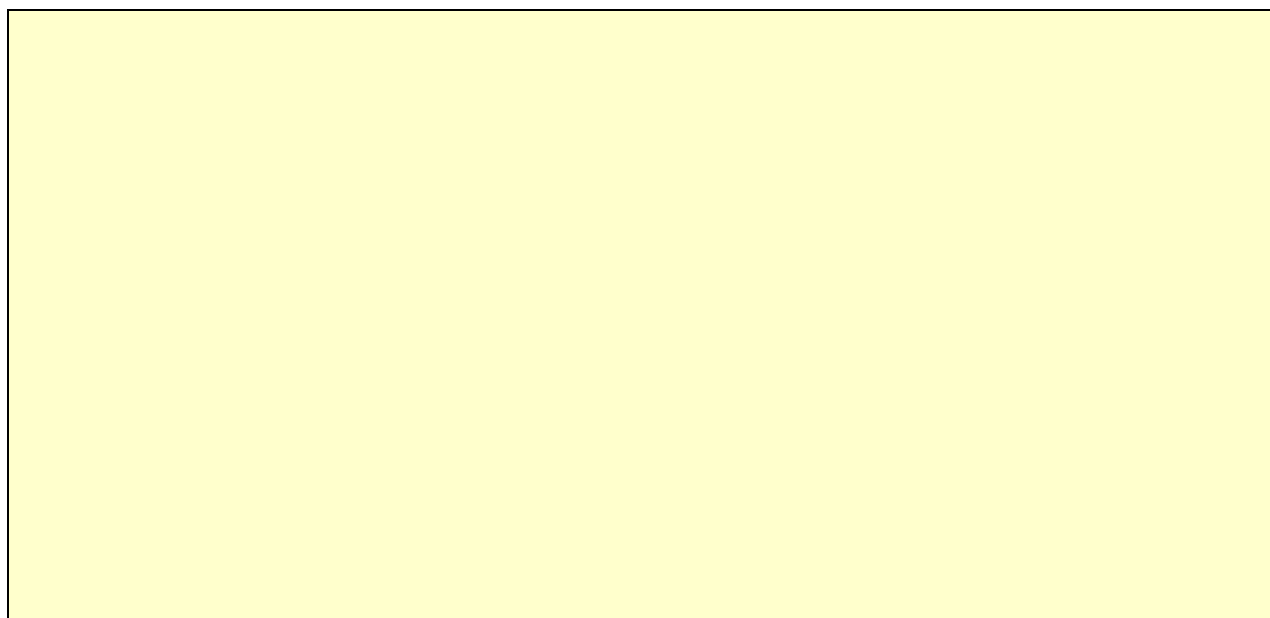
The researcher may dismiss you from the study at any time for the following reasons: (1) it is in your best interests (e.g. side effects or distress have resulted), (2) you have failed to comply with the study rules.

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



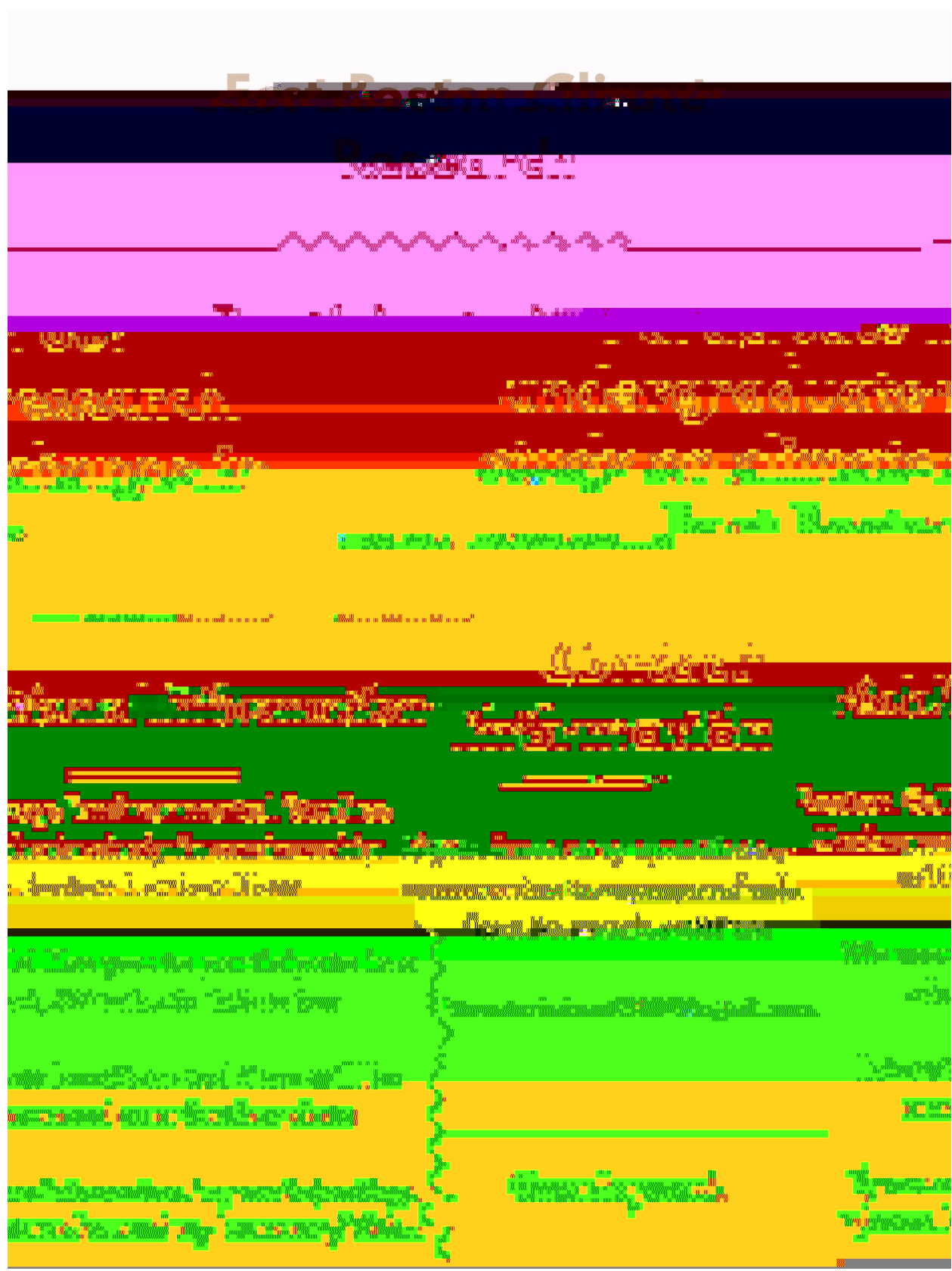
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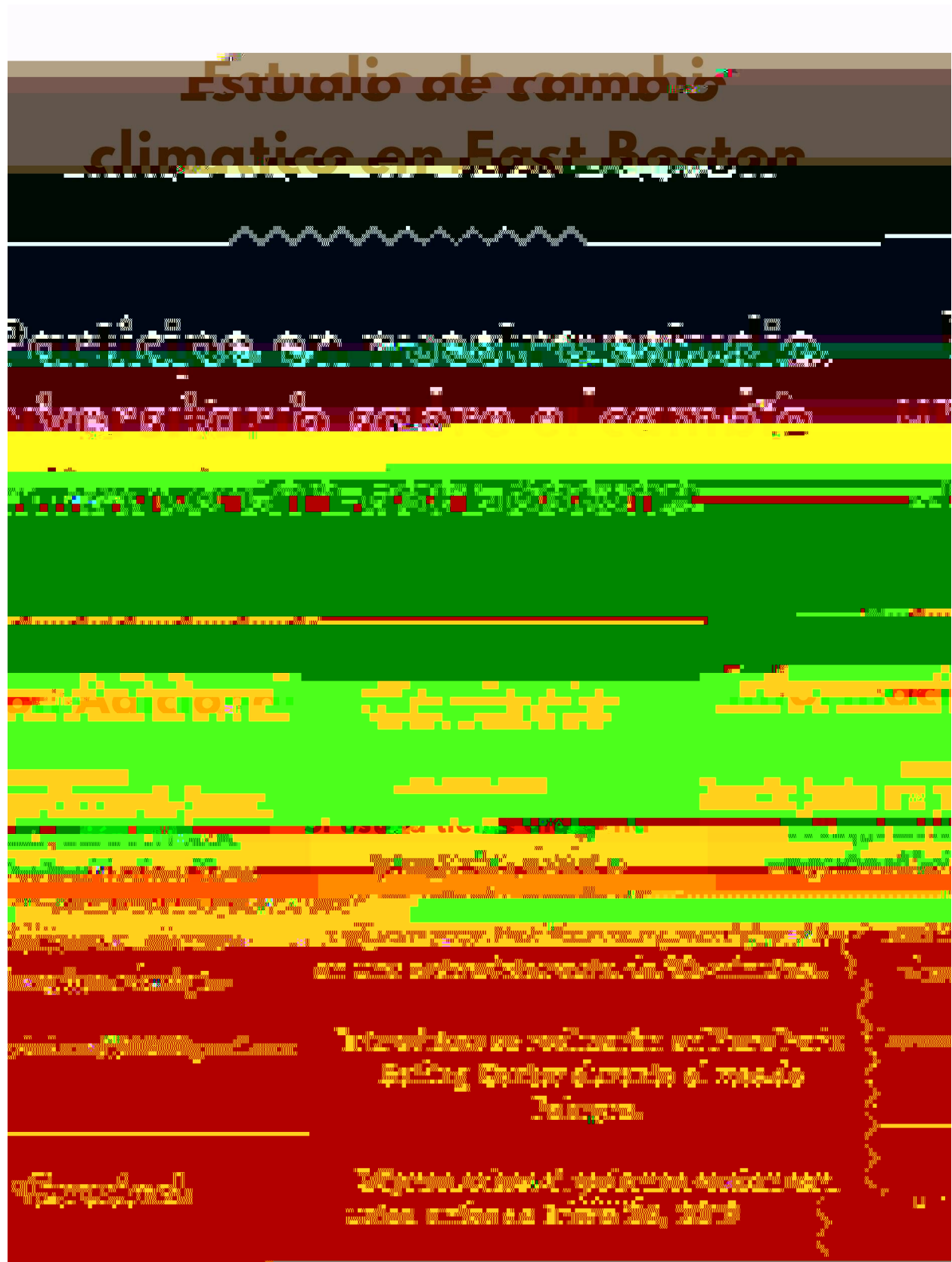
Date

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

Signature

Date





1. **Intervenciones de resiliencia en Puerto Rico**
 Spring Equinox durante el mes de
 febrero.

2. **El potencial de los espacios verdes para
 reducir las temperaturas urbanas**

