

**C-HEAT 2021**

# **PHOTOVOICE / FOTOVOZ**

*Chelsea and East Boston, Massachusetts*



# CONTENTS

---

## ACKNOWLEDGEMENTS

---

## EXECUTIVE SUMMARY

---

## ABOUT CHELSEA and EAST BOSTON

Why is it hot?

Who lives here?

---

## PHOTOVOICE PROCESS

---

## PHOTOVOICE RESULTS – THE PHOTOS

Where are the trees? / *Here are the trees!*

Populations *vulnerable* to heat

Water: the *good*, the *bad*, the *ugly*

Keeping it cool *creatively*

---

## CONCLUSIONS

---

## ABOUT C-HEAT



# ACKNOWLEDGMENTS

Thank you to the Barr Foundation for funding the C-Heat project and making all of this work possible.

This report and ongoing project would not have been possible without the hard work and contributions made by many on the incredible teams at Boston University School of Public Health and GreenRoots, as well as community member participants that gave their time, energy, and passion to these projects. Thank you to all who participated and continue to support this process, including in particular: photovoice leaders and facilitators Leila Heidari and Pilar Botana (BU); photovoice logistics and support team including Alina McIntyre, Abgel Negassa, Julie de Lange (BU); photovoice community member participants from Chelsea and East Boston, Massachusetts including Adela Gonzalez, John Abbott, Luiz Hernandez, Racquel Davey, Susanna Carella, Isabel Villeda, Roxana Aguirre, Noemy Rodriguez, Nohemi Lobato, and Mayra Molina.

The authors of this report include members of the C-Heat team: Bianca Bowman (GreenRoots), Flannery Black-Ingersoll (BU), Patricia Fabian (BU), Madeleine Scammell (BU), Leila Heidari (BU), and Maria Pilar Botana Martinez (BU).

We would also like to acknowledge and thank staff at the City of Chelsea, the Chelsea Cultural Council the gallery opening event showing in July 2022. We also thank the Cities of Chelsea and Boston and the Chelsea Cultural Council for supporting the continuation of the Photovoice project as we hope to keep uplifting the experiences and voices of community members in Chelsea and East Boston to combat the health and environmental effects of extreme heat and climate change.

How to cite this report:

C-Heat (2022). *Photovoice / Fotovoz: Chelsea and East Boston, Massachusetts*. <https://www.c-heatproject.org/reports>

# EXECUTIVE SUMMARY

THE PHOTOVOICE/FOTOVOZ project brought together twelve residents from various neighborhoods in Chelsea and East Boston, MA to share and document their experiences of *urban heat and climate change*.

Chelsea and East Boston, Massachusetts are recognized environmental justice communities, and therefore disproportionately suffer from the urban heat island effect. Heat islands are areas dominated by pavement, buildings, and other surfaces that absorb and retain heat. Discriminatory historical city planning has resulted in higher heat island conditions in low income areas, as a combination of limited green space and concentration of industrial activity intensifies the urban heat island effect. The urban heat island effect leads to increased energy costs (e.g., for air conditioning), air pollution, as well as heat-related illnesses and deaths (Santamouris, 2014). Over half of Chelsea and East Boston residents are foreign born, majority Latinx and Spanish speaking, and both areas places where low-income and essential workers reside (Rangadass, Dominguez-Santos, 2021, p27). These populations are more vulnerable to the consequences of extreme heat and air pollution due to less access to information, resources, and healthcare (Rangadass, et al., 2021, p3, p51).

The Photovoice / Fotovoz project is a component of the Chelsea & East Boston Heat project (C-HEAT) that began in 2020. A partnership between investigators at Boston University School of Public Health and GreenRoots, Chelsea, C-HEAT aims to build capacity for Chelsea and East Boston residents and municipalities to respond to extreme heat events. The C-HEAT team works with residents to gather data on heat in and around resident homes and subsequent effects on health. Photovoice / Fotovoz is a form of participatory action research and took place in the summer of 2021, centering resident voices in C-HEAT and creating a space for participants to record and reflect on community heat experiences through photography and writing.





In the summer of 2021, Photovoice participants worked in two groups: one comprised of Spanish-speakers, and the other of English-speakers. Through facilitated discussions participants in each group decided on several thematic areas for heat-focused photo assignments. Over the course of four weeks, participants took photos in these thematic areas, and then grouped photos into one of four final themes and created narrative captions for each. Due to the COVID pandemic the groups met virtually via zoom throughout the project. It wasn't until early 2022 when the two groups convened to agree on, and prioritize, action messages and photos to present to community decision-makers.

Together, they discussed themes and created action messages on heat and climate issues relevant to their immediate communities and concerns; themes in each group were nearly identical. The four final themes included:

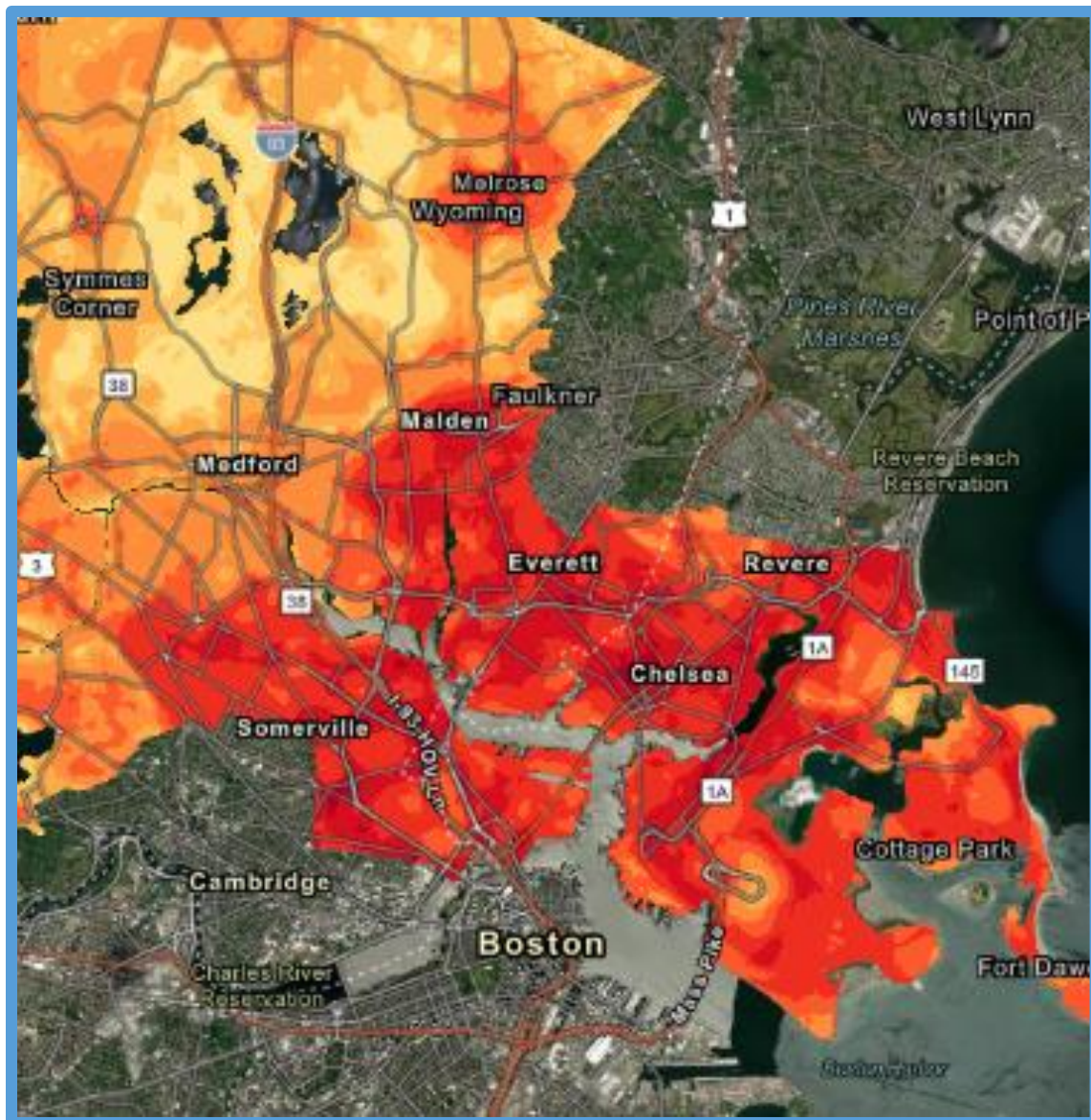
- 
- 1. Where are the trees? / Here are the trees (Tree inequity)**
  - 2. Populations vulnerable to heat**
  - 3. Water: The good, the bad, and the ugly**
  - 4. Keeping it cool, creatively**
- 

Participant photos were organized into these four themes. The themes and captions of the photos are action-focused and directed at community-based needs, emphasizing changes participants want to see from local decision makers. At the final meeting, participants went through the photos, chose their favorites, and voted on which photos would be displayed in various public places throughout in their communities of Chelsea and East Boston. In the summer of 2022 and beyond, participants and their neighbors will see the photos and action-focused captions displayed on banners and in galleries around their communities. Through these displays, we hope to further conversation and awareness about the way these communities experience extreme heat and climate change.

# CHELSEA and EAST BOSTON

## Why is it hot?

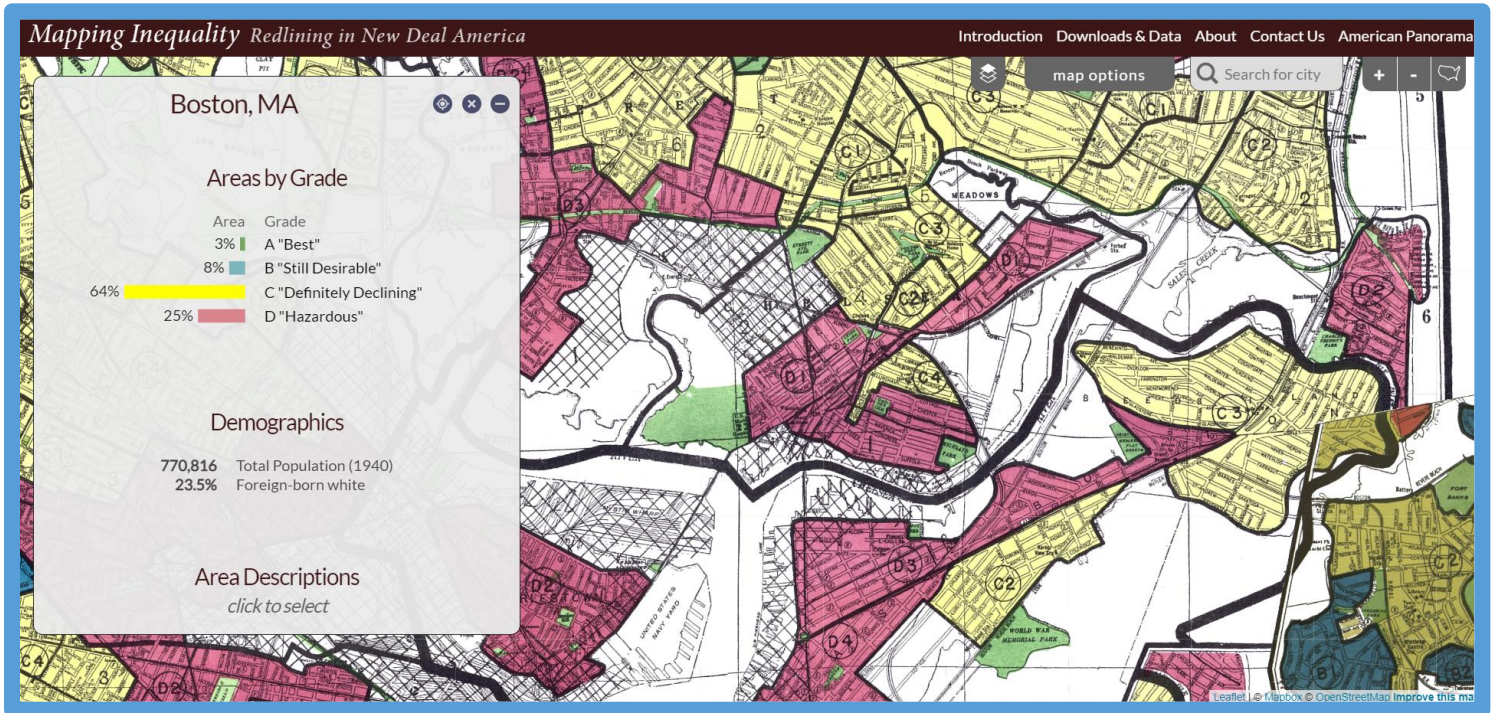
In the last twenty years, extreme heat events have increased in frequency and duration, affecting millions of people globally (World Health Organization, 2018). Urban areas experience higher temperatures than rural areas due to greater impervious surface area, low tree cover, and highly concentrated fossil fuel use. These factors contribute to the urban heat island (UHI) effect, with urban daytime temperatures measuring 1-6°F higher than surrounding rural areas (Peng et al., 2012). The UHI effect is visually demonstrated in maps by the Wicked Hot Mystic project where residents mapped areas in the Mystic River Watershed, including Chelsea and East Boston, on the same two days in August 2021 (Wicked Hot Mystic, 2022). The more urban the area, the higher the temperatures, as indicated by darker color reds.



# CHELSEA and EAST BOSTON

## Why is it hot?

Higher temperatures directly affect health, contributing to heat-related deaths and illnesses such as heat exhaustion, heat stroke or respiratory illnesses (Hsu et al., 2021). During summer months, extreme heat is the leading cause of morbidity in the United States (ibid). However, summer UHI intensity across major US cities disproportionately impacts people with lower incomes and people of color (Hoffman et al., 2020). Additionally, non-US citizens face 3.4 times the risk of heat-related deaths compared to U.S citizens, with Hispanic non-US citizens having an even higher risk (Taylor et al., 2018). One reason for this relationship between heat and low-income communities of color is historic red lining by home loan lending agencies. The map from shows the areas in Chelsea and East Boston that were both “red-lined” and subject to discriminatory lending practices.



For these reasons, the C-HEAT research project was started, to build the capacity for these communities to respond to such extreme heat (C-HEAT website). Since 2020, the C-HEAT team has been working with community partners gathering localized heat data outdoors, in schools, and in homes in Chelsea and East Boston. The Photovoice project, facilitated by the GreenRoots and C-HEAT team, engaged residents with this process and focused on the lived experiences of residents dealing with extreme heat and climate change in their neighborhoods.

# CHELSEA and EAST BOSTON

## Who lives here?

The City of Chelsea and neighborhood of East Boston include 45,000-55,000 residents, with 67% and 58%, respectively, identifying as Hispanic or Latinx (Healthy Chelsea, BPDA). Approximately 45% of Chelsea residents identify as foreign-born, while 50% of East Boston's residents self-identify in this category (Healthy Chelsea, BPDA). A significant percentage of residents in both areas live below the federal poverty level; 24% of Chelsea's residents compared to the state's 10.5% (Healthy Chelsea, BPDA). These characteristics meet the demographic criteria of the Massachusetts Executive Office of Energy and Environmental Affairs, establishing census tracts as Environmental Justice (EJ) populations (Commonwealth of Massachusetts).

EJ populations have historically been excluded from environmental health decision making and face structural inequities such as old housing stock, high tenant occupied multi-family buildings, high residential instability, poor air quality, economic pressures, immigration-related stressors, and high rates of violence (Commonwealth of Massachusetts).





# PHOTOVOICE PROCESS

---

The photovoice method that inspired this project is a “participatory action research strategy[...] typically used with marginalized populations that have been silenced in the political arena.

**Using ethnographic techniques that combine photography, critical dialogue, and experiential knowledge, participants reflect on and communicate their community's concerns to represent their culture, to expose social problems, and to ignite social change”** (Sutton-Brown 2014).

The C-HEAT Photovoice project with Chelsea and East Boston residents was created to be by and for residents to explore their observations through photos that they took, connect with others in their community around the photos and ideas behind them, and build collective action messages based on their discussions about heat in their communities.

The stages of photovoice were: (1) identify interested residents and recruit participants, (2) conduct individual interviews, (3) hold group meetings for Spanish and English speaking participants, and (4) wrap up the project in a final group meeting.

| Variable                         | n (%)      |
|----------------------------------|------------|
| <b>City</b>                      |            |
| Chelsea                          | 10 (83)    |
| East Boston                      | 2 (17)     |
| <b>Sex</b>                       |            |
| Female                           | 9 (75)     |
| <b>Preferred Language Spoken</b> |            |
| Spanish                          | 5 (42)     |
| English                          | 7 (58)     |
| <b>Foreign-born*</b>             |            |
| Foreign-born                     | 6 (55)     |
| <b>Race/Ethnicity*</b>           |            |
| Hispanic/Latina/o                | 9 (82)     |
| Non-Hispanic White               | 1 (10)     |
| Other                            | 1 (10)     |
| Unknown or not reported          | 1 (10)     |
| <b>Age*</b>                      |            |
| Median (Range)                   | 45 (23-66) |
| <b>Rent/Own</b>                  |            |
| Rent                             | 10 (83)    |
| <b>Income*</b>                   |            |
| Below \$50,000                   | 5 (45)     |
| Above \$50,000                   | 6 (55)     |
| Refused/Don't know               | 1 (10)     |
| <b>Employment Status*</b>        |            |
| Employed                         | 10 (91)    |
| Unemployed                       | 1 (9)      |
| <b>Education*</b>                |            |
| Less than high school            | 1 (10)     |
| High school diploma or GED       | 5 (45)     |
| Higher than high school          | 5 (45)     |
| <b>Home Inhabitants</b>          |            |
| Adults (Median, Range)           | 3 (1-6)    |
| Children (Median, Range)         | 1 (0-4)    |
| <b>Years lived in Home</b>       |            |
| 1-2 years                        | 2 (17)     |
| 3-5 years                        | 4 (33)     |
| >5 years                         | 6 (50)     |
| <b>AC type</b>                   |            |
| Central                          | 2 (17)     |
| Other (portable/wall/window)     | 10 (83)    |
| <b>Housing Type</b>              |            |
| Multi-Family                     | 10 (83)    |
| Single Family                    | 2 (17)     |
| <b>Number of Stories in Home</b> |            |
| 2                                | 3 (25)     |
| 3                                | 6 (50)     |
| 4+                               | 4 (33)     |

\*One participant did not complete interview

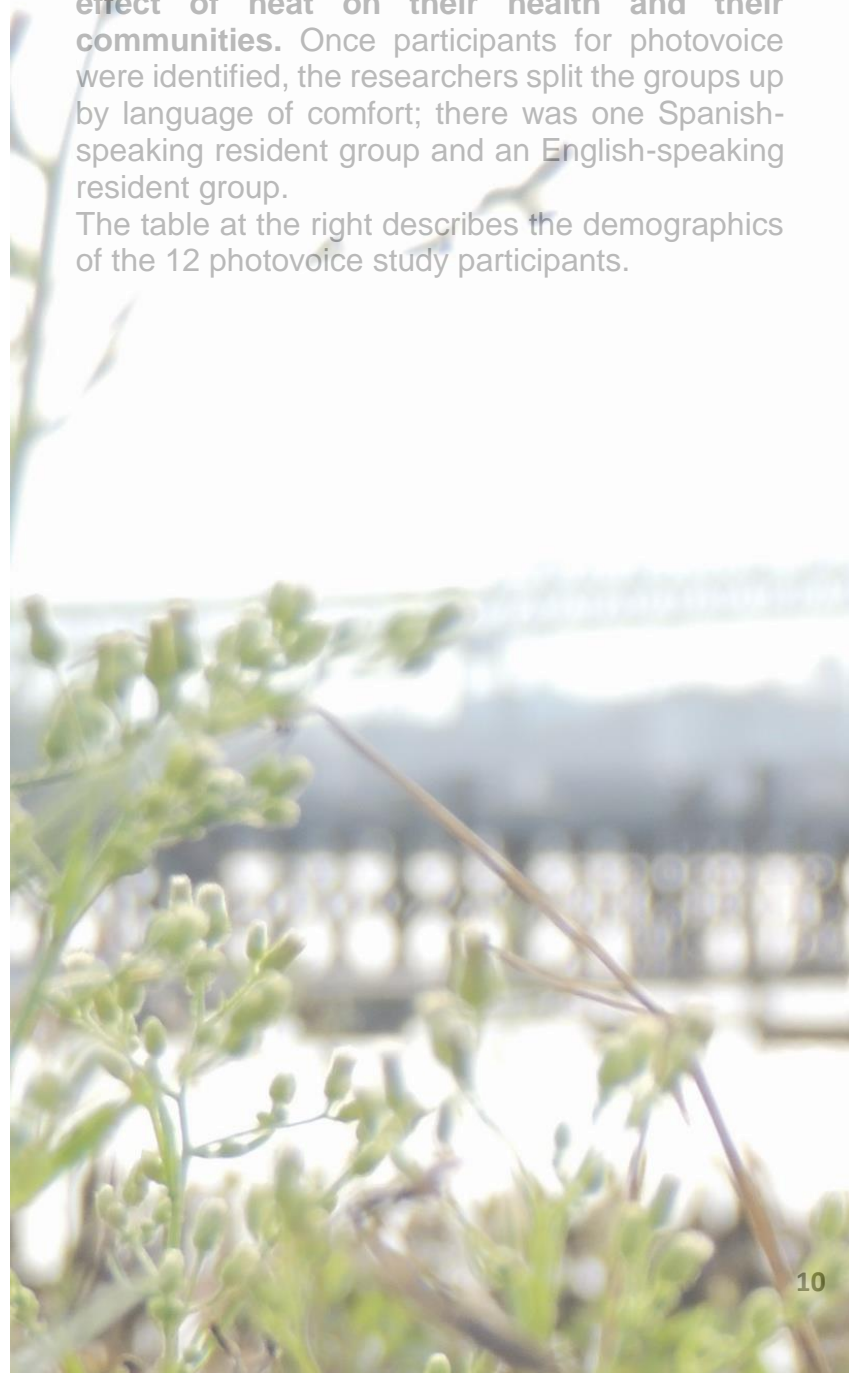
# 1

## Identify interested residents and recruit participants

The C-HEAT team identified residents who were interested in documenting their personal experiences with extreme heat and climate change by reaching out to participants of the 2020 home-temperature monitoring project.

Many participants therefore had backgrounds or developed interest in thinking about the effect of heat on their health and their communities. Once participants for photovoice were identified, the researchers split the groups up by language of comfort; there was one Spanish-speaking resident group and an English-speaking resident group.

The table at the right describes the demographics of the 12 photovoice study participants.



## 2

## Individual interviews

In-depth individual interviews were conducted with participants to discuss topics including their living environments, transportation, cooking, drinking water, where they received news about weather – all with the focus on heat.

**These interviews also showed that the community member participants bring a variety of backgrounds and perspectives on how heat affects their daily lives.**

The participants include parents, immigrants, part-time and full-time workers, public transport users and car drivers, home renters and owners. Some significant trends were identified through these interviews; for example, many of the English speaking participants noted that while they had well-functioning air conditioning, the systems or window units are old and they're not satisfied with their AC's ability to keep their homes cool. Similarly, many of the Spanish-speaking group participants don't feel that the AC units work very well or maintain the desired temperature. All feel that part of the problem is that it's expensive or not feasible to have AC in every room or running all of the time, and multiple participants have specific issues in their home (the way it's insulated, can't open the windows safely, ceiling is fake, etc.) that cause them to not feel like their homes are being cooled efficiently. All of the English-speaking and most of the Spanish-speaking participants also reduce their cooking time when it is hot, and have occupation-related heat concerns.

Many participants chose to live in their current homes in Chelsea or East Boston due to lower costs of living in the area, ease for their kids to get to schools, it was closer to their jobs, or that rent was much more expensive elsewhere. Most participants walk and take the bus or public transport most of the time and feel that public transportation station protection from heat is inadequate in Chelsea and East Boston, specifically at bus stops. The heat sometimes affects the way they get around, economically or time taken by needing to take a taxi or get a ride. While most residents in both groups said that they've heard the city water is fine, there appears to be some level of distrust in the water quality as most have bought a filter, buy water bottles, or boil their water.

**A majority of the participants don't sleep well, especially when hot, and have noticed or worry about heat symptoms including being tired and feeling faint, dizzy or nauseous.**

Multiple participants say that while their health is overall good, their children, friends, and family who have issues like asthma or other conditions have been more affected by the heat. Some have had intense experiences with taking friends or family to the hospital because of heat sickness, vomiting and severe dehydration. Most cite that heat sickness worries them, mostly for other people in their lives. All the participants noted that in their areas of Chelsea and East Boston there are not many green spaces or areas to keep cool. Many travel to lakes or areas where they have water access, go to parks with water features, travel into downtown Boston for areas with more parks and trees. Some don't leave the house if they have an older or family prone to heat sickness because of the time it would take to travel in the heat to get to cooler places.

### 3

## Group meetings: Spanish and English speaking groups

After these initial interviews with C-HEAT facilitators, participants met in their English- and Spanish-speaking groups.

In the first meeting, both groups received background information on the C-HEAT research project, urban heat islands, and how extreme heat is increasing in Chelsea and East Boston due to climate change.

During this first session also took part in a “citizen journalism” photography workshop with Julia Cumes, a photojournalist who walked participants through using their cameras, as well as taking powerful photos for storytelling purposes. After this first meeting, the Spanish and English participants met separately for focus groups to generate big ideas and themes that the participants were most drawn to as photo assignments regarding heat and climate change in their communities. The Spanish-speaking group met in person for their focus group, and many brought their children to the meeting, which was especially meaningful for community building, as most meetings were not able to be held in person safely during the summer of 2021 due to the COVID-19 pandemic. After the initial focus group session, each group met for weekly discussions on Zoom video calls over the course of five weeks in August 2021. In their focus group meetings, the participants had decided upon weekly thematic photography assignments. During each Zoom meeting, the participants would share that week’s photos and how they felt they connected to the themes, workshop potential captions for their photos with the group, and discuss their thoughts, emotions, and experiences around the heat they experienced in their communities.

### 4

## Final meetings

After five weeks of meeting and taking photos, the Photovoice participants met one final time as separate Spanish- and English-speaking groups over Zoom to discuss the themes of all of their photos, the captions, and the action messages that they wanted to express to decision makers and to the rest of their communities.

**A challenge encountered by the participants and facilitators was the difficulty in finding a meeting time that would work consistently for all participants.** Because these residents were willingly participating in this project outside of work, there were some days where family or personal issues had to take priority, and very few people were able to attend the meetings. Despite these challenges, participants contributed robust discussions and indicated that they wanted to continue being involved with the project and see the action messages they had discussed come to fruition.

# PHOTOVOICE PHOTOS AND THEMES

Participants in the Spanish and English speaking groups identified a different topic on which to focus their photography each week.

The C-HEAT team collected all the photos and worked with the participants to identify themes shared across the two groups. Participants in both groups gravitated towards taking photos to depict contrasts in the natural and built environments experienced by residents of Chelsea and East Boston. These included photos that highlighted differences between geographic areas – usually one with trees, shade, or greenspace contrasted or juxtaposed with spaces that were covered in concrete, dry, and sunny. Sometimes these contrasts occurred on the same city street. From the photos, their associated captions, and the group conversations among participants, inequity was a clearly unifying theme of all the photos. Specifically, inequity of heat mitigation and living infrastructure in city planning, interventions and maintenance of amenities and assets.

The photos, and the associated “calls to action” are organized by more specific themes that also incorporate equity. The first theme highlights the inequitable location of, access to and maintenance of greenspace and trees, titled, “Where are the trees? Here are the trees.” The second theme, “Populations vulnerable to heat,” focuses on populations that are especially vulnerable to the harmful effects of extreme heat at the workplace, at home, or where residents travel and play. The third theme addresses both the benefits and risks of water experienced by residents, including clean drinking water for hydrating during heat waves, access to the waterfront for cooling, and the hazards of water presented by flooding, “Water: the good, the bad, the ugly.” The fourth and final theme encapsulates the creativity of Chelsea and East Boston residents coping with extreme heat, “Keeping it cool creatively.” Each theme is described with some examples below.



## Where are the trees? / Here are the trees!



## Populations vulnerable to heat



## Water: the good, the bad, and the ugly



## Keeping cool, creatively



## WHERE ARE THE TREES? / HERE ARE THE TREES!

**Photovoice participants recognized from the beginning that trees are important for cooling. They provide shade for homes, on the streets, and in parks.** In both Chelsea and East Boston, there are many areas with no trees where the sun “beats down” with “no refuge” from the heat. Multiple participants called the heat “unbearable” when walking around areas of their neighborhoods with no shade. Participants delved into what created these unbearable conditions, when, and where they experienced them. Discussions revealed nuanced experiences of trees, canopy, and shade. For example, when trees were small or recently planted, they provided little shade in public walking areas. Photos were evidence of the inequity in where trees are located, and how well they are maintained. Some explicitly made this connection, photographing streets where one side has very nice tree coverage and another side has no trees. Participants see trees and shade as a public good: through their photos we see a stark difference in access between trees on private property versus public areas filled mostly with concrete and open to the sun.

Where possible, participants have created greenspaces on porches and in their backyards to create cooler spaces. Participants from Chelsea mentioned that industrial areas such as around Market Basket and the New England Produce Center, are treeless and hot, and noted that the heat compounded with the truck exhaust caused very poor air quality. Participants worried about people that are especially vulnerable to heat: older adults, people with disabilities, and children. These people cannot as easily find shade – it needs to be more equitably distributed.

***“Where are the trees? Here they are! [...] It’s not that we don’t have trees in Chelsea, and people tell us all the time that trees are being planted in Chelsea, and they’re right! But they’re not equally distributed nor equally accessible.”***

**- Susana**

***“Our community has a great shortage of trees. We need the city to take responsibility for taking care of the trees, and plant more.”***

**- Noemy**

Participants emphasized the importance of tree maintenance: newly planted trees and older trees cannot grow to provide more shade if they are not maintained by the city. In many photos, participants noted when trees in the city were dying or had been removed, and noted that the newly planted small trees will take a long time to grow and provide shade. There must be other solutions for shade in the meantime, or larger trees need to be planted. Conversely, many of the trees that have been planted recently have died or are doing poorly. Participants asked, “who is making these decisions and how can we be better at thinking about heat in the community when the city takes actions like this?”

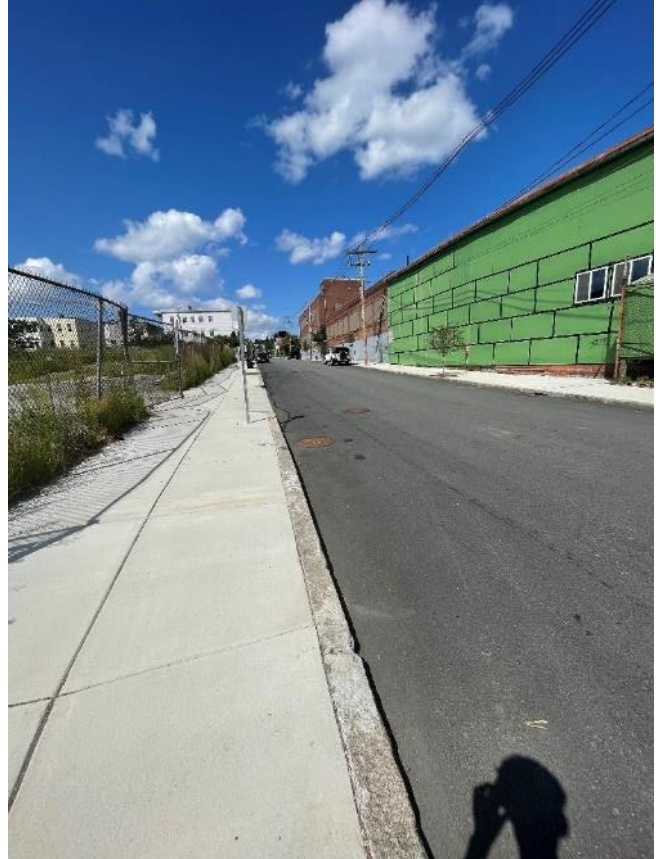
In Chelsea, participants noticed differences between neighborhoods like Admiral’s Hill and the rest of Chelsea. Covered in green space, many people mentioned going to Admiral’s Hill when it’s hot. This neighborhood is more expensive and less racially diverse compared to other Chelsea and East Boston neighborhoods, and the participants all photographed the visible greenspace inequity between Admiral’s Hill and other areas of their community.



## WHERE ARE THE TREES? / HERE ARE THE TREES!



Broadway in Chelsea. 7/2 at 2:30pm. The buses and other cars on Broadway. The bus is contributing to the heat, the overall emissions... - Adela



This was taken at the end of Suffolk St. merging with Highland St. Around 2-3pm. I took photo because it's weird how there are trees and they could give you shade, but **the trees are so small**. It gets so hot around here and it's sometimes unbearable.  
- Luis



## WHERE ARE THE TREES? / HERE ARE THE TREES!

### *CONTRASTS*



Here is the view of Chestnut Street standing at Beacon Street. **The lack of trees and vegetation is notable, particularly given the proximity to the loud and dirty Tobin Bridge.** - Susana



This street, and the rest of Admiral's Hill, has **an abundance of trees and vegetation that offer protection from the heat as well as the air and noise pollution of the Tobin Bridge.** I am hopeful that when city officials see these photos, they'll see how much inequity is present throughout the City. - Susana





## WHERE ARE THE TREES? / HERE ARE THE TREES!

### *CONTRASTS*



Off Broadway near Webster Ave on Saturday around 1:30pm. Stark difference of no trees on one side juxtapose trees on the opposite side of the street; however, the trees that are there are on private property. - Racquel

Near Market Basket, 8/1 at 6pm: this is the industrial side of Chelsea which impacts the microclimate of the neighborhood. **Both factory and truck exhaust surrounding concrete adds to the heat island effect.** - Racquel





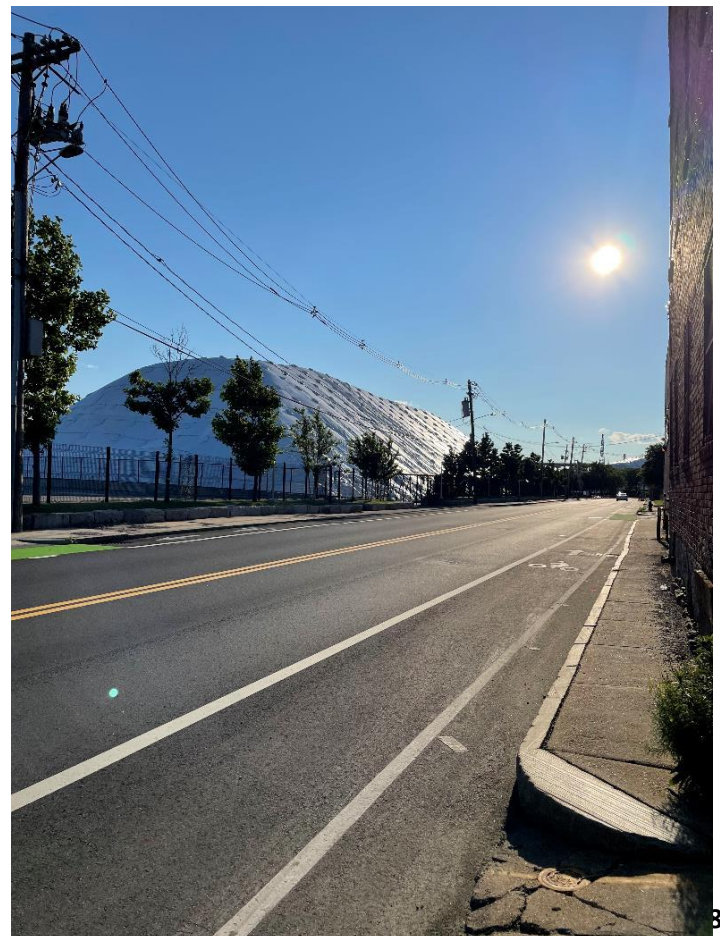
## WHERE ARE THE TREES? / HERE ARE THE TREES!

### *CONTRASTS*



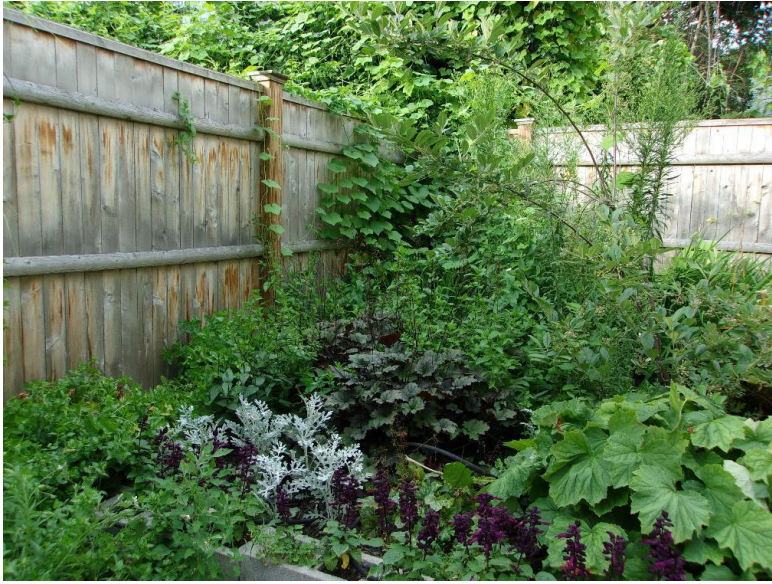
A welcoming, accessible road leads to the Judie Dyer Park in Chelsea. The attractive area is enjoyed and used often by both children and adults. - Susana

A much less hospitable road leads to PORT Park. It is not one you can easily bike or walk to due to safety and stop lights. This park was almost placating in its creation. It's only a job half done. Surroundings matter. - Susana





## WHERE ARE THE TREES? / HERE ARE THE TREES!



Garden - honestly, it gets hot here during the day (waiting for the tree to grow big enough to cast shade) but it's pleasant here. My idea is that **you need to create cooling spaces on your own to a degree**, so that's what I've been trying to do here. - John



A small patch of green surrounded by roads on all sides illustrates how **our society prioritizes cars over people**. The only feature of the park is a broken fountain, but the surrounding roads are repaired. - John



Kayem Park, Chelsea. Walking by this park I was struck by how gloomy it looked. The surrounding buildings and the tall trees of the park keep it mostly in shade, but **at human level there is nothing green, just concrete, plastic and rat traps**. We can do better than this.. - John



## WHERE ARE THE TREES? / HERE ARE THE TREES!

### CONTRASTS



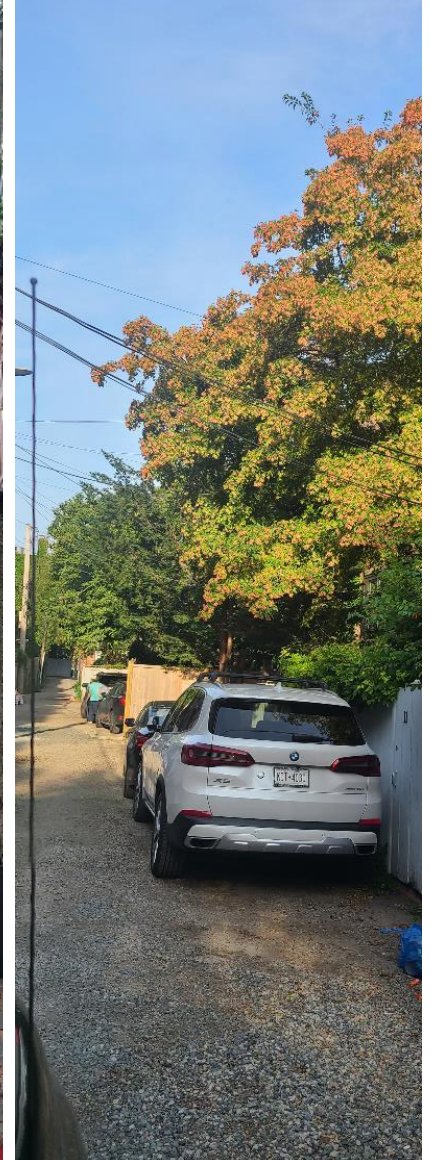
I love this picture because the trees give us shade and at the same time **a little sun is filtered between the branches, we can enjoy the freshness we feel by being under them.** Just looking at the picture, it feels cool. There is water in the background, I feel that I breathe fresh air, oxygen is clean and essential in our breathing. That should be how all parks should be. - Isabel

This photo shows what I see on my walk. **There are no trees, no shrubs, no grass: only intense light.** When I took the picture, I was invaded by a feeling of heat, oppression, abandonment. The heat feels very intense, despite being in the early hours of the morning. - Isabel





## WHERE ARE THE TREES? / HERE ARE THE TREES!



This is one of the neighborhoods I work in. It is beautiful. There are trees everywhere, in the streets, and behind the houses. **This city invests in its community. My neighborhood is not like this. There are no trees, but many buildings.** - Roxana



## WHERE ARE THE TREES? / HERE ARE THE TREES!

### *CONTRASTS*



In the photograph we can see the contrast between the plot on the left, with trees, and green, and the right, pure asphalt, without grass. On the street, trees are not visible either. **The community needs trees and public green spaces.** - Mayra

**On my walk there are no trees that protect me from the intense rays of sun.** The only shadow you see is that of a building. The breeze passes through the shade of trees, and it feels cool. However, under the shade of a building you still feel the humidity and intense heat. - Mayra





## WHERE ARE THE TREES? / HERE ARE THE TREES!

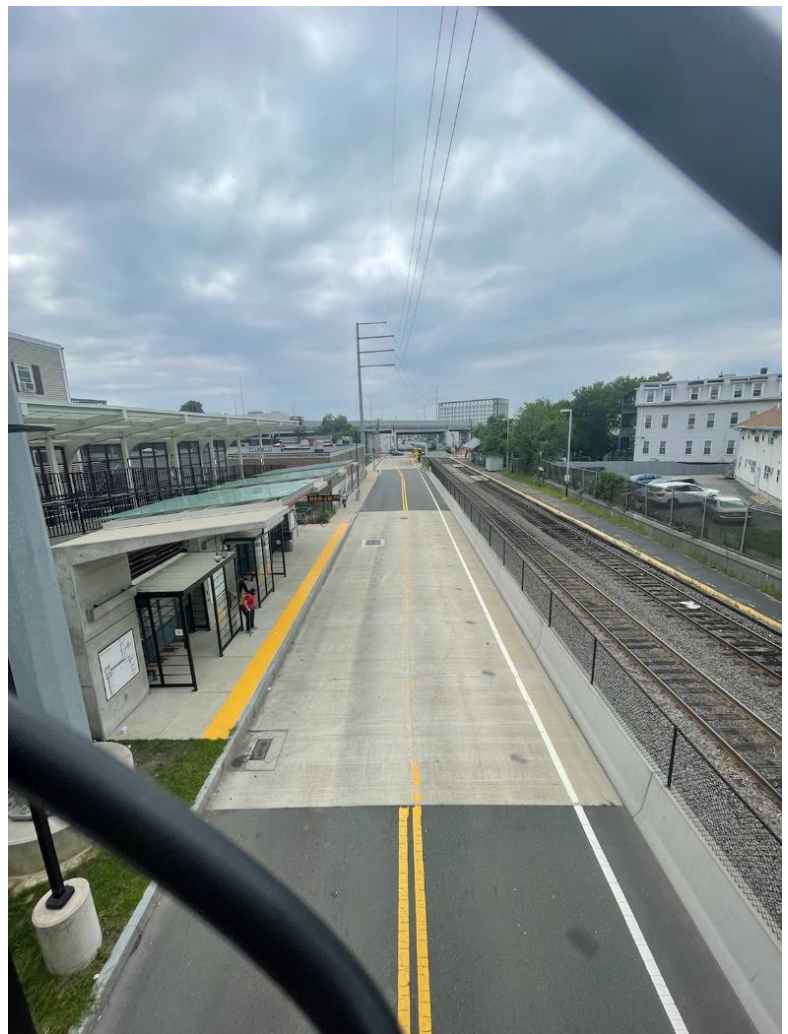


"A crime happened here." Where there is now only cement, there was a tree. But one day it wasn't there, and the gap was filled. Did it happen illegally? Did the municipality allow it?. - Noemy



This is a tree that lamentably died. It is newly planted, and has rained a lot, but its branches and leaves are dry. For some reason it did not have the opportunity to grow. What can be the cause? Whose responsibility is this? For me, this dead tree is a message that nature sent us, a sign. - Noemy

On the bridge on top of the Chelsea commuter rail / silver line stop. I wanted to show how different each side of the picture is. From man made buildings and structures, to the patch of trees living in a corner. **I felt like the MBTA should've kept the trees to work around them to involve more natural shading.** - Luis





## WHERE ARE THE TREES? / HERE ARE THE TREES!



This is me at American Legion Park in Eagle Hill on a day of strong heat and humidity, as can be seen on the personal monitor that I was given for the C-HEAT study. **In the park there are no children, only heat, and planes flying over the place.**

- Noemy

***Nature is therapy. It helps us to reconnect with our lives, to have a more positive attitude, to improve our mental health.***

For this reason I organize a walk for the members of our community every week: The "Green Walks". Public green spaces are important to the urban community, but these are scarce in our community, and often difficult to access. - Noemy







## **WHERE ARE THE TREES? / HERE ARE THE TREES!**

### **CALLS TO ACTION:**

**1. Plant more trees and vegetation in public areas to reduce heat, improve flooding issues, and reduce traffic noise, and improve the lived experience of residents.**



**2. Create awareness campaign/promotion/educational materials about current green spaces and waterfronts in Chelsea in East Boston.**

**3. Hold those who are responsible for given land areas (i.e. landlords, home owners, private property owners, the City) accountable for maintaining and improving their green spaces, and planting more trees.**



## POPULATIONS VULNERABLE TO HEAT

**In Chelsea and East Boston, people deal with heat differently.** Participants all noted that some populations are more vulnerable to the negative effects of extreme heat than others, for example outdoor workers, older adults, children, low-income folks with less access to cooling, or those who work in hot indoor environments like kitchens. In discussing their personal experiences and observations of vulnerable populations interacting with heat, participants noted specific ways in which vulnerable populations have to deal with the consequences that other populations may not.

As parents themselves, some participants discussed how parents and guardians must strategize safe activities during extreme heat events, seeking spaces with shade and water. Searching for these spaces can prove difficult when parks have limited shade and inadequate water features, or when water features in parks are not dependable or maintained. People with disabilities and older adults are at higher risk when moving around the city and waiting for buses at bus stops in the heat. Other vulnerable individuals such as those who depend on support like weekly food pantries sometimes wait in line for hours in the hot sun. Participants pointed out that this subtracts from the benefits of receiving food resources because their health is at risk while waiting. All participants discussed how accessing protection from the sun and heat is particularly important for vulnerable populations, and their needs should be prioritized when implementing publicly available protections and solutions. The ability to use cool spaces and shade should not be limited to those who can afford to create it for themselves.

***“There is a difference between a city park and a private park, you can see that they are not cared for the same. City parks should have more green areas that are also taken care of, there are people who want to volunteer to take care of such parks – that way you can include people from the community. Who is taking care of the parks? Because that person also takes care of the community.” – Noemy***



## POPULATIONS VULNERABLE TO HEAT



Broadway St. near Carry Ave. around 1:30pm. Absolutely no protection from the sun. **The person waiting at the bus stop and the person in the wheelchair (and who's pushing the wheelchair) are sweltering in the sun.** It definitely sheds light on the need for protection in the City. - Racquel



These are my co-workers. We work on the street, doing surveys from home to home. **In days of intense heat it is hard to work like this, as there are almost no shadows to protect us. But as a community, we can't stay at home.** We need to get out, and contribute to the improvement of our communities. - Isabel



## POPULATIONS VULNERABLE TO HEAT



Children need to get out, and sometimes they feel like getting out in the sun. How he plays, and runs! **I like to watch him have fun, but I am worried that extreme heat and direct exposure to the sun can hurt him.** With so few trees and no guarantee that the fountains will work, we must carry enough bottles of water, and we must minimize the time spent in the park.  
- Nohemi

Some buildings in our community are excellently equipped to fight the heat. This house has grass, trees, and central air. Its occupants are well protected from the extreme heat, even if there are no trees on the street. **But not everyone has access to such a home. We need public community spaces that protect us all.** - Isabel





## POPULATIONS VULNERABLE TO HEAT



On days of intense heat, mothers organize to take their children to play cool places, such as parks with fountains for drinking, and with fountains of water to play and cool off. Walking to them is hard on days of intense heat, due to the lack of shade in the streets. It is frustrating when you get to these places, you discover that the drinking or water fountains do not work. **In the photo, two mothers recover from the heat, under the shade of a tree, while watching their children enjoy the splashes of water offered by this park.** – Isabel



My husband works in construction. During heat waves, construction workers are vulnerable to dehydration and heat shock, and the effects of intense heat can increase the risk of occupational accidents. **Once I heard a construction worker say that on a very hot day, he felt like his shoe soles were melting when walking on a roof. What protections do labor regulations offer to protect these workers from the intense heat and their health risks?** - Roxana



## POPULATIONS VULNERABLE TO HEAT



On this street in Chelsea, free food is distributed once a week. People are waiting in line early in the morning, waiting for their turn, for a long time. It is hard to have use this resource to keep going every day, but the elderly, on hot days, these **people must wait under the sun until their turn, without being able to take refuge in the shade** What could the city do about this?

– Nohemi

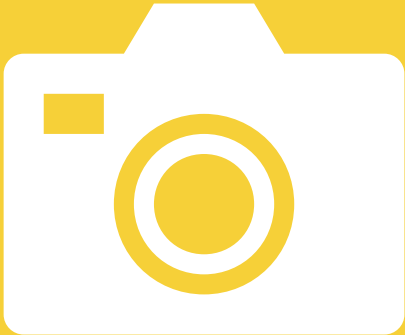


## POPULATIONS VULNERABLE TO HEAT

### ***CALLS TO ACTION:***

**1. Establish protocols for outdoor worker protection, including break times, hydration, clothing for hot periods.**

**2. Improve green spaces that are in disrepair, and inaccessible to residents**



**3. Build shade structures or plant large trees in walking areas that vulnerable populations use often (near food pantries, public transport-heavy areas and stops, frequented walking routes, and outside public spaces like City Hall and the Library).**

**4. Extend library hours during heat waves or hotter periods.**

**5. Replace materials in sidewalks and public transportation stops with surfaces that are cooler and reflect heat.**



## **WATER: THE GOOD, THE BAD, AND THE UGLY**

**Photovoice participants discussed issues in their community around water: access to clean water, access to water as a cooling mechanism, and issues with increased urban flooding in their neighborhoods.** Participants were clear that heat and flooding mitigation strategies focused on equity are critical to supporting populations that are more vulnerable and susceptible to the adverse health effects and financial burdens of climate change.

Residents of Chelsea talked about the low accessibility to the waterfront as a missed opportunity for residents to access cool spaces. They also noted the industrial use of the waterfront. Better access would improve residents' experience of heat in the community; access to the waterfront means access to cool breezes and beauty that connects people to their environment through water. In East Boston, participants expressed that getting close to the water provides a calm escape and a connection to nature that is otherwise hard to feel in the city, even in areas where the shoreline is hard to get to and sometimes dirty and not maintained. Waterfront areas with greenery are even more appreciated, and the ability to kayak, boat or look at wildlife elicits positive feelings from participants.

***When I think about ways of keeping cool one of the ways that I immediately think of is water, and you don't necessarily have to be in water in order to benefit from the effects of water cooling a space. I think we should create more visibility of existing green spaces in Chelsea, but also make use of the fact that Chelsea does have a waterfront. We don't have the same access to the waterfront areas as people do in Boston. It could create more vibrancy for those of us that live in Chelsea and allow for more opportunities for people to have public space.***

***- Raquel***

In addition to waterfront areas, participants took photos of and discussed how water features in parks are frequently used in their communities to stay cool, and how frustrating and disappointing it is for many people when water features are not working. Cooling becomes much more accessible when park water features are working.

Participants also described an increase in flooding caused by precipitation in the city, and noted how despite this increased flooding, there are still areas getting paved over with asphalt. Multiple participants mentioned how the hardship and aftermath of flash flooding often falls upon them and their neighbors: people who walk, drive, use public transportation, and those have to take care of rented or owned homes that are affected more and more by the rising water and flooding that stays around longer on paved surfaces. This stagnant water sitting in the asphalt with nowhere to go also brings in more mosquitos, causing more potential health issues. While there are problems with flash flooding, there are also problems with lack of water, which affects residents when trying to grow their plants in yards and on porches or balconies.





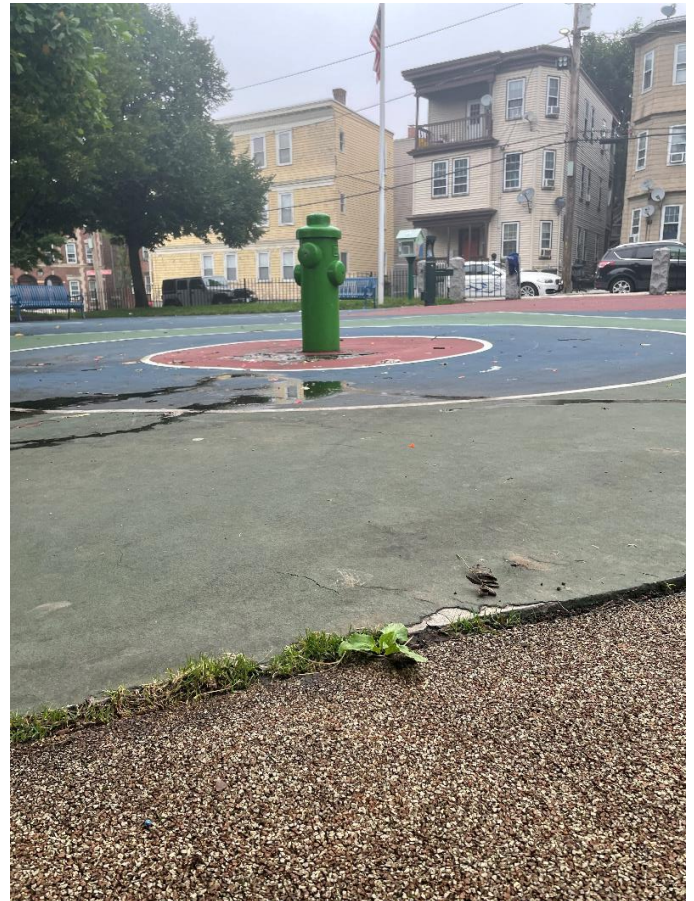
## WATER: THE GOOD, THE BAD, AND THE UGLY



PORT park on Marginal St. It has **sufficient amount of shade**, there is a **cool breeze coming from the waterfront**, also the **water guns are super refreshing**. I can be out there for hours and never feel bothered by the heat. - Luis

Quigley park on Essex St. You can see the green fire hydrant that throws out water when it is extremely hot, and there is the new water tower in the background, which is accessible to anyone. **This picture shows the community that there is accessible water to cool off with and drink.**

- Luis





## WATER: THE GOOD, THE BAD, AND THE UGLY



Tomato plants on my porch. **The water we give them gives them life.** They're not really doing that well because sometimes the water isn't enough. - Adela

Packs of **water bottles**, which are NOT environmentally friendly, but we ended up buying before hurricane Henri would hit. - Adela



This is a green area in Chelsea where you used to be able to kayak and boat; It was also home to various species of animals such as birds and fish. Now it looks almost dry perhaps due to the high temperatures.

**It is a nice place to walk but there is garbage around, and in the afternoons there are mosquitoes .** - Nohemi



## WATER: THE GOOD, THE BAD, AND THE UGLY



PORT Park on Eastern Ave: I don't feel like Chelsea utilizes its waterfront for the benefit of the greater community. **Being along the water allows us to keep cool.** - Racquel



Chelsea St. bridge. **Chelsea's waterfront is dominated by parked cars and cargo ships**, so there is this inaccessibility to create a waterfront for people to use as a cooling mechanism. - Racquel



## WATER: THE GOOD, THE BAD, AND THE UGLY



In Admiral's Hill we cannot use the waterfront to cool ourselves directly, but the **attractive, wide open space invites residents to enjoy the great outdoors.** The waterfront is not only beautiful but also allows for the breeze off the water to cool the park. Residents walk or bike the path, enjoy the tennis courts, picnic beneath the trees, and make use of the open green space to play any number of sports. - Susana

The shoreline of Chelsea Creek, near the Andersen bridge. Despite the dirt and debris it's a calm escape from the bustle and heat of the city. **The land exists to create more green spaces in our communities if we can overcome the financial, bureaucratic and political hurdles.**

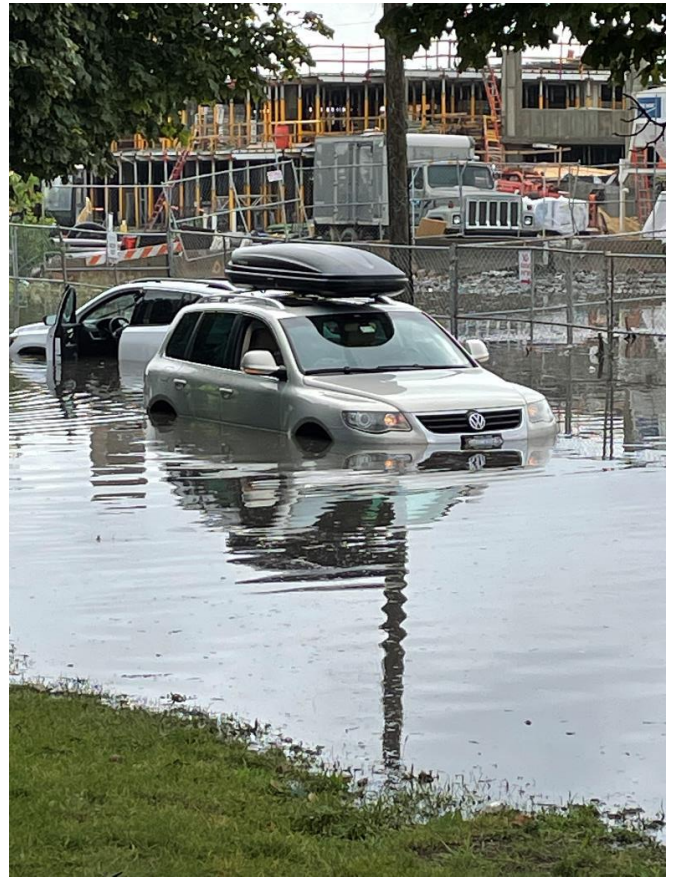
- John





## WATER: THE GOOD, THE BAD, AND THE UGLY

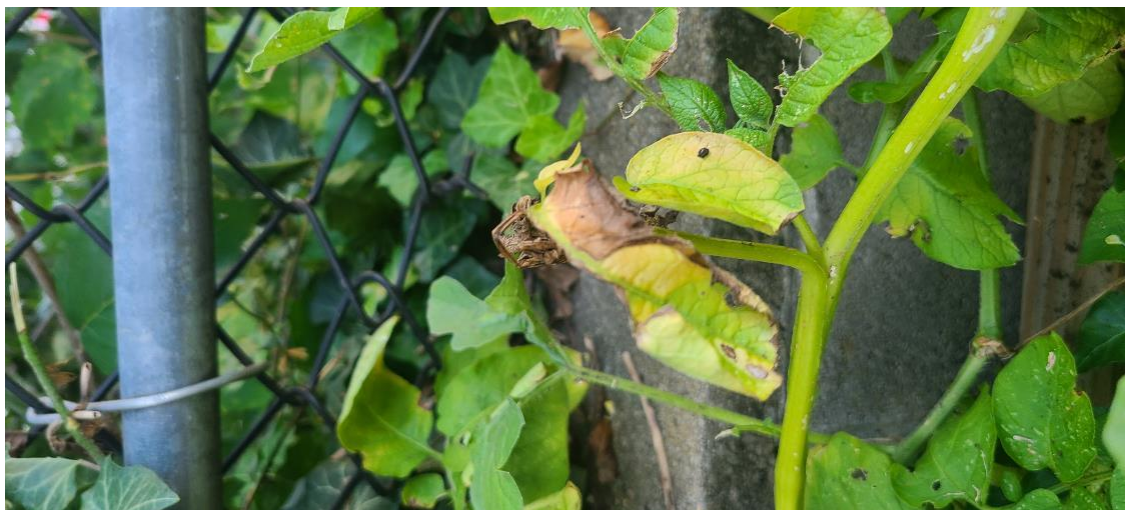
Increased temperatures and precipitation have led to an increase in ground saturation and localized flooding within our city. **With many of us forced to park on streets and walk to public transportation, avoiding this flooding is becoming increasingly difficult.** Similarly, many are experiencing flooding within their homes and are struggling with the consequences of water damage. - Susana



The backyard used to have grass and trees, but when they built the new building, they replaced the green with asphalt. With climate change and heavy rains, the water has nowhere to go, and that is why my patio floods, and the water enters the basements of the houses. **Why does the city grant building permits without considering the problem of flooding?** The water is stagnant in the patios, and mosquitoes soon appear. In the reflection of the water you can see the only large tree in the courtyard. And it is dead. - Nohemi



## WATER: THE GOOD, THE BAD, AND THE UGLY



I often hear about the effects of climate change in reference to the disappearance of glaciers, the vulnerability of polar bears, droughts in farmland. But I can also see the effect of global warming in my garden. The plants I planted wilted quickly this year, they are not used to the heavy rains and extreme heat that we had. The flowers in my garden make me think of my daughters, I think about them a lot in regards to climate change. **"What planet do we leave to our children? I ask myself: What children do we leave to the planet?"** It is important to educate the next generations. - Roxana



## WATER: THE GOOD, THE BAD, AND THE UGLY



**This is our community: here we raise our children. This community belongs to us, we are an active part of it.**

- Noemy



The banks of the Creek are occupied by tanks. **We cannot enjoy the cooling effects of water, but we do suffer from the smell of fuel.** These tanks, will they be prepared for climate change? It's worrying and frustrating to live like this. - Noemy



## **WATER: THE GOOD, THE BAD, AND THE UGLY**

### ***CALLS TO ACTION:***

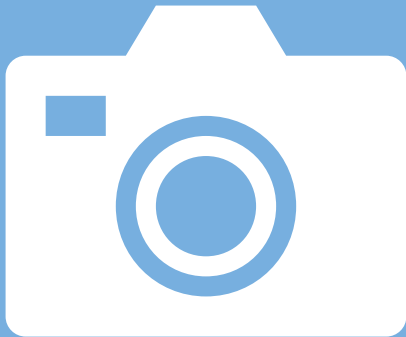
**1. During warm months, cities should prioritize keeping water features working and cared for, as the community depends on them.**

**2. Continue improving access to the waterfront for the public.**

**3. Improve placement and maintenance hydration stations, and increase marketing and promotion of their location and use.**

**4. Increase the number of intergenerational shaded green spaces with water features in all parks.**

**5. Municipalities need to plan for more water and flooding, and change the way homes are built. They also need a plan for what happens when things inevitably flood, and for keeping the public informed.**







## KEEPING COOL, CREATIVELY

While taking photographs of hot places and cooling in their day to day lives, Photovoice participants had many ideas about possible solutions. Everyone already has strategies for keeping cool, and participants shared these while also discussing new methods that could help them and their communities stay cool on hot days.

***“We are unprotected, our health is affected and we don't always know it. Fear doesn't help either, if you talk [to landlords about problems with heat], they'll tell you ‘if you don't like it, look for another [place to live]’ and it's very difficult to find another. The repercussions of standing up for one's rights are eviction. An example of another health problem that is exacerbated by heat and humidity is mold, and the AC will not solve the problem. We are living with the enemy inside”***

***- Noemy***

Participants discussed their personal cooling strategies: blasting the AC in the car, putting towels on the couch for sweating, using fans to cool down while saving money on AC, opening windows for the breeze with shades drawn for sun protection. Participants talked about how AC window units are often inefficient and expensive, especially when houses do not have effective insulation. They discussed how this adds to the cycle of making the problem of climate change worse: this strategy for cooling needs to change. Many also felt that AC units waste energy, especially if they are older.

When creating cooling spaces for the larger community, participants pointed out that more effort needs to be put into making sure these spaces are actually useful.

Participants emphasized the need for water availability in parks, trees that are planted and maintained, and more green or natural space in public spaces rather than built infrastructure. Through discussing their photos, participants noted the inequity around cooling and community or housing infrastructure: those who are more vulnerable to heat, such as low-income renters, are also at higher risk when bringing up issues of heat inside and outside of their homes to landlords or those in power. For fear of eviction or retaliation, those who are not able to throw money at their problems, are also less able to advocate for their rights and the changes they want to see in their communities.

***“There is an AC in each window, 4 in each apartment [in one of the buildings I took a photo of]. Waste of energy! If the houses are not well insulated, more expenses. They expel hot air and humidity, heating the outside.”***

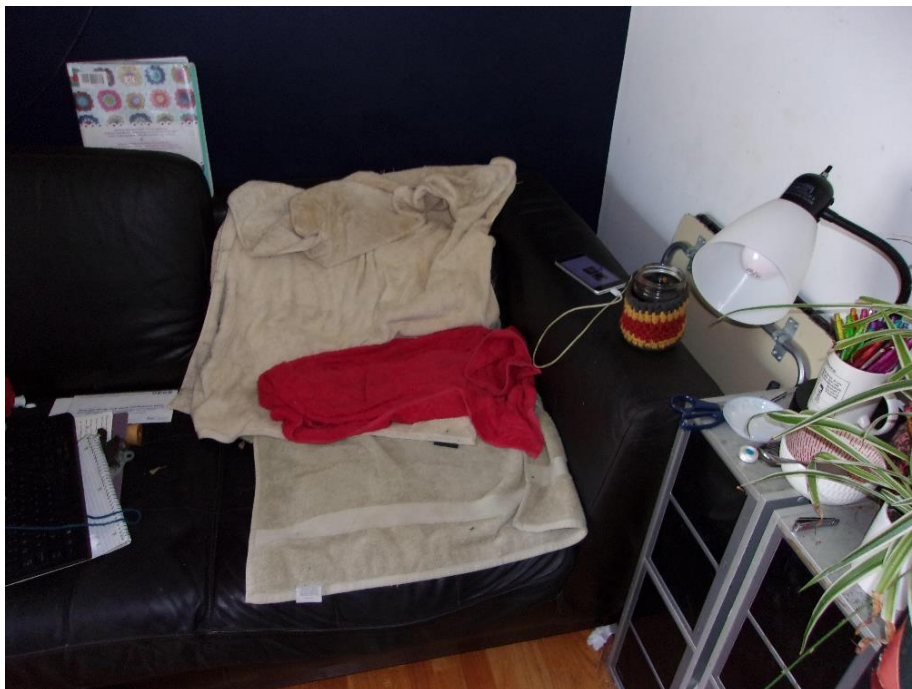
***- Mayra and Noemy***



## KEEPING COOL, CREATIVELY



In the car with the AC on. - Adela



Sweat chair - when it gets crazy hot, I pile towels on the couch and sit on them so I don't sweat onto anything. Also there's always a towel at hand to wipe yourself down with. This speaks to me about **the oppression, inescapable-ness of extreme heat.**

- John



## KEEPING COOL, CREATIVELY



A "cooling station" outside the East Boston Public Library. The brightly colored ribbons cast very little shade. Nozzles at the corners of the structure spray a fine mist for a short distance. **It provides little cooling. What is your idea of a cooling station?** - John



East Boston library. I thought this was pretty neat to **create a place to cool and hydrate around reading and learning.** Being able to access the library's resources in a non-conventional way could be studied and applied to other environments. - Racquel



## KEEPING COOL, CREATIVELY



**Ceiling fan in bedroom is critical to provide air circulation.** If it's really hot, we turn on the AC low and allow the fan to circulate the cool air. We also have sun-blocking curtains for the southern facing sun. - Racquel



**Blinds with window slightly open are critical to reducing solar heat gain** while letting in some air/breeze. The white color of the blinds reflect heat while the blinds block the bulk of solar heat and glare. - Racquel

**Trying to stay cool with this huge fan.** We use this fan all the time during the summer to save on the electricity bill due to the cost of having an AC. - Luis





## KEEPING COOL, CREATIVELY



This is an old and inefficient air conditioner unit. It is difficult to save energy with it because I have to keep it on all night to be effective. **I worry about the excessive electricity bill because of this AC.**

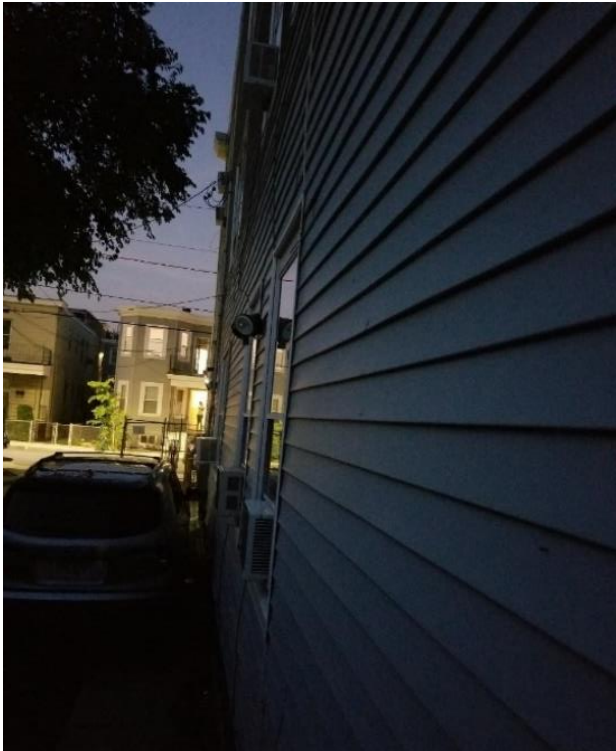
- Noemy



This is a new air conditioner unit, it is incredible! But **the cost of the device is too much, so I only have one that I use to cool down the whole house, and it is not enough.** - Noemy



## KEEPING COOL, CREATIVELY



See the amount of window air conditioning units necessary to cool down an apartment. **What a waste of energy!** There are better strategies to mitigate the heat, but we don't have access to them. - Mayra

I see many window air conditioning units, most are old, inefficient, and noisy. **In our community there are people that cannot buy new ACs.** Many don't have storage for them, so they leave them in the windows during winter.

This year the city gave away some AC units. Unfortunately, I heard of some people that got a units but had central air in their home – depriving others more in need. It is frustrating to hear about this injustice and not be able to do anything about it. - Nohemi





## KEEPING COOL, CREATIVELY



This is **my workplace**. It is an **enclosed space**, and when we cook the **heat and humidity feels very intense**: it feels unbearable. We know it is not an ideal solution, but it is all we can do. - Mayra

**My son** found the way to keep himself cool during these hot days. He **sits in front of the air conditioner unit**. The strategy my son is using is an example of adaptation to the extreme heat, but it is only a patch to the problem, not a solution. - Nohemi





### **CALLS TO ACTION:**

**1. Provide residents a spectrum of cooling strategies for different spaces, ranked by price and energy efficiency.**

**2. Support programs with insulation and HVAC system improvements, as many buildings that people rent aren't updated.**

**3. Provide assistance for electricity bills.**

**4. Utilize opportunities to combine interventions, make a larger impact.**

**5. Create and send out effective messaging and outreach to Spanish-speaking and different language communities about heat waves, places to go when hot, and strategies for staying safe and healthy while it's hot.**





# CONCLUSIONS

Researchers and participants encountered challenges during the Photovoice process that may provide insight to other communities interested in replicating a version of this project. The COVID-19 pandemic presented certain difficulties, as accessible outdoor spaces to meet are limited in Chelsea and East Boston, and Zoom meetings posed challenges for residents that had not used Zoom before or did not have consistent access to high speed Wi-Fi or internet services. Additionally, while having two separate language groups fostered comfortable conversations for residents, the two groups did not necessarily have many chances to connect and compare their experiences. This allowed for two different group cultures, but less consistency across the experiences of participants in the process. As it was important to engage participants that represented different aspects of the community, this also meant participant schedules and ability to attend all meetings varied greatly. Despite these challenges, in the final Photovoice meeting, members of the two groups met to discuss the project and their photos. It was clear that Photovoice participant photos and captions from both groups capture the urgent need for community-led change and solutions in areas like Chelsea and East Boston where the urban heat effect is disproportionately felt by low-income residents and people of color. During the final meeting, participants chose which photos would be displayed throughout the communities and discussed the most important messages they wished to communicate to their neighbors and municipal officials. They agreed with each other that many in their communities live in buildings with expensive air conditioning or without air conditioning, work in industries with high risk of extreme heat exposure, and have less access to cooling and green spaces. Participants emphasized that these groups deserve to see changes and improvements in their communities so that they are able to be climate resilient and healthy.



# ABOUT C-HEAT

The Chelsea East Boston Heat Study (C-HEAT) is a partnership between Environmental Health researchers Boston University School of Public Health (BUSPH) and GreenRoots, Inc.

The Department of Environmental Health at Boston University School of Public Health has over 40 years of conducting research in response to and in partnership with communities facing environmental hazards in Massachusetts on topics ranging from air quality to toxic waste, contaminated drinking water and unsafe housing. The mission of BUSPH is to improve the health of local, national, and international populations, particularly the disadvantaged, underserved, and vulnerable, through excellence and innovation in education, research, and service.

The mission of GreenRoots is to improve and enhance the urban environment and public health in Chelsea and surrounding communities through deep community engagement and empowerment, youth leadership, and the implementation of innovative projects and campaigns.

Over the past twenty-five years, GreenRoots has restored more than two acres of urban salt marsh, created new parks, advocated and supervised the development of waterfront walkways, educational signage, and public access to the shoreline. The organization has implemented numerous initiatives to improve Chelsea Creek's water quality; and worked with businesses and adjacent municipalities to implement best management practices to improve water quality and reduce environmental and public health burdens on the adjacent communities.

In partnership over the last 15 years, BUSPH researchers and GreenRoots have studied indoor and outdoor air quality, social and environmental stressors from street lighting to food insecurity, and shared results and data with study participants and the community at-large.



# References

- Boston Planning & Development Agency (BPDA), Research Division. (2020, July). *Boston by the numbers 2020*. bostonplans.org. Retrieved June 20, 2022, from <http://www.bostonplans.org/getattachment/51f1c894-4e5f-45e4-aca2-0ec3d0be80d6>
- Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs. (n.d.). *Environmental justice populations in Massachusetts*. Mass.gov. Retrieved June 20, 2022, from <https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts>
- Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs. (n.d.). *Environmental justice*. Mass.gov. Retrieved June 20, 2022, from <https://www.mass.gov/environmental-justice>
- Angel Hsu, Glenn Sheriff, Tirthankar Chakraborty, and Diego Manya. “Disproportionate Exposure to Urban Heat Island Intensity across Major US Cities.” *Nature Communications* 12 (2021): 1–11).
- Jeremy Hoffman, Vivek Shandas, and Nicholas Pendleton. “The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas.” *Climate* 8 (2020): 12.
- Shushi Peng, Shilong Piao, Philippe Ciais, Pierre Friedlingstein, Catherine Ottle, François Marie Bréon, Huijuan Nan, Liming Zhou, and Ranga B. Myneni. “Surface Urban Heat Island across 419 Global Big Cities.” *Environmental Science and Technology* 46 (2012): 696–703.
- Priyanka Rangadass, Leslie Dominguez-Santos, Roseann Bongiovanni, Eva King, Giselle Barahona. 2021. *COVID-19 in Chelsea: A Glance Into One of the Hardest Hit Cities And the Role of Intersecting Social Determinants of Health*. [https://static1.squarespace.com/static/57ac44ebb3db2b4ff1e21ced/t/61bb43cee87b3c39cf1d712c/1639662549281/Final+PDF\\_DEC+15\\_JW+Corrections.pdf](https://static1.squarespace.com/static/57ac44ebb3db2b4ff1e21ced/t/61bb43cee87b3c39cf1d712c/1639662549281/Final+PDF_DEC+15_JW+Corrections.pdf)
- M. Santamouris. 2014. *Cooling the cities – A review of reflective and green roof mitigation technologies to fight heat island and improve comfort in urban environments*. Solar Energy. Volume 103. May 2014 issue. 682-703. <https://doi.org/10.1016/j.solener.2012.07.003>
- Ethel Taylor, Ambarish Vaidyanathan, W. Dana Flanders, Matthew Murphy, Merianne Spencer, and Rebecca S. Noe. “Differences in Heat-Related Mortality by Citizenship Status: United States, 2005-2014.” *American Journal of Public Health* 108 (2018): S131–36.
- Wicked Hot Mystic (2022). *Executive Summary*. [https://drive.google.com/file/d/1chFfqrVnH7\\_NahqMBc4noZaiRcZ5Lj6/view](https://drive.google.com/file/d/1chFfqrVnH7_NahqMBc4noZaiRcZ5Lj6/view)
- Who we are*. Healthy Chelsea. (n.d.). Retrieved June 20, 2022, from <https://healthychelsea.org/who-we-are/>
- World Health Organization. (2018, June 1). *Heat and Health*. Fact Sheets. <https://www.who.int/newsroom/fact-sheets/detail/climate-change-heat-and-health>

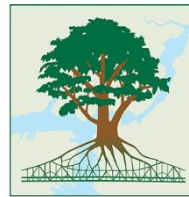
# C-HEAT TEAM

**BOSTON  
UNIVERSITY**

- Patricia Fabian, co-PI
- Madeleine Scammell, co-PI
- Flannery Black-Ingersoll
- Pilar Botana
- Fei Carnes
- Leila Heidari
- Patrick Kinney
- Julie de Lange
- Jonathan Levy
- Chad Milando
- Alina McIntyre
- Abgel Negassa
- Ameera & Alex Saba
- Hannah Levine



Twitter, Instagram: @c\_heatproject  
Website: [c-heatproject.org](http://c-heatproject.org)



Celebrating **25** Years  
of Fighting for Social and  
Environmental Justice!

**GreenRoots**

- Roseann Bongiovanni
- Marina Pinedo-Shokooch
- Ibrahim Lopez Hernandez
- Bianca Bowman
- Environmental Chelsea Organizers

## Funding:



**Barr  
Foundation**

Kalila Barnett

## Advisory Team:

- Melanie Gárate, *MyWRA*
- Matt Frank, *Chelsea Housing Authority*
- Rafael Mares, *Neighborhood Developers*
- Zoe Davis, *City of Boston*
- Ben Cares, *City of Chelsea*
- Fidel Maltez, *City of Chelsea*
- Tracy Nowicki, *Chelsea Senior Center*
- Indrani Ghosh, *Weston & Sampson*

Special thanks to all the C-HEAT Study participants, Victor Tiernan and Alex Train with the City of Chelsea, and Bell.