

EXPLORING CLIMATE CHANGE AND WARMING IN CITIES: A PUBLIC FORUM WITH A FOCUS ON VULNERABLE POPULATIONS IN THE GREATER BOSTON AREA

ABOUT US

We are a group of students taking Science and Civic Action at Tufts University. For our semester-long project, we created a forum to discuss the scientific and social impacts of climate change in East Boston, with a focus on how rising sea levels and warming could lead to the displacement of at-risk communities. Our hope for the future is to merge science and community action, engage political leaders, community members, and scientists to ensure that residents of East Boston are not left behind in any potential city measures.

QUESTIONS TO:

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WARMING IN CITIES

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OVERVIEW

WHAT IS CLIMATE CHANGE?

Climate change is defined as "a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates" (NASA)

WHAT IS THE MAIN CAUSE OF CLIMATE CHANGE?

Human activity is the main cause of climate change. Humans consume fossil fuels which release greenhouse gases into the air. Fossil fuels include the burning of coal, oil consumption, and deforestation (NASA).

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"WE ARE CALLED TO ASSIST THE EARTH TO HEAL HER WOUNDS AND IN THE PROCESS HEAL OUR OWN... RECOGNIZING THAT SUSTAINABLE DEVELOPMENT, DEMOCRACY AND PEACE ARE INDIVISIBLE IS AN IDEA WHOSE TIME HAS COME."

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WANGARI MAATHAI

KENYAN SOCIAL, ENVIRONMENTAL AND POLITICAL ACTIVIST AND THE FIRST AFRICAN WOMAN TO WIN THE NOBEL PEACE PRIZE.



BOSTON CLIMATE IMPACT

Boston suffers from the effects of climate change disproportionately due to its coastal geography. As temperatures rise and weather patterns change, the Boston area will experience flooding and extreme heat (NBC Boston)

WARMING

Areas within the city will warm at different rates, with the most severe heat in racial and ethnic minority neighborhoods due to historical redlining. Research shows that in the summer Dorchester can be 15° hotter than Brookline. This disparity results from how heat is reflected and absorbed. Asphalt reflects and intensifies heat, whereas trees and other greenery help absorb heat and provide shade. Whiter and wealthier neighborhoods tend to have more parks and, therefore, cooler temperatures. (Climate Ready Boston)

SCIENCE LITERACY: GASES THAT WARM THE CLIMATE

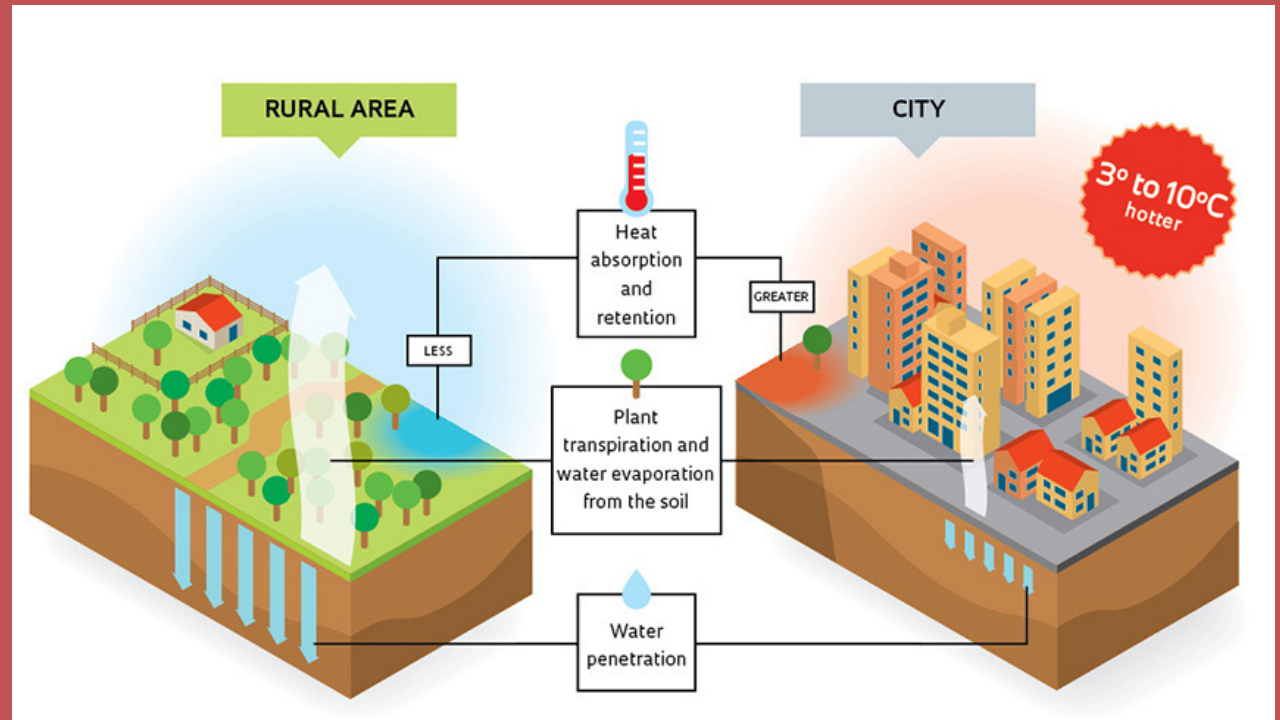
CARBON DIOXIDE

Carbon dioxide is a greenhouse gas that contributes to the warming of the Earth. It is released through human activities such as deforestation, emissions from cars, and raising livestock, also natural processes like volcanic eruptions. Since the beginning of the industrial revolution, the Earth's CO₂ concentration has increased by almost 50% (NASA)

METHANE

Methane is another greenhouse gas that is active in the environment, though less prevalent than CO₂. It is increasing in content due to human activities like agriculture and landfill waste (NASA).

URBAN HEAT ISLAND EFFECT



INCREASED TEMPERATURES AND EXTREME HEAT

Boston experiences a phenomenon known as the Urban Heat Island (UHI) effect that makes the city warmer than its surrounding rural areas due to human activities and land use. This effect has resulted in increased power outages, reduced air and water quality, and more frequent hospital visits, especially for those with existing illnesses and disabilities. (Boston Government)

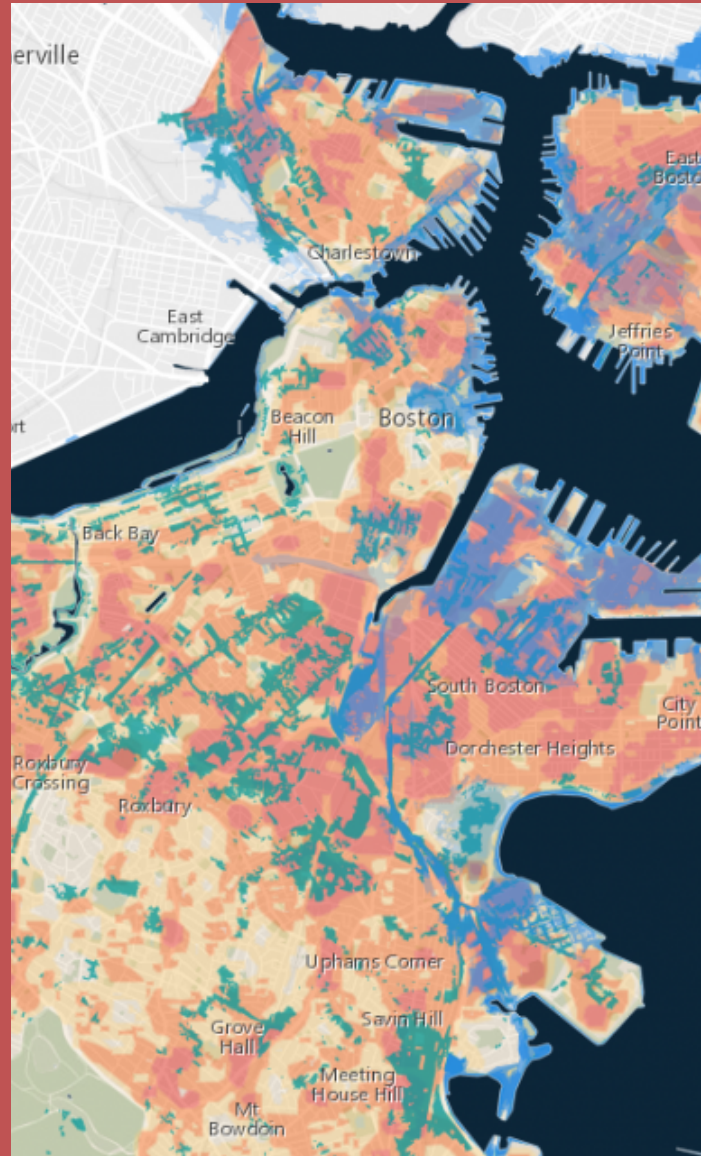
FAST FACTS

- The planet's average surface temperature has risen about 2 degrees Fahrenheit since the pre-industrial era, 1880-1900 (NOAA).
- The sea level around Boston, Massachusetts, has risen by 8 inches since 1950 (Sea Level Rise)
- There is more carbon dioxide in the atmosphere today than at any point in the last 800,000 years (Climate)
- Main Street in Charlestown is being raised by 2 feet to protect 250+ residents from sea level rise and coastal flooding (New England News Collaborative)
- 1,500 affordable housing units are at immediate risk of flooding in Boston (NBC Boston)
- Heatwaves caused by global warming present a greater risk of heat-related illness and death, most frequently among people who have diabetes who are elderly or are very young (Boston Government)

WHO IS AFFECTED IN BOSTON?

LOW INCOME RESIDENTIAL AREAS

Certain communities across Boston face greater risks of climate change due to their aging infrastructure and inability to protect from severe storms and flooding. Many of these older and non-renovated spaces are home to low income communities. Low income housing units in cities such as Quincy, Cambridge, and Boston face risks of climate change due to their old structure and lack of renovations (NBC Boston).



WHO SUFFERS THE MOST CONSEQUENCES?

- low-income communities
 - communities of color
 - native and tribal communities
 - Children and the elderly
 - those without access to cool spaces in the summer
 - Residents near coastal areas
 - individuals with chronic illnesses and conditions that worsen with heat exposure
 - residents in areas with less green space.
- (Boston Government)

HOW SEVERE IS THE ISSUE?

A research study done on the Boston area found that more than 1,500 of the city's affordable housing units are at risk of floodwaters reaching their door at least once a year. By 2050, this number is expected to triple to just under 5,000, around 25% of Boston's housing that could experience flooding at least four times a year. Furthermore, in regards to warmer temperatures, "There were 22 days over 90 degrees in 2015. By 2030, we could see up to 40 days over 90 degrees" (NBC Boston)

CONCERN 1

HAVING A SECURE FUTURE

- A recurring concern we heard in our gatherings was fear that climate change will cause insecure futures.
- With rising sea levels, natural disasters, and warming temperatures occurring at faster rates, participants fear that these challenges will cause harm and displacement in the short-term.
- Others participants pointed to anxiety over the thought that humans have done too little and are too late to reverse the effects of climate change, citing the increased occurrence of natural disasters that, for the first time, are impacting the everyday lives of community members in a particularly evident manner.
- Sabrina, a participant in the concern gathering said:
""Awakening, seeing things in our own eyes with storms, heatwaves, things that are finally visible to us etc. Awareness that this is happening. Is it too late?"

CONCERN 2

CARE FOR THE VULNERABLE

- Another crucial concern to understand is that different neighborhoods within a city will experience the effects of the warming climate unequally. Lower-income neighborhoods have less access to relief from the warming climate including fewer parks that provide shade and grass to absorb the heat and less access to air conditioning.
- Another participant in our concern gathering highlighted inequities exacerbated by climate change by saying, "there's a big chance of leaving East Boston behind. Some communities bear the brunt of climate change and aren't treated equitably."
- As temperatures continue to rise and the economic gap continues to grow, there is an increasing concern that lower-income communities will not have the resources they need to be able to survive in a harsh climate like Boston's and will thus be left behind.

- Not only did participants express concerns about increased warming in low-income neighborhoods, but they also pointed to issues of political capital, as many were worried that these communities would not have equal access to policy-making decisions.

CONCERN 3

SAFETY OF MY PERSON

- Finally, there was a general concern of the safety of everyone as the detrimental effects of climate change continue to worsen.
- For instance, it was common that when asking about friends and family experiencing the effects of climate change, people were worried if recurring natural disasters like hurricanes, wildfires, and tornados would cause great harm to those they cared about.

SOLUTIONS TO CONCERNS

CONCERN 1: HAVING A SECURE FUTURE

- Seeing increased storms, heat waves, and other consequences of climate change is alarming, and it may seem as though it is too late to take action. While some harm cannot be reversed, taking initiative immediately is critical in minimizing damage.
- Spreading awareness should be the first step. Climate change is no longer a hypothetical threat, as its effects can now be seen in communities across the country, so advocates should use these developments to highlight the need for action.
- To move from awareness to action, advocates should support organizations that center the communities impacted by rising sea levels and warming.
- In addition to supporting organizations on the ground, advocates should lobby their local leaders and governments to enact climate-friendly policies.

CONCERN 2

CARE FOR THE VULNERABLE

- Due to the lack of green spaces in low-income areas, these communities face disproportionately high temperatures. Moreover, with less political capital, low-income and historically marginalized communities are often left out of the policy discussion.
- By supporting organizations who are invested in these communities, they can, in turn, advocate for the needs of those most impacted by climate change when lobbying local governments for policy change.
- One potential policy change could require developers constructing climate-resilient buildings to have a certain number of affordable units in order to prevent the displacement of low-income community members.
- Another potential policy would be to invest in more green spaces in low-income neighborhoods to offset warming.

CONCERN 3

SAFETY OF MY PERSON

- Ultimately, the fear around the detrimental impacts of climate change is real and increasingly evident. Warming in cities, rising sea levels, and natural disasters are no longer hypothetical scenarios, but instead, they are common occurrences that threaten the wellbeing of those we love.
- To ensure the safety of the people and communities we care about, advocates must first raise awareness, center the needs of those most vulnerable, and then advocate for climate friendly policy changes that will slow the impacts of climate change.
- Caring for the safety of our loved ones means caring for the climate. Climate friendly policy change will ensure that we all live longer and healthier lives.

SOLUTIONS

ACTIONS BEING TAKEN

- The city of Boston launched its Climate Ready Boston initiative in 2017 with the goal of shielding residents from the impact of climate change by creating climate resilient housing and infrastructure. (Boston.gov)
- Currently, the city is creating resiliency plans for the North End, East Boston, Dorchester, Charlestown, and South Boston.
- Though unique to each neighborhood, plans include:
 - Constructing flood walls;
 - Elevating waterfront neighborhoods;
 - Constructing underwater basins;
 - Installing hardscape furnishing;
 - And erecting climate resilient mixed-use developments with greater building heights and density.



- So far, the city of Boston is in the second step of their four step plan, meaning that no concrete infrastructure plan has been implemented yet.
- After an analysis of current conditions, the city has been focused on stakeholder and community engagement before moving on to goal setting, recommendations, and, then, implementation.

BENEFITS:

- If Boston's climate resiliency plan is fully enacted, it has the potential to shield thousands of residents from the most adverse effects of climate change.

- In East Boston, for example, where plans for elevated parks and pathways with artificial basins are being considered, climate resilient measures would protect an estimated 13,200 residents, or about a third of the East Boston population, and over 300 businesses.

DRAWBACKS:

- Unfortunately, these initiatives do come with some risk, especially when it comes to constructing new climate resilient housing.
- To fund such an immense climate investment, the city hopes to use mixed-use developments to bring in revenue and business to waterfront neighborhoods.
- As seen in major cities across the country, when modern developments and high-end businesses enter a neighborhood, rent prices increase and small business, often owned by community members, are forced to relocate.
- With rising costs of living, residents of waterfront areas will be at risk of displacement.

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