

Municipal Vulnerability Preparedness Program Action Grant Case Study

Municipality: City of Boston

Project Title: City of Boston Heat Resilience Planning Study (the Heat Plan)

Award Year (FY): FY 20-21 and 21-22

Grant Award: \$280,070

Match: \$94,622

Match Source: In-kind City staff time

One or Two Year Project: Two year project

Municipal Department Leading Project: Environment Department

Project Website URL:

- Project website: boston.gov/preparing-heat
- Executive Summary (includes link to full report): boston.gov/heat-plan

Community Overview:

- What is the population size of your community and where is it located?
 - Boston is located on the northeast coast of MA and has a population of ~689,300 people (2020 US Census Bureau)
- Do you have any [Environmental Justice](#) or other Climate Vulnerable communities? (Think about both those who live and work in your town.)
 - Yes. The majority of Boston has Environmental Justice communities including minority populations, lower income households, and households with language isolation. Many of these characteristics overlap in most neighborhoods.
- Other unique traits of your municipality like who the top employers are, geography, history, etc.
 - Boston is the capital of Massachusetts with the highest population in the state and is facing rapid growth. Boston is uniquely situated as a hub of economic and cultural significance in the Greater Boston Area and the east coast. As a coastal city, Boston faces multiple climate-driven impacts including coastal and riverine flooding from sea level and increasing coastal storms, inland flooding from increasing storm intensity, and extreme temperatures.

Project Description and Goals:

- Where was the project located?
 - City of Boston
- What climate change impacts did the project address?
 - Extreme heat
- What were the specific goals and tasks of the project as stated in your application?

- The goal of this project was to develop a heat resilience plan for Boston to help build an understanding of:
 - how we define impact in regards to heat (syndromic surveillance, 911 calls, felt temperature, surface temperature, relative indoor temperature, all of the above, etc)
 - what heat mitigation strategies (e.g. design interventions, policies, engagement with vulnerables residents, all of the above, etc) will have the greatest impacts in Boston,
 - when strategies need to be implemented in order to have the desired impact,
 - where strategies will have the greatest impact,
 - and who will bear the greatest burden from extreme heat and thus should be prioritized in implementation.
- Did your project meet the goals set forth in your application in terms of:
 - Employing nature-based solutions
 - Yes. Integrating nature-based solutions specifically into streetscapes and urban parks is a core part of Heat Plan. See Strategy 6: Parks, Trees, and Outdoor Spaces and Strategy 7.1: Cool Commutes.
 - Improving equitable outcomes for and fostering strong partnerships with EJ and other Climate Vulnerable Populations
 - Yes. While the project identified citywide heat resilience strategies, the project focused on five neighborhoods where there is disproportionate distribution of extreme heat that overlaps with Environmental Justice communities. These neighborhoods include Chinatown, East Boston, Dorchester, Mattapan, and Roxbury. The planning process focused community engagement and the development of heat resilience strategies with residents and workers in these communities to identify strategies that will address specific and place-based needs. The specific needs and corresponding strategies that have been identified are included for each of the five neighborhood focus areas in the Neighborhood Context section of the Heat Plan.
 - Providing regional benefits
 - Yes. The Heat Plan coordinated with three regional heat analysis and preparedness planning efforts in Greater Boston to share data and coordinate community engagement efforts.
 - Wicked Hot Mystic through the Museum of Science, the Mystic River Watershed Association (MyRWA), and the City of Cambridge
 - C-HEAT through Boston University (BU), GreenRoots, and the City of Chelsea
 - Regional heat preparedness planning through the Metropolitan Area Planning Council (MAPC)
 - Additionally, because extreme heat incurs impacts on residents and workers across the Greater Boston Area and regional critical infrastructure, the Heat Plan

acknowledges the need for regional collaboration (i.e. strategies related to transportation infrastructure and heat sensing networks).

- Implementing the public involvement and community engagement plan set forth in your application
 - Yes. The project team accomplished all sub-tasks related to Task 3: Stakeholder engagement with City, State, and community partners.
- Finishing the project on time
 - Yes. The project was completed and the Heat Plan was released on Earth Day April 22nd, 2022.

Results and Deliverables:

- Describe, and quantify (where possible) project results (e.g. square footage of habitat restored or created, increase in tree canopy coverage, etc.). Report out on the metrics outlined in your application.
 - Task 1: Review of existing plans, projects, initiatives and plans by consultant and project team:
 - The consultant team completed a comprehensive review of extreme heat related projects and plans through a review of documented material and stakeholder and steering committee meetings. The findings were documented in the Task 1A deliverable.
 - Task 2: Analysis urban heat island and heat vulnerability:
 - Four extreme temperature maps were produced including daytime and nighttime air temperature, urban heat island index, and heat event duration maps.
 - Task 3: Stakeholder engagement with City, State, and community partners:
 - The Community Advisory Board was formed to provide guidance on broader community engagement and heat resilience strategies. The CAB also informed the development of the Heat Resilience Resource Guides.
 - The project team held
 - Two virtual open houses with over 100 participants across the two sessions
 - Five neighborhood idea sessions with over 50 participants across all sessions
 - Youth idea session specifically for Boston youth with 14 youth participants.
 - Boston youth also spearheaded a citywide survey with 150 responses
 - For all community surveys and public meetings, translation and interpretation services were provided in the most commonly used languages other than English.
 - Task 4: Development of a citywide heat resilience strategy
 - Sub-task 4.1 - the Heat Resilience Toolkit included 13 strategy areas
 - Sub-task 4.2 - there are three primary goals to: reduce heat exposure, adapt to heat, and reduce sensitivity and foster healthy connected communities.
 - Sub-task 4.3 - an in depth analysis was completed for each of the five neighborhood focus areas. The analysis includes the identification of air temperature and exposure index hot spots and a cooling network gap analysis,
 - Sub-task 4.4 - a cost benefit analysis was developed that included an analysis of three typologies including schools buildings and grounds, large multifamily housing, and triple deckers. For each typology, benefit cost ratios (BCR) were calculated for the lower and higher emissions scenario (RCP4.5 and 8.5) and two

- likelihood ranges (17th and 83rd percentile).
 - Task 5: Final Report and implementation roadmap
 - The Heat Plan plan final report lays out 26 strategies within 8 focus areas where heat resilience is needed.
- Provide a brief summary of project deliverables with web links, if available.
 - The Heat Plan provides a roadmap of 26 strategies that Boston will implement to increase access to cooling resources and decrease localized extreme temperatures. The report outlines next step actions for each st
 - The project produced updated temperature maps including daytime and nighttime air temperature, urban heat island index, and heat event duration maps. The plan also featured updated extreme temperature projections developed by the Greater Boston Area Research Group (GBRAG).
 - Visit boston.gov/heat-plan to view the Plan executive summary and full report and boston.gov/preparing-heat to view the project website.

Lessons Learned:

- What lessons were learned as a result of the project? Focus on both the technical matter of the project and process-oriented lessons learned.
 - As the full duration of the project was conducted within the context of the COVID-19 pandemic, it was especially critical for the project team to be adaptive and attentive to community and stakeholder needs. In response, the team diversified safe methods for outreach (flyering and virtual outreach with CAB members) and developed creative forms of engagement (Heat Story Comic Builder). The team also provided information about existing local resources related to cooling, utilities assistance, and COVID assistance programs.
 - During the process of developing the benefit cost analysis, we determined that the analysis should be scoped for three typologies including schools buildings and grounds, large multifamily housing, and triple deckers. Scoping typologies allowed us to define consistent parameters for the variables that determined the monetized benefits. Due to the limited scope, we determined areas future analysis (included in BCA Technical Memo "Next Steps") to further our understanding of the cooling strategy benefits.
- What is the best way for other communities to learn from your project/process?
 - Communities interested in learning about the project can visit the project website at boston.gov/preparing-heat which includes an overview of the study and information from the community engagement process such as survey and open house materials, the Heat Story Comic Builder.
 - For information about the Heat Plan, visit boston.gov/heat-plan which includes the executive summary of the report and links to the full report.
 - For additional information or to schedule a conversation, reach out to the Climate Ready Boston team directly at climate.ready@boston.gov.

Partners and Other Support:

- Include a list of all project partners and describe their role in supporting/assisting in the project.
 - Core consultant team - provided technical assistance for climate modeling, plan development, community engagement, diversity, equity, and inclusions training

- Sasaki, Klimaat, All Aces, WSP
- Please see the full list of acknowledgements on pages 5-9 of the [Heat Plan](#)). Those recognized in “Special Thanks” supported the development of the heat resilience strategies, reviewed report drafts, and provided administrative and financial management support.

Project Photos:

- In your electronic submission of this report, please attach (as .jpg or .png) a few high-resolution (at least 300 pixels per inch) representative photos of the project. Photos should not show persons who can be easily identified, and avoid inclusion of any copyrighted, trademarked, or branded logos in the images. MVP may use these images on its website or other promotional purposes, so please also let us know if there is someone who should receive credit for taking the photo.
 - See images in “project photos” folder