

Compound Risks and Multi-Faceted Climate Collaboration



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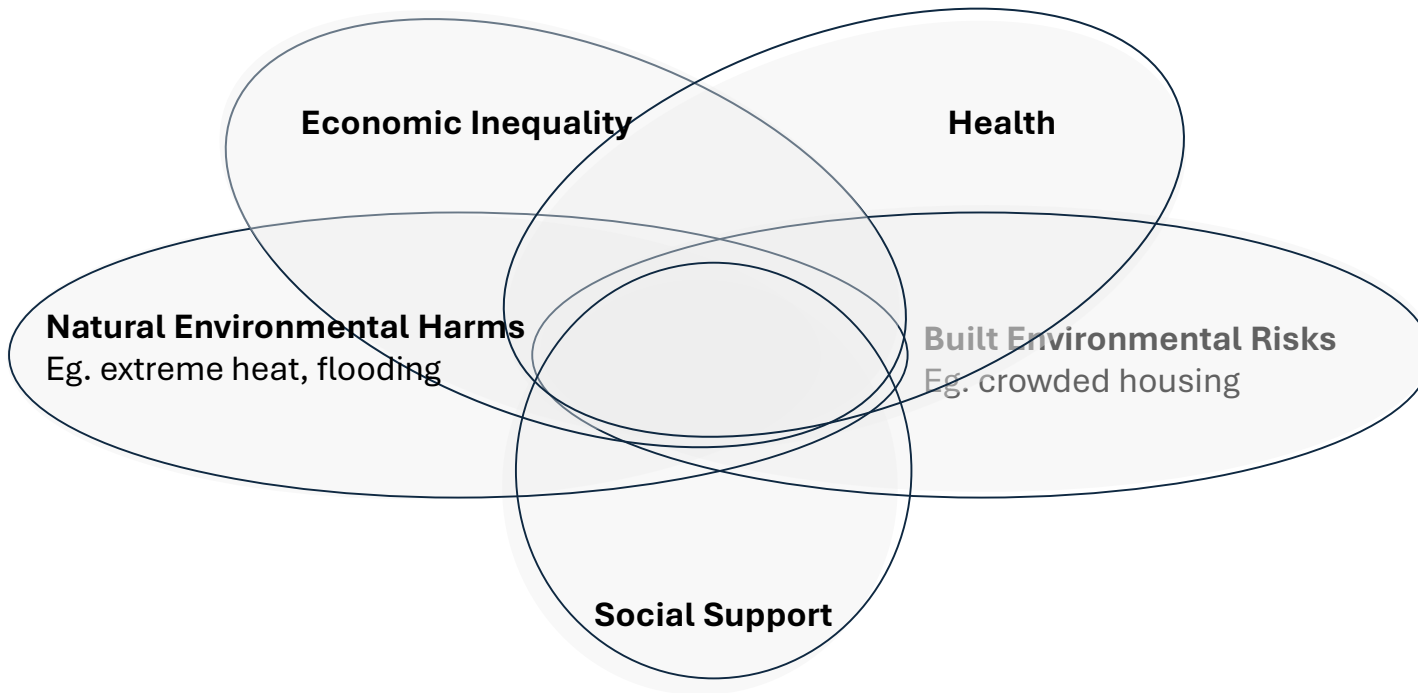
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The Compound Risk of Heat and COVID-19 in New York City: Physical, Built, Social Factors, and Interventions









LOCAL ENVIRONMENT
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The compound risk of heat and COVID-19 in New York City: riskscales, physical and social factors, and interventions

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ABSTRACT

Climate change is disrupting the fundamental conditions of human life and exacerbating existing inequity by placing further burdens on communities that are already vulnerable. Risk exposure varies by where people live and work. In this article, we examine the spatial overlap of the compound risks of COVID-19 and extreme heat in New York City. We assess the relationship between socio-demographic and natural, built and social environmental characteristics, and the spatial correspondence of COVID-19 daily case rates across three pandemic waves. We use these data to create a compound risk index combining heat, COVID-19, density and social vulnerability. Our findings demonstrate that the compound risk of COVID-19 and heat are public health and equity challenges. Heat and COVID-19 exposure are influenced by natural, built, and social environmental factors, including access to mitigation infrastructure. Socio-demographic characteristics are significant indicators of COVID-19 and heat exposure and of where compound vulnerability exists. Using GIS mapping, we illustrate how COVID-19 risk geographies change across the three waves of the pandemic and the particular impact of vaccinations before the onset of the third wave. We, then, use our compound risk index to assess heat interventions undertaken by the City, identify neighborhoods of both adequate and inadequate coverage and provide recommendations for future interventions.

ARTICLE HISTORY

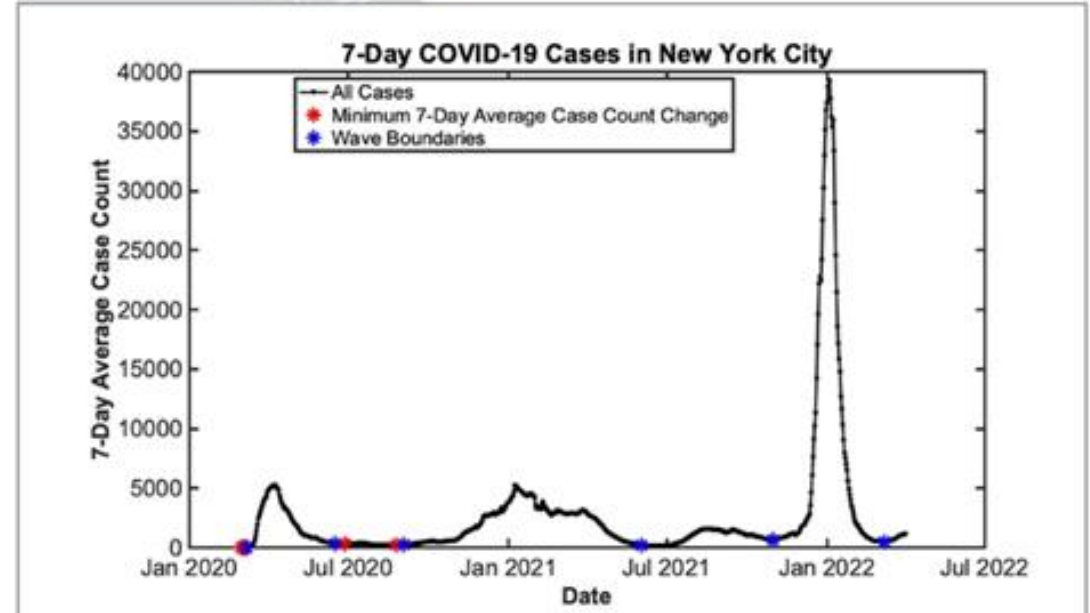
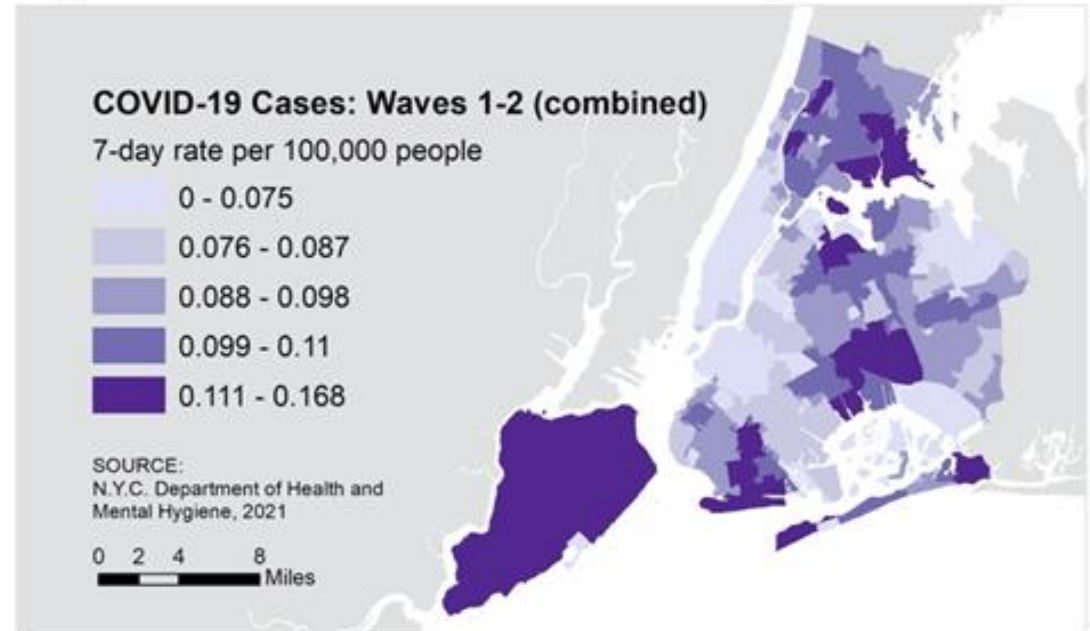
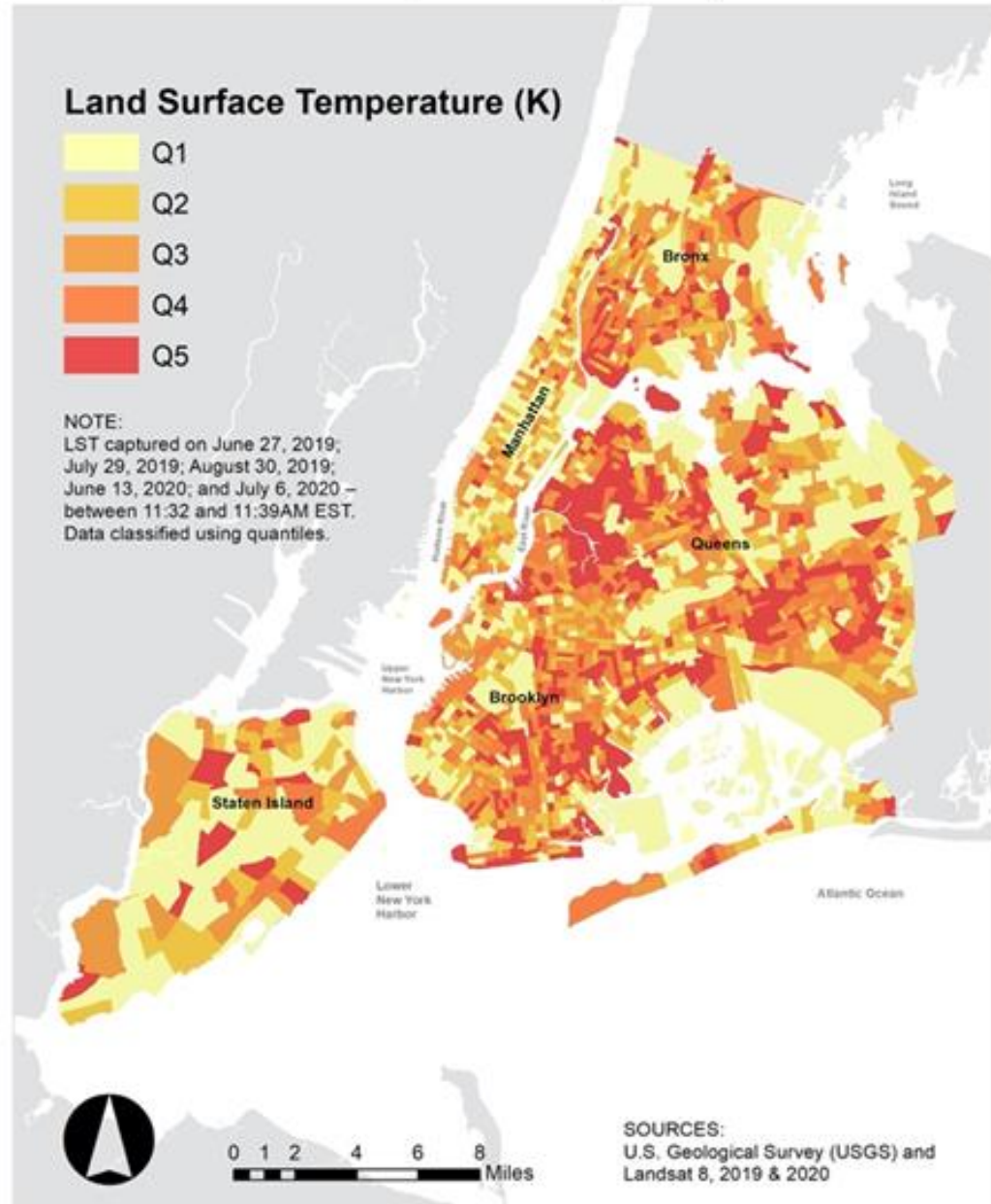
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KEYWORDS

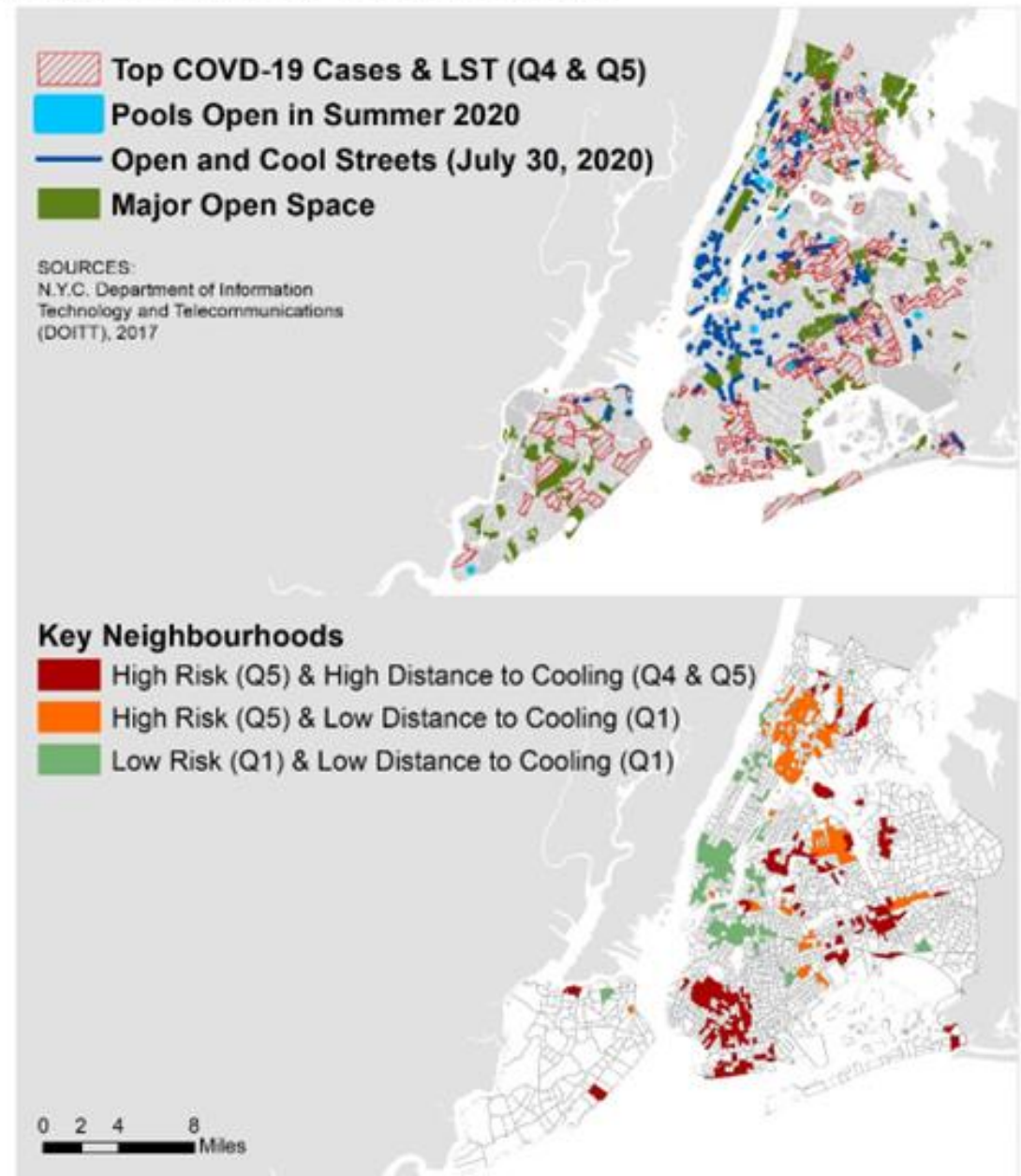
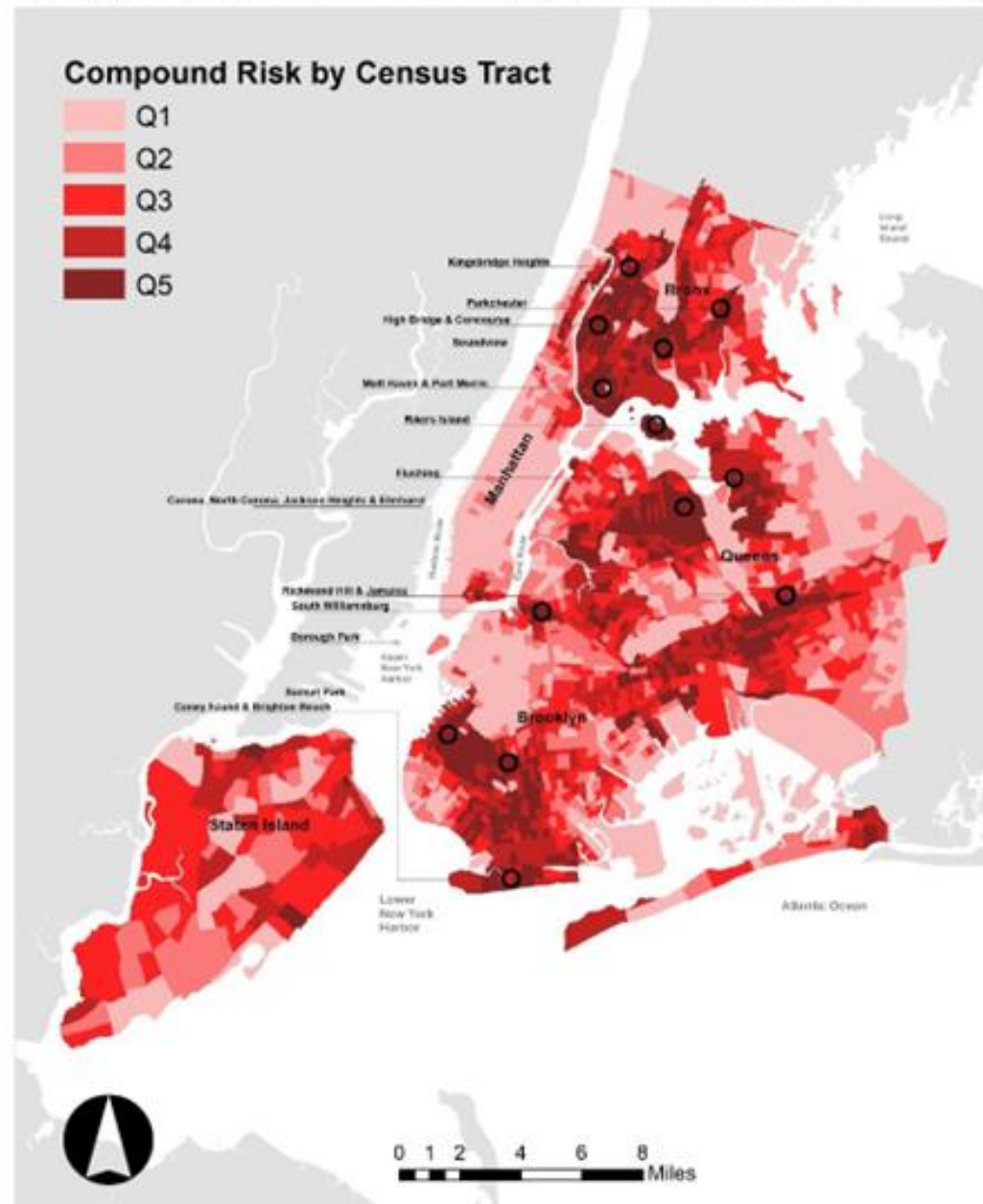
COVID-19; urban heat; social equity; public health; climate change; compound risk

Understanding of the origins, interdependencies, and spillovers between risk clusters

Land Surface Temperature (LST) & COVID-19 Daily Case Counts for Waves 1 & 2 (combined)



Compound Risk, Cooling Interventions & Key Neighbourhood Observations



Governors Island: New York Climate Exchange

Governors Island transferred from federal control to New York (2003); City later designated it for climate-focused redevelopment and leased land for a climate center

NYC-based hub advancing urban climate solutions, research, and workforce development

Created through a 2021–2023 global competition:

- **Academia:** Stony Brook (lead), Pratt, Pace, Georgia Tech, others
- **Industry:** IBM, Boston Consulting Group, private-sector partners
- **Community:** Local orgs like GOLES
- **Public sector:** NYC + Trust for Governors Island

Brings together 40+ partners across academia, industry, community organizations, and city government

Functions as a “living lab” to test, pilot, and scale climate solutions in a real urban environment



Boston Climate Community Collaborative

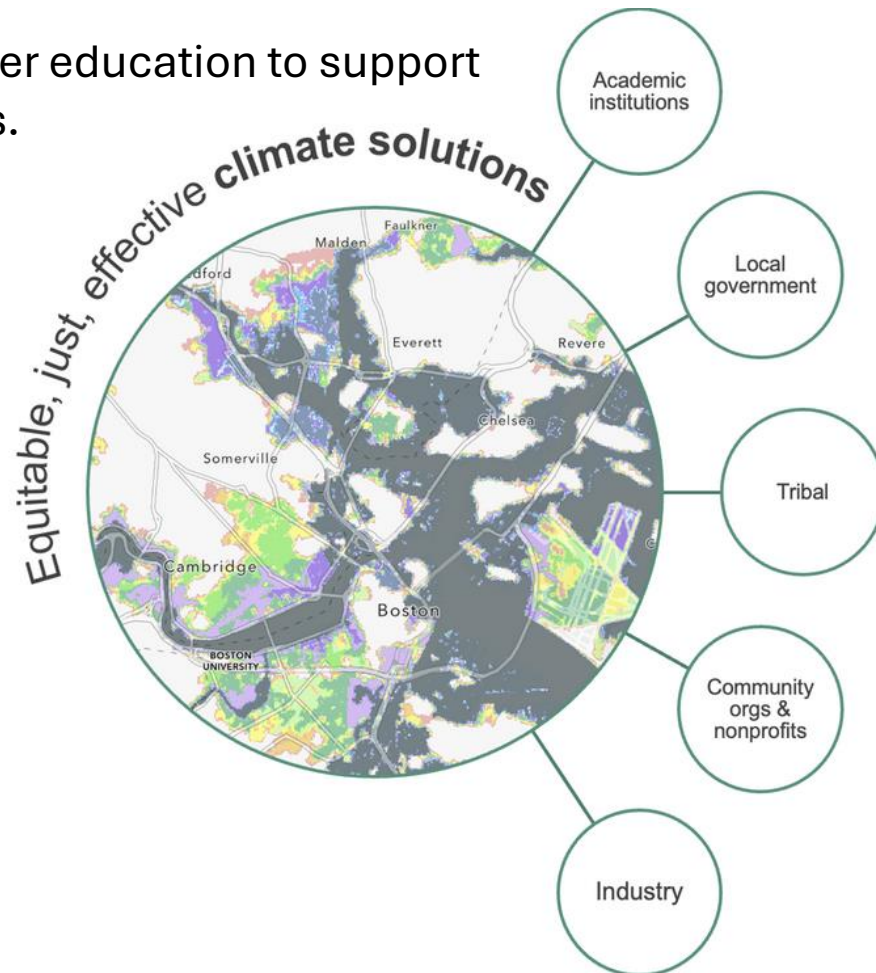
- **Connecting stakeholders:** Builds networks to share knowledge and coordinate climate action.

- **Driving collaboration:** Leverages higher education to support interdisciplinary, cross-sector solutions.

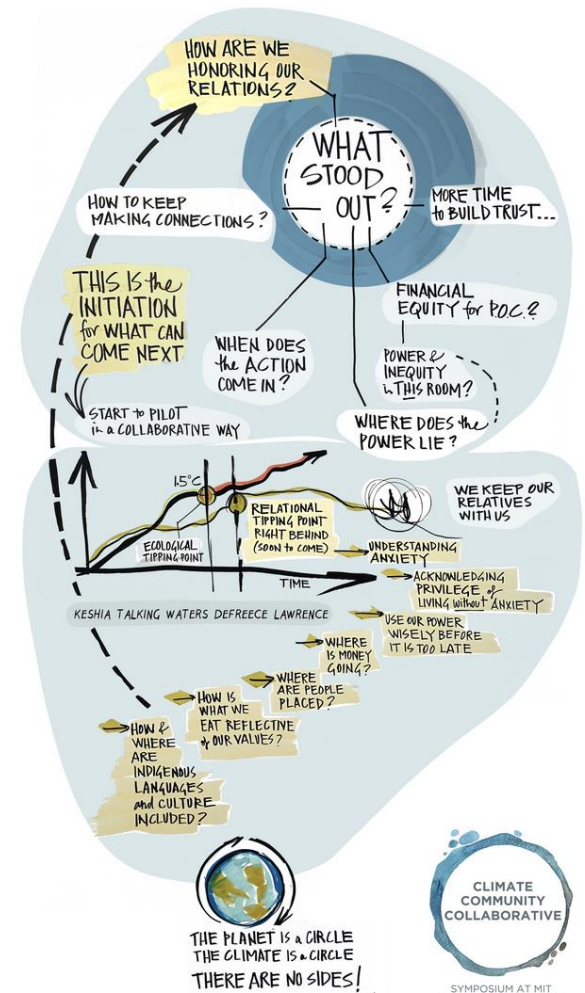
- **Climate:** Technical and social problem needing new ways of thinking and solutions.

- **Community:** Inclusive engagement to create just and equitable outcomes.

- **Collaborative:** Partnerships beyond any single organization to tackle climate challenges.



MAPPING OUR NEEDS & CAPACITIES



Convened 2023 Symposium with 80+ organizations



Abode Energy Management
Action for Boston Community Development
Action for Equity
All Aces, Inc.
All in Energy
Allston Brighton Health Collaborative
Alternatives for Community & Environment
Benjamin Franklin Cummings Institute of Technology
Boston Climate Action Network (BCAN)
Boston Green New Deal Coalition (BGND)
Boston Green Academy
Boston Green Ribbon Commission
Boston Harbor Now
Boston Society for Architecture
Boston University
Browning the Green Space
BU Institute for Global Sustainability
Cambridge Public Health Department
City of Boston
City of Cambridge
Climate Jobs Massachusetts
East Boston Climate Action
Eastie Farm
Emerald Cities Collaborative
Emerald Necklace Conservancy
Emerson College

Global Center for Climate Justice
GreenRoots
Harvard Environmental & Energy Law Program
Harvard Law School
Harvard Department of Economics
Harvard University Office for Sustainability
Health Resources in Action
HEET
Inst for Data Systems & Society Profs
J-Clinic
MA Building Electrification Accelerator
MACA
Malden River Works
Mashpee Wampanoag Tribe
Mass Audubon
MA Division of Ecological Restoration
MA Executive Office of Energy & Environmental Affairs
MassEnergize
Metropolitan Area Planning Council
MIT D-Lab
MIT Earth, Atmospheric, & Planetary Sciences
MIT Energy Initiative
MIT Open Learning
MIT Washington Office
Morningside Academy for Design
Mothers out Front

Mystic River Watershed Alliance
Native American Indian Center of Boston
NEU4J
Northeastern University
Office of Workforce Development, City of Boston
Omere Development
PKG Center for Public Service
POUA
Power Corps Boston
ReGeneration Center
Roxbury Community College
Salata Institute for Climate & Sustainability
Secretary of the Corp
SEIU 509
Sierra Club, MA
Sovereign Science
Sustainable Solutions Lab at UMASS Boston
Terrascope
Tisch College
Trees as a Public Good Network
Tufts University
U4J/ACE
UMass Amherst
UMass Lowell
Urban Harbors Institute, UMass Boston
Wentworth Institute of Technology
YMCA of Greater Boston

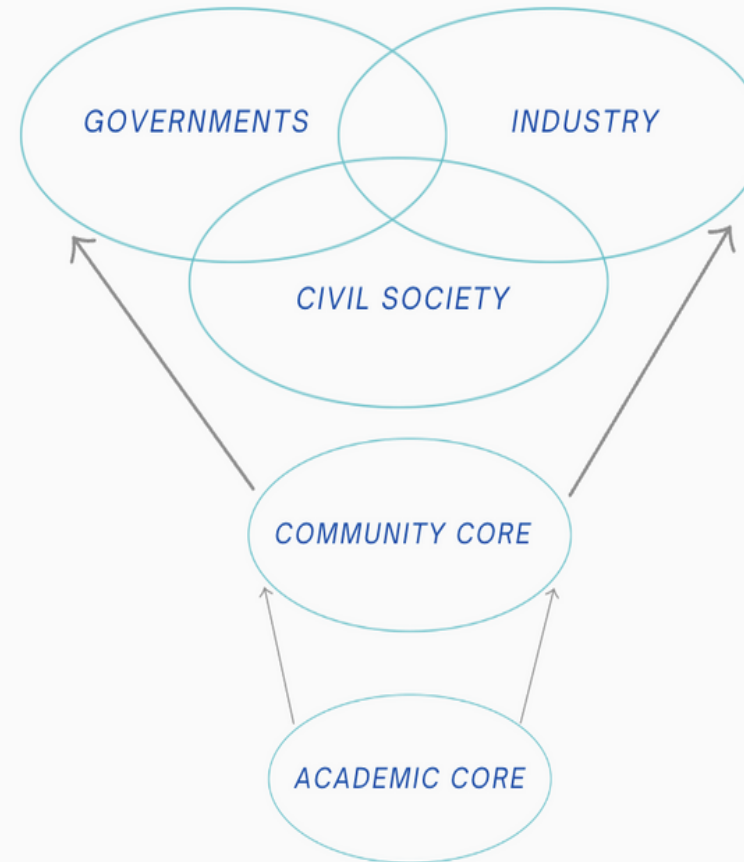
Day 1: Showcase Boston community leaders' climate work via interactive case studies; workshop to map stakeholder needs, capacities, and collaboration opportunities.

Day 2: Focus on higher education's role in strengthening cross-sector collaboration and leveraging resources to support climate action.

Successful Case Studies and Collaborative Model

- **PowerCorpsBOS:** a 10-month Green Industry Workforce Development Program; collaborating with Roxbury Community College's Center for Smart Building Technology on a building operations workforce training pilot
- **Electrify Cambridge:** a program that offers free consulting services to customers to help home and residential building owners electrify and remove fossil fuels from their home. a collaboration between the City of Cambridge, the nonprofit All In Energy, and for-profits Abode Energy Energy Management and New Ecology
- **Chelsea and East Boston Heat Study (C-HEAT):** "Cool block" collaboration between Boston University School of Public Health, GreenRoots, and the City of Chelsea. Working collaboratively to engage the community in heat mitigation efforts and more; focus on environmental justice
- **Massachusetts Division of Ecological Restoration:** partnership-based work with municipal, non-governmental organizations, and federal partners to plan and implement river and wetland restoration projects that help people and nature adapt to climate change
- **Networked Geothermal / HEET:** Pilot project in Framingham that brings together government, utility, and community leaders, and a multi-year research effort called 'Learning from the Ground Up' (LeGUp) led by the non-profit organization HEET that includes Boston University, MIT, Salem State, Berkeley, National Renewable Energy Laboratory (NREL), and Lawrence Berkeley National Lab (LBNL)
- **Sovereign Science:** Indigenous-led organization dedicated to mobilizing Indigenous communities to collect data of sacred sites and places of ecocide
- **Urban Planning Summer Camp:** a summer camp for Boston Public School (BPS) students at Roxbury Community College (RCC); a collaboration between the University Massachusetts-Boston, RCC, BPS, and Boston Planning and Development Agency
- **Emerald Necklace Conservancy:** an organization that maintains, restores and protects the parks designed by Frederick Law Olmsted; collaborates across cities and government agencies
- **Moakley Park:** a collaboration between the City of Boston, Boston Harbor Now, and other stakeholders to transform Moakley Park from a recreational park to a resilient, multi-use community park
- **Malden River Works for Waterfront Equity and Resilience:** this project aims to create a "climate resilient waterfront park for all on the Malden River"; Malden River Works is a coalition that brings together BIPOC community leaders, government stakeholders, and environmental advocates

STRENGTHENING & LEVERAGING EXISTING NETWORKS



- *Benjamin Franklin Cummings Institute of Technology*
- *Boston University*
- *Emerson College*
- *Harvard University*
- *Northeastern University*
- *Massachusetts Institute of Technology*
- *Roxbury Community College*
- *Tufts University*
- *University of Massachusetts Amherst*
- *University of Massachusetts Boston*
- *Wentworth Institute of Technology*

Values, Achievement, Vision

CORE VALUES

- **ENVIRONMENTAL JUSTICE** Justice, equity & sustainability rooted in Indigenous knowledge & storytelling
- **SYSTEM THINKING** Climate change is multi-sectoral; requires connecting needs to big-picture goals
- **SPEED OF TRUST** Show up without expectations. Listen. Prioritize relationships over timelines.
- **MEANINGFUL PARTNERSHIP** Communities lead. Compensated involvement. Research serves their needs.

WHAT IS WORKING

- Systems & Data: Building metrics, processes & post-program procedures ensuring justice and equity across all projects
- Values-Aligned Collaborators: Partnering with community colleges, Indigenous leaders, and students passionate about community goals
- Equitable Engagement: Co-developing programs with clear scopes, accessible compensation (money, food, childcare), and supporting local advocacy

WHAT IS NEEDED

- Regional coordination & academic alignment to reduce community research burden
- Deeper community relationships & clearer boundaries with institutions
- Broader political engagement across government & decision-makers
- Research funding & new streams tied to real community needs
- Workforce development in green industries (materials science, construction, building science)

The ROLE of HIGHER EDUCATION in SUPPORTING a CLIMATE COLLABORATIVE

