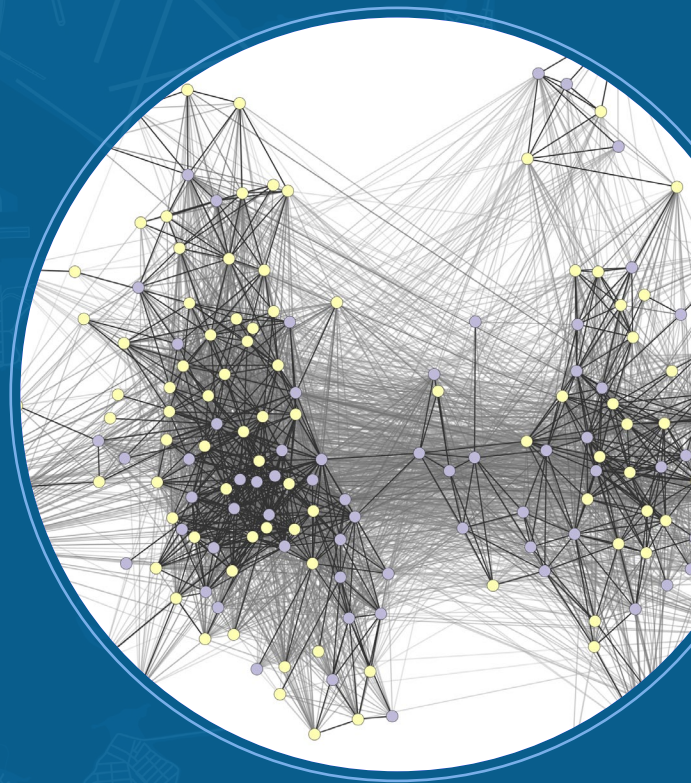
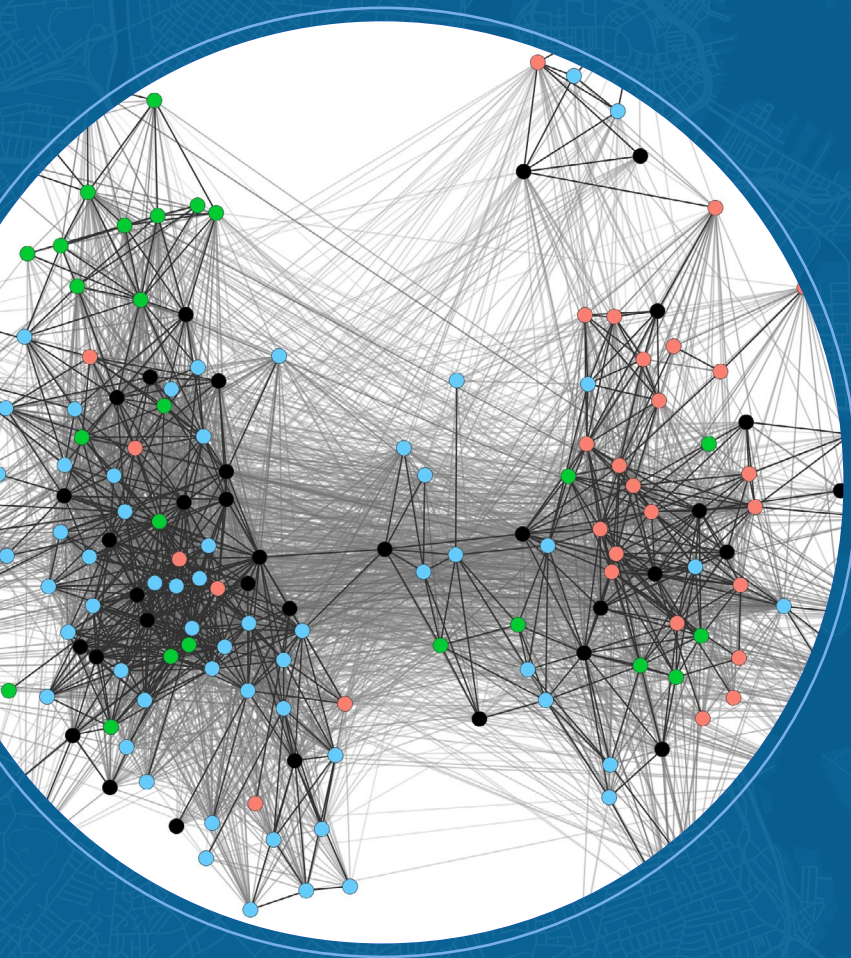


Connecting for Equitable Climate Adaptation: Mapping Stakeholder Relationships in Metro Boston





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A Report from the Sustainable Solutions Lab
at the University of Massachusetts Boston

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About The Sustainable Solutions Lab

The Sustainable Solutions Lab, or SSL (sisəl), at UMass Boston is a collaborative research and action institute focused on keeping historically excluded people and communities safe and healthy as our climate changes. Through an interdisciplinary partnership with six schools and institutes dedicated to four major communities of color in the U.S., SSL bridges across disciplines to pursue research, convenings, and thought leadership to advance climate adaptation that prioritizes the needs of communities facing the most severe climate impacts. In addition, SSL partners with local organizations (grassroots, academic/research, non-profits, public agencies) to understand local priorities and identify research needs and potential for collaboration to advance equitable climate adaptation.

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Introduction

Climate change is already disproportionately impacting historically marginalized populations. Without intentional interventions, adaptation efforts will amplify existing social and economic inequities. At the same time, society will mobilize massive resources to address increasing climate-related threats. This means that climate change also presents opportunities to address persistent and systemic inequities. However, equitable adaptation efforts are impeded by multiple factors. For example, many frontline communities do not have the capacity to work on adaptation efforts if it means diverting attention from addressing existing inequities. Even as policymakers, practitioners, and planners increasingly prioritize climate adaptation, frontline communities are not brought into the process early and deeply enough. And there is a broader issue, which is that knowledge about what equitable adaptation looks like and how to achieve it is still limited. The knowledge gaps are heightened by siloes preventing people in different fields - and across academic and community divides - from learning from one another.

Given these factors, the Sustainable Solutions Lab Metro Boston Climate Adaptation Stakeholder Mapping Project (henceforth, “SSL” and “Stakeholder Mapping Project”) is one contribution toward efforts to bridge knowledge and practice gaps between different actors in the local climate justice field. The Stakeholder Mapping Project aims to identify a set of people and organizations collaborating in climate adaptation work and to bring together stakeholders to determine paths forward in advancing climate adaptation equity. We show the existing, and by default, the missing connections between climate adaptation actors in the Metro Boston area. By establishing what is, we can then ask questions about what should be and what it would take to get there. While the Stakeholder Mapping Project cannot tell us how practitioners, activists, researchers, and officials establish and nurture various forms of collaborative practices, it does provide a snapshot of the relational outcomes - who works with whom - that result from the existing structures, norms, and policies driving climate adaptation work locally.

Who is a stakeholder?

For the project's purposes, stakeholders are those who impact and/or are impacted by efforts to achieve climate adaptation or climate justice-related efforts in the Metro Boston area. The overarching research question driving the work is: *what are the existing collaborative¹ connections between climate adaptation stakeholders in Metro Boston?* We focused on collaboration networks because such networks drive progress on goals of shared importance across sectors, distribute efforts, contribute to innovation in ideas and practices, and contribute to the robustness of possible responses in times of crisis. Specific objectives of the Stakeholder Mapping Project include:

- Developing a collective understanding of the climate adaptation social field, key actors, and potential for action
- Identifying needs and opportunities for stakeholder engagement
- Identifying resource strengths and resource gaps within the climate adaptation social field
- Identifying leverage points for equitable climate adaptation action
- Identify potential partners for projects (e.g. research, planning, policymaking, organizing)
- Identifying core & periphery groups to better understand power distribution and inform power redistribution efforts
- Understanding the racial and ethnic composition of the social field and how groups are distributed

The Social Network Approach

Through the application of theory and methods in the field of social network analysis (SNA), we systematically examined the network of relationships between a set of key stakeholders within climate justice and climate adaptation efforts in the Greater Boston area. SNA makes it possible to identify the roles and sources of stakeholders' different forms of power and the connections between them regarding climate justice and climate adaptation efforts in the area. Through an analysis of these connections, we can identify highly connected actors, areas within the climate adaptation field that see greater levels of collaboration, as well as areas of disconnect.

¹Collaboration was defined as working together to achieve a shared purpose or outcome, including sharing information, knowledge, resources, and/or effort.

At the heart of SNA theory and methods is the view that people and their behaviors are embedded in a web of relationships that both enable and constrain. For example, relationships enable action through access to resources, be those resources material, informational, or emotional. Through an SNA lens, people are embedded in a matrix of relationships that both reflect institutional policies and practices and shape these same policies and practices. One of the key advantages of the SNA approach is that it enables us to ask questions both at the individual level (Who are the key actors? What are their roles within the network? What agendas are they driving?), while also looking at the bigger picture - the structures, institutions, and social fields that emerge from the interactions between stakeholders.

Several studies have used the social network approach to stakeholder mapping, including in environmental and conservation work. These studies concur on the following key benefits of the social network approach, as compared to traditional stakeholder mapping: First, the SNA approach enables a systematic analysis of the structural characteristics of the stakeholder network. For example, users can view subgroups, bridging ties, and density of interactions in the stakeholder network. Second, using social network visualizations, the options for displaying and presenting the stakeholder map are more versatile. SNA software yields compelling visual maps that can help to make explicit the social fields that we operate in and which we may not be aware of — or are aware of, but only intuitively. Finally, the use of SNA facilitates network interventions. In other words, once insights about the stakeholder networks are gathered and action areas identified, the mapping and subsequent analysis can be used to increase the quantity and quality of relationships. This can improve the overall functioning of a group of collaborators. As such, the stakeholder network we present here can be considered a “before” snapshot of the Metro Boston climate adaptation network. Future studies of the network can track changes in collaborations, using this snapshot as a baseline.

Who is in the Metro Boston Climate Adaptation Field?

Appendix 1 outlines the full process by which we arrived at the stakeholder network that we discuss in this report. The stakeholder network is composed of 169 people who responded to our Stakeholder Mapping Project survey. On the following pages you will see an overview of who the respondents were.

Gender

We asked stakeholders to identify their gender using binary and non-binary options. Figure 1 shows how gender is distributed in the stakeholder network. Fifty-six percent of the 169 stakeholders who responded were women. We note that collaborative relationships are not clustered according to gender, with plenty of cross-gender collaborations. With just over half of the stakeholder network being composed of women, women and men are about evenly distributed across areas of the network.

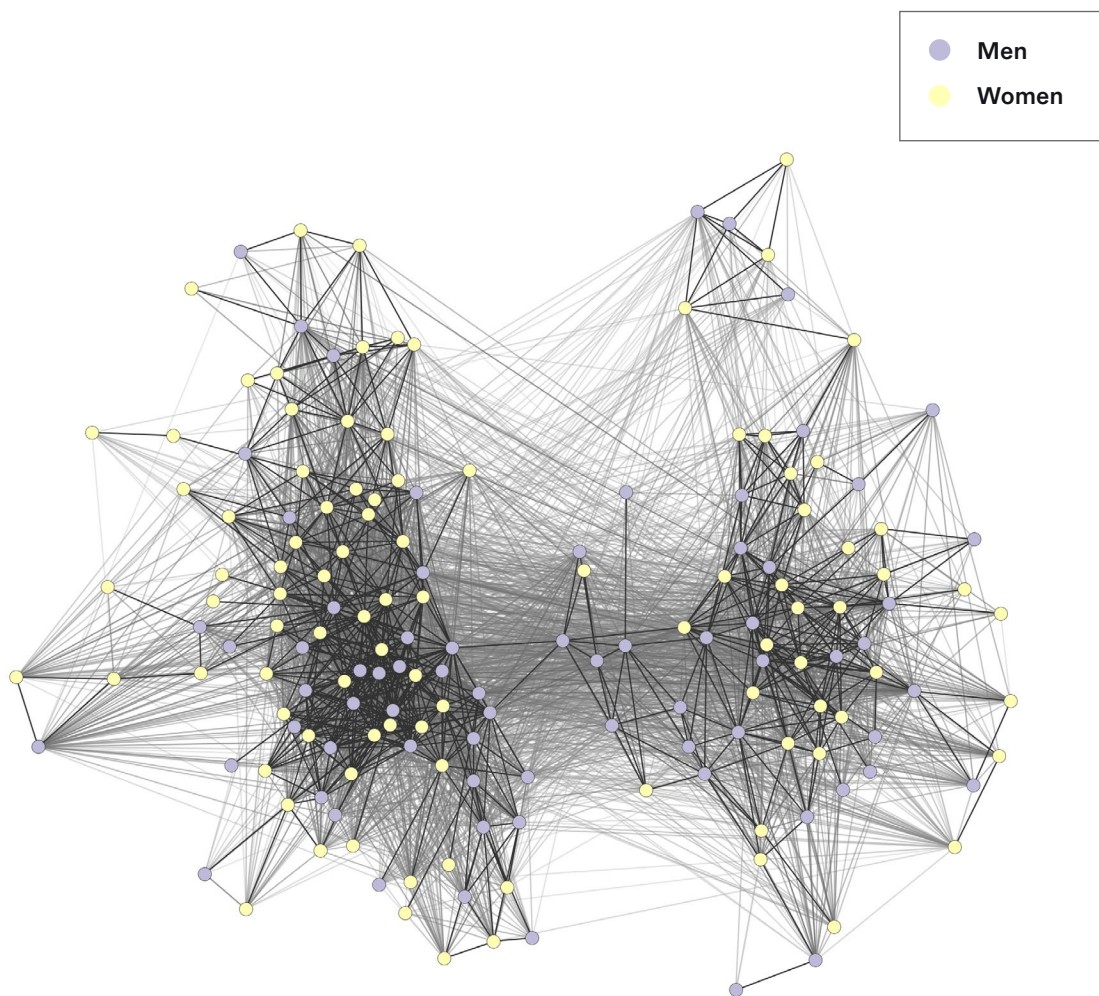


Figure 1. Gender composition of the Metro Boston climate adaptation stakeholder network

Race & Ethnicity

While respondents represented a range of ethnic and racial backgrounds, 75% of respondents identified as white. Seven percent of respondents identified as black or multiracial, 10% identified as Latina/o/x or multiracial, and 4.7% identified as Asian (which included East Asian, Southeast Asian, and South Asian) (see Figure 2). Using U.S. labor statistics data (<https://datausa.io>) as a guide to the ethnic and racial demographics of different occupations adjacent to climate adaptation, we note that nationwide, 67% of people working in Environmental Science and 54% working in Sustainability Studies are white. Based on those who chose to fill out the survey, our results suggest that in the Metro Boston climate adaptation field, the percentage of those who are white is higher even than in those other related fields, which are already disproportionately white. This is with the caveat that we do not know the racial self-identification of stakeholders who were invited to complete our survey but did not complete it and are therefore not represented in our maps.

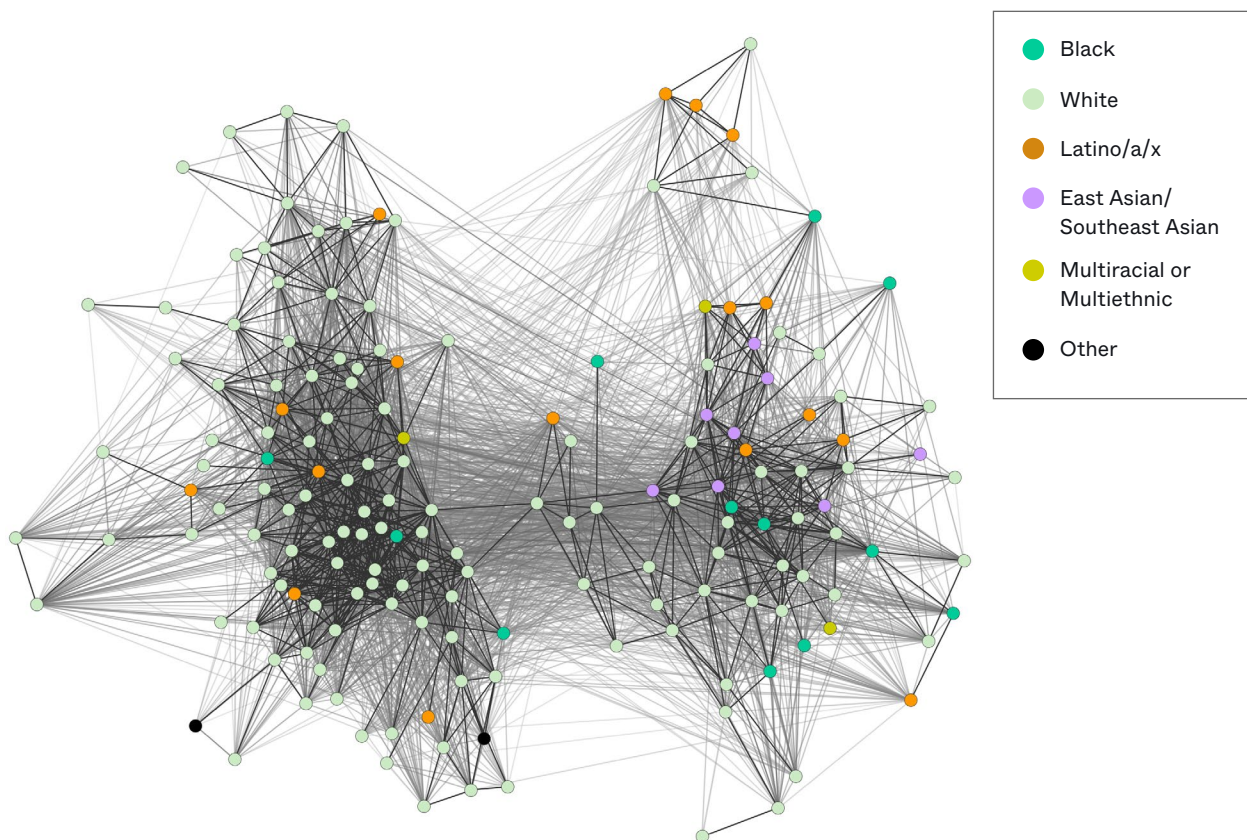


Figure 2. Ethnic and racial composition of the Metro Boston climate adaptation stakeholder network

Work and organization characteristics

Stakeholders provided information on their organizational affiliations. We then used this information to determine organization type and related roles, as well as the type of resilience work being pursued by the stakeholder and their organizations. Table 1 summarizes stakeholder characteristics related to their roles, organizational affiliations, and the nature of the work they did within the climate adaptation field. Based on our classifications, the organization types most represented in the stakeholder network were non-profit (35%), private sector (25%), and public sector (20%) organizations. We also classified 20 different role types designating the nature of the work done by stakeholders. The top roles are presented in Table 1. Most prominently, they included academia (14%), government (12%), and engineering (11%) roles. These roles spanned resilience efforts, with physical (i.e., infrastructural) resilience being the common type of resilience work pursued by stakeholders (39%). Social resilience work was pursued by the lowest percentage of stakeholders at 21%. Finally, most stakeholders reported having collaborated with at least one other stakeholder in the network on COVID-19-related response (56%).

%(N)	
Attribute	
<i>Organization Types</i>	
Non-profit	35 (59)
Private sector	25 (43)
Public sector	20 (34)
University	12 (21)
Foundation	3.5 (6)
Network	3 (5)
Independent	1.7 (3)
<i>Resilience Work</i>	
Physical	39 (66)
Other	23 (39)
Social	21 (35)
Environmental	17 (29)

<i>Top Roles</i>	
Academia	14 (23)
Government	12 (21)
Engineering	11 (20)
Conservation	10 (17)
Energy	10 (17)
Organizing	9 (15)
Advocacy	7 (12)
Development	6 (10)

Learning from the Maps

There are a number of questions we can ask about the network maps. Two initial things we look at in these maps are structure and composition. Structure has to do with the pattern of connections, revealing subgroups, gaps, and areas of greater or lower levels of interconnectivity. Composition has to do with the traits of actors in the map, represented by the color of the nodes on the map. Here it is traits like gender and resilience work types. The maps are visual tools for making sense of complex sets of relationships and for uncovering the different storylines in the broader Metro Boston climate adaptation scene. So what are the stories that these maps are telling us? Here we highlight three main ones.

Storyline #1: Missing Connections

There are many missing connections in the Metro Boston climate adaptation network. If everyone in the stakeholder network were connected to each other, that would be 28,292 possible connections. Instead, there are 7,120 connections, or 25% of all potential ties. This low level of interconnection, or density in the SNA jargon, can point to a number of issues in the local climate adaptation field. One of the drawbacks of sparse networks like this is that information flows less efficiently. This can result in efforts that are under-realized, duplicative or cross-purposes, as people work on projects without the benefit of knowledge about similar efforts in distant parts of the network. More interconnection also makes for more robust networks that don't easily break apart - with people or groups becoming completely disconnected from each other - in the face of disaster. But it is not all negative. It is unlikely,

for example, that it would be a good thing for all or most of the stakeholders to be connected to each other. A certain level of sparseness can be less constraining to people and groups in the stakeholder network. All-in-all, there are many opportunities for bridging different parts of the Metro Boston climate adaptation network. The need for this becomes particularly clear when considering the next storyline.

Storyline #2: Resilience Silos

The network is divided into two main groups. While a number of people collaborate across these groups, the net effect is a local climate adaptation field separated along important lines. As in Figures 1 and 2 above, Figure 3 shows the network of 169 stakeholders who responded to SSL's Stakeholder Mapping Project survey. The color of the nodes in Figure 3 represents the type of organization that the stakeholders primarily worked in, according to our classification, which we based on their organization and job role. The legend shows the organization types that were most represented in the stakeholder network. Figure 4 displays the same network but highlights the type of resilience work done by each stakeholder. The stakeholder nodes are colored by type of resilience work, corresponding to the broad realms of physical (e.g., of physical infrastructures development), environmental (e.g., development of green and blue infrastructures), and social (e.g., community-informed activities related to climate adaptation) resilience issues. A fourth category, in black, includes those individuals whose activities either span across these three primary realms or transcend them.

Considering Figure 3 and Figure 4 together, we note that the two groups include: 1) mostly grassroots stakeholders working through non-profit organizations on the right side of the visualization (henceforth, the "grassroots" group) and, 2) a larger group of stakeholders from the public and private sectors on the left (henceforth, the "institutional" group). The private organizations were mostly engineering firms, while stakeholders from the public sector worked mostly for the City of Boston.

The three main types of resilience work are distributed throughout the network. However, we highlight a few notable patterns. First, a small subset of actors doing environmental resilience work cluster on the upper part of the network's institutional side. With a few exceptions, stakeholders doing environmental resilience work are at the peripheries of the climate adaptation network, with some environmental resilience actors connected to grassroots groups and another set of environmental resilience actors connected to the institutional side. Second, a large proportion of the network's institutional side are stakeholders working on physical resilience, including public and private sector stakeholders. On the other hand, social resilience work is primarily pursued by stakeholders in the "grassroots" group, with a few stakeholders from the institutional side who do social resilience work pulling towards the grassroots side.

While stakeholders of color work in various sectors of the climate adaptation field, they are especially represented in grassroots organizations. We can return to Figure 2 for additional detail on ethnic and racial composition of the stakeholder network. Again, we see, for example, that Asian/Asian American stakeholders in the network work within the "grassroots" part of the network. Similarly, 9 out of 12 Black/Multiracial stakeholders work in this "grassroots" group. This is the part of the network that is also primarily engaged in doing social resilience climate adaptation work.

To sum, the Metro Boston climate adaptation field is structured along types of resilience work, with mostly non-profit, grassroots organizations collaborating on social resilience, and a larger group of public-private partnerships moving forward physical resilience agendas. The Metro Boston climate adaptation network has limited ethnic and racial diversity, with stakeholders of color primarily concentrated in grassroots, non-profit organizations pursuing environmental and climate-related social resilience. These trends suggest a need for structures and initiatives that better integrate social and infrastructural climate adaptation activities, and in particular, that direct more attention and resources to social resilience work. Such interventions could also function to ethnically and racially diversify the climate adaptation network.

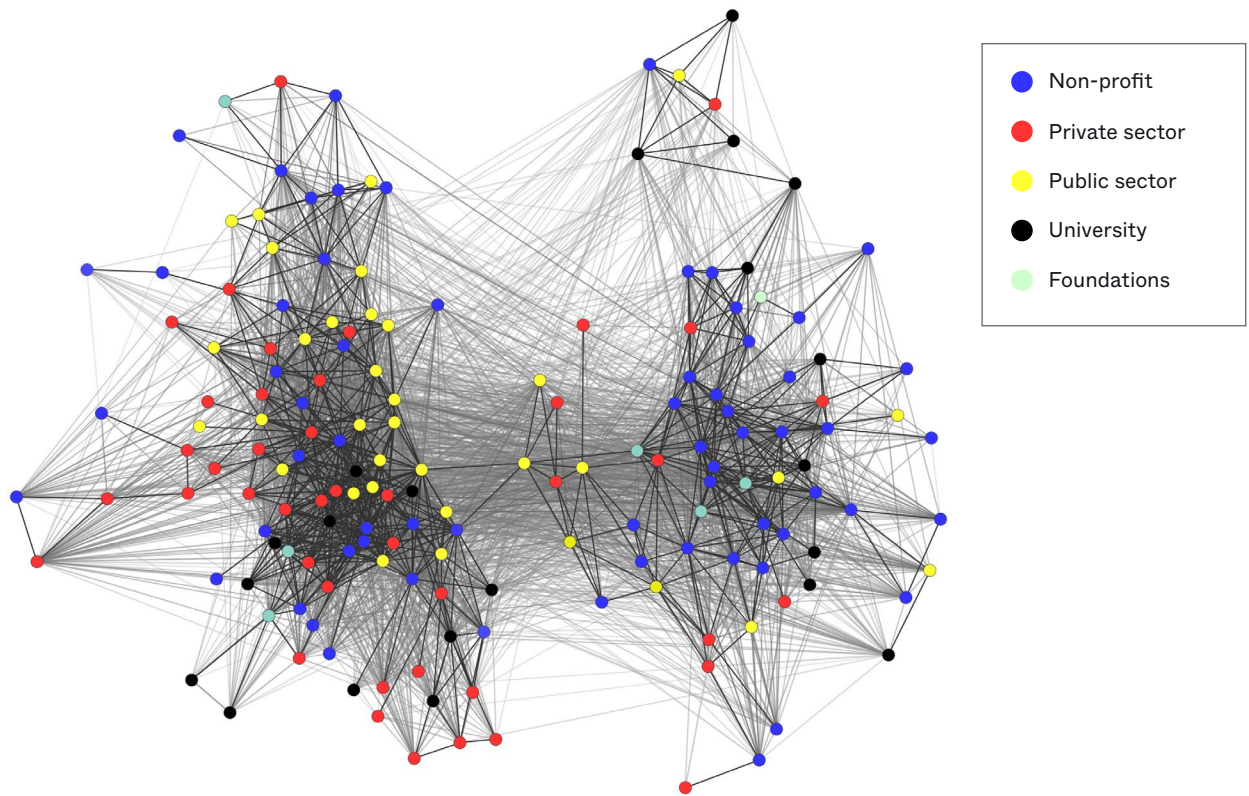


Figure 3. Key organization types in the Metro Boston climate adaptation stakeholder network

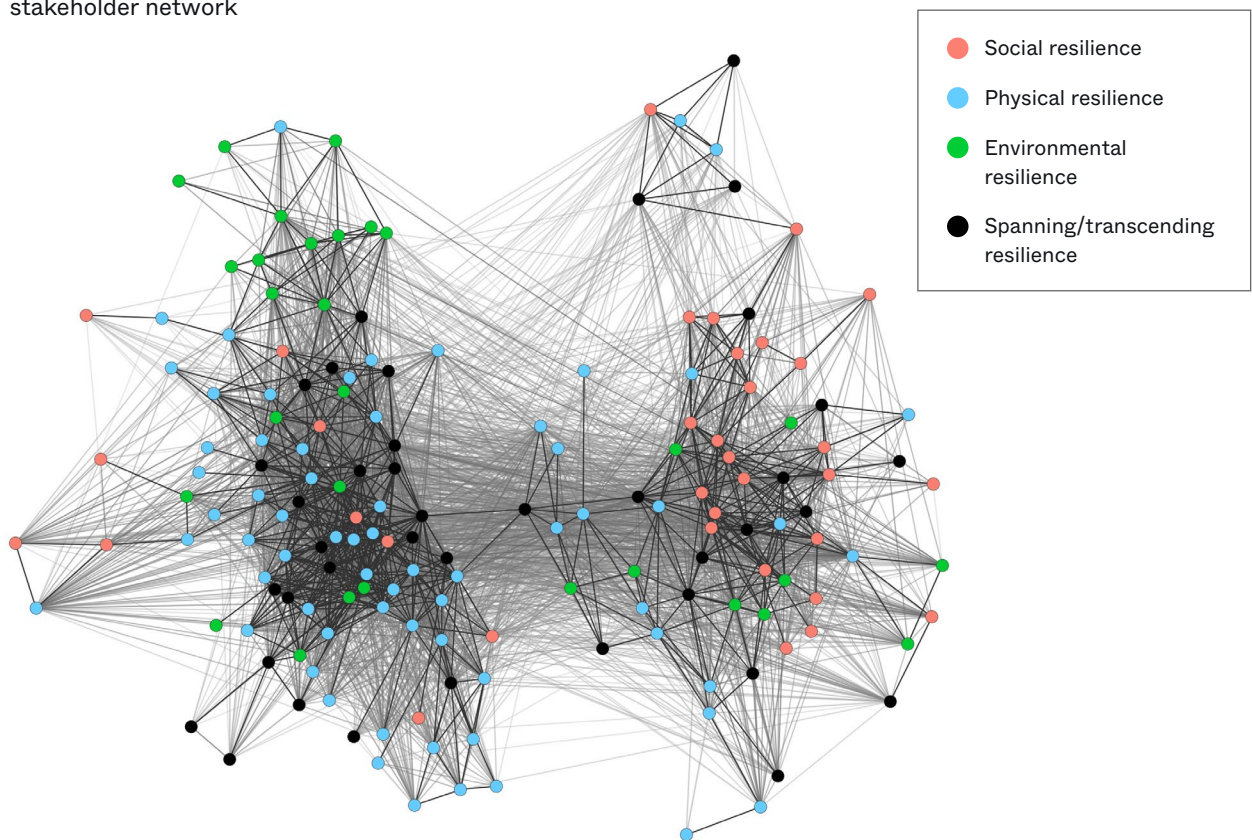


Figure 4. Resilience work types in the Metro Boston climate adaptation stakeholder network

Storyline #3: The Power of Connectors

The divide between the institutional and grassroots side of the stakeholder network brings attention to the bridging stakeholders in the middle. While many stakeholders work across the two sides, some individuals play roles as connectors. Three of the stakeholders who connect the two sides (see close-up in Figure 5), do work that spans or transcends resilience types. Two of them are public sector employees, and one works for a foundation. Several other bridgers work on physical resilience, evenly divided between public and private sector employees. The identities of these individuals are not as important as the nature of and approach to the work that they do, which puts them in a position to pass opportunities and resources along, including information and funding. This is one way that power shows up in the stakeholder network. Why connectors appear where they are in the network could be a result of many factors beyond specific actions they have taken. One important factor is the type of formal role or position they have within their employing organizations.

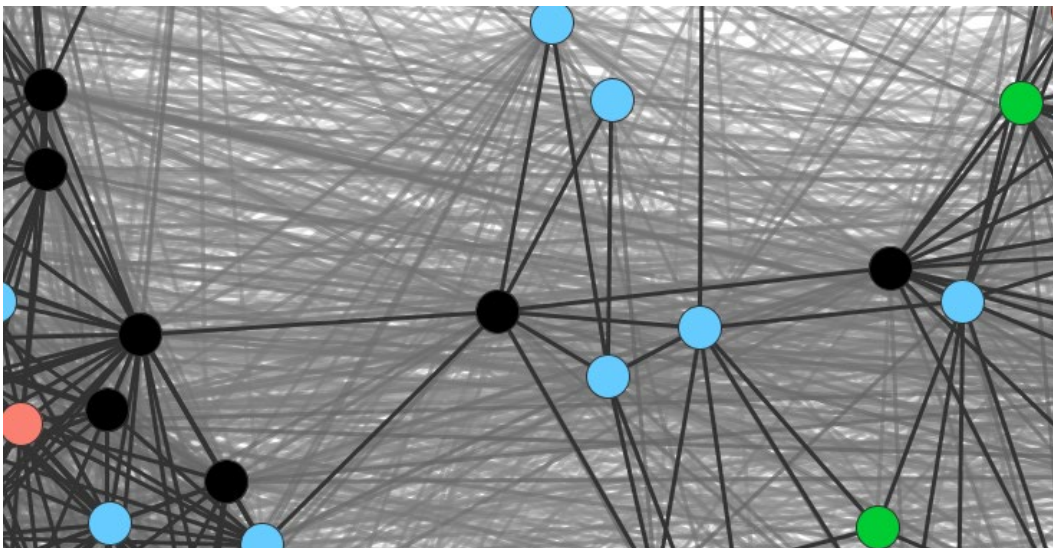


Figure 5. Close up of the middle of the stakeholder network, colored by resilience type

There are different forms of power, including financial, political, and expertise power. In the context of the stakeholder network, we are talking about relational power — the potential to influence and facilitate action by virtue of the quantity and strength of the connections one has. One type of relational power is brokering or bridging in nature.

Individuals who bridge between disparate groups within a network hold this type of power. They can be effective in both circulating or thwarting the spread of resources between the more disconnected parts of the network. Then there are those whose relational power comes from knowing a lot of people in the network. This is represented in Figure 6, where the size of nodes corresponds with the number of connections. Larger nodes are highly connected individuals within the network. Smaller nodes are less connected. To be clear, people with few connections within this specific network may have many connections to people outside of the climate adaptation field. Twelve stakeholders had significantly more connections in the network (60 or more connections). Of these 12, seven did work that spanned or transcended resilience types, while another four stakeholders worked primarily in the social resilience, non-profit space. Not surprisingly, resilience-spanning roles and work types tend to put stakeholders in bridging/connecting positions (or vice versa). Identifying best practices and project types that foster the ability for individuals and groups to work across climate adaptation niches is a potentially fruitful avenue for future Metro Boston climate adaptation network interventions.

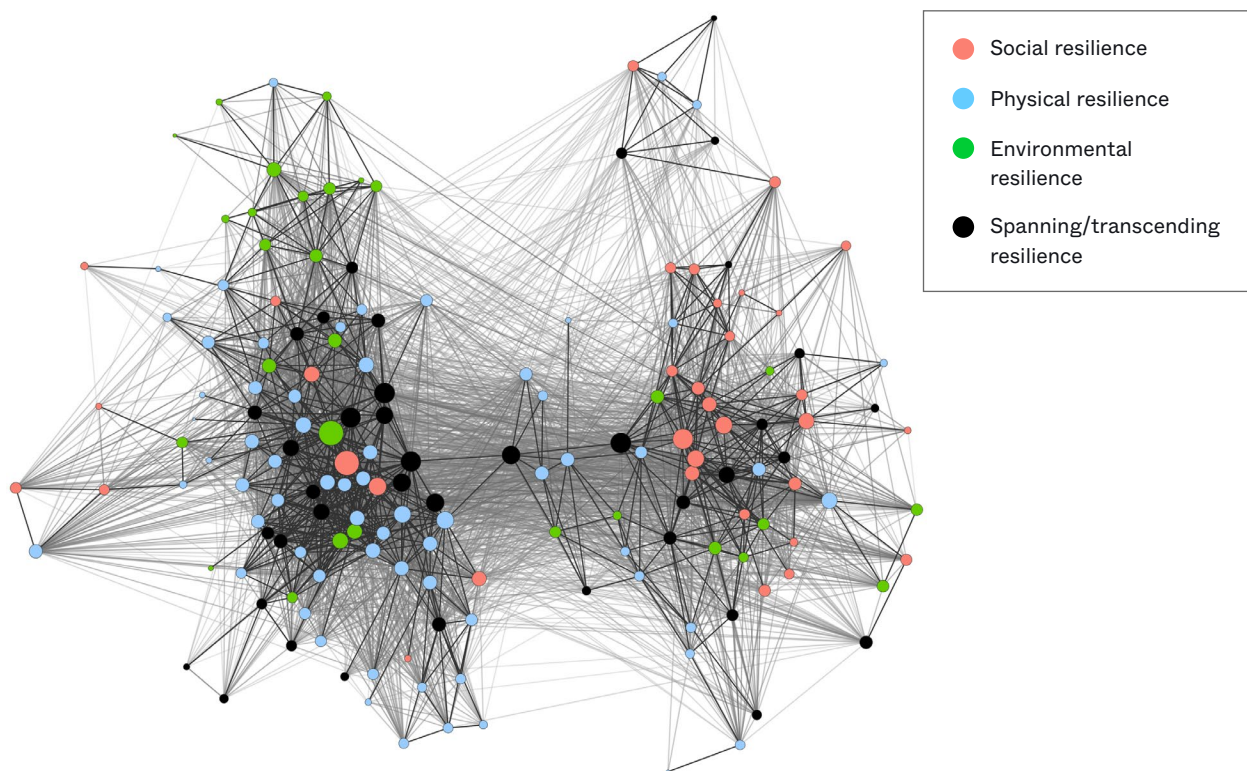


Figure 6. Resilience work types in the Metro Boston climate adaptation field, with nodes sized by number of connections

Summary

The stakeholder network explored here was a snapshot in time that highlighted a set of actors. It is important to note that it has likely shifted in different ways — with new and dropped connections, and new individuals entering the field while others leave it. While the maps themselves are static representations of collaborative relationships in the Metro Boston climate adaptation field, the reality is much more dynamic and, therefore, ripe with opportunity for transformation.

The Metro Boston region features meaningful levels of collaboration among stakeholders who are from different backgrounds and are affiliated with various public and private institutions. But the fact remains that there are many missing connections and missed opportunities for collaboration. In regards to this, there are a few key questions for stakeholders in the Metro Boston climate adaptation field to consider:

1) Who is missing from this network?; 2) What level of connection is desirable?; and 3) What structures, policies, and practices can help to fill the gaps?

The most notable collaboration gap is between the institutional and grassroots groups. More work is needed to better align and integrate climate adaptation efforts focused on physical resilience, driven primarily by private and public sector groups, with social resilience efforts driven by non-profit, grassroots organizations. The larger, more densely connected cluster — an institutional one that is predominantly white, and composed of a mix of engineering and planning firms, government groups, and universities — seems to advance a resilience agenda through public-private partnerships that apply new ideas from research

to develop innovative physical infrastructures. Within the institutional portion of the network, a smaller cluster of stakeholders advances a similar agenda differing in its emphasis on constructing ecological infrastructures or protecting natural sites.

This institutional part of the network appears to have fewer connections with the group composed mostly of community organizations, with a higher representation of stakeholders of color, advancing a resilience agenda based on collaborations spanning education, community development, community organizing, and social programs. Individuals taking part in these various forms of collaboration appear diverse in terms of know-how and professional experiences. However, with 25% non-white representation — primarily working on social resilience efforts — there is still a significant improvement margin to increase diversity in the Metro Boston climate adaptation field. Another way in which the field could be diversified is by creating opportunities for more people to develop as connectors, thereby distributing relational power among a greater number and diversity of people.

This research has provided a snapshot in time of the Greater Boston climate adaptation and resilience field. By exploring the implications of these collaborative connections, stakeholders can examine relative gaps and opportunities for true climate resilience in our region.

Appendix 1

Research Process

An initial list of 280 climate adaptation stakeholders was built through a multi-phase process. First, we held a meeting with a small group of SSL community partners. These partners were asked to freely list individuals actively involved in climate justice/climate equity in the Greater Boston area. We collected more than 200 names that we then narrowed based on the location where stakeholders did their work. Only stakeholders working within a 5-mile radius of Downtown Boston (Figure A1) were included in the stakeholder list, with the assumption that physical proximity (e.g., ease of travel to meetings, shared interests tied to local projects) is an important factor in structuring collaborations. The narrower list was then shared with other key stakeholders via email, yielding additional names for a core list of 188 stakeholders. We then shared this list of 188 names with a broader set of stakeholders, representing diverse sectors of the climate adaptation field in Metro Boston. As the list grew, we continued to filter the list based on the following criteria.

Network Boundaries

- Climate adaptation/climate resilience
- Climate equity/environmental justice

Roles

- Broadly defined: people who are actively involved in climate adaptation work in the Metro Boston area. Active involvement may entail decision-making, planning & design, policymaking, agenda-setting, advising, resource allocation, communication, activism, research, and/or project implementation.

Excluded

- Research assistants
- Temporary or ancillary project staff

- Elected officials unless nominated by a stakeholder
- People in symbolic/ceremonial roles within boards of organizations (e.g. CEO's, donors)

The various exclusion criteria we applied were important for focusing the scope of our work. In addition, extending the stakeholder inclusion criteria would have resulted in a list too onerous in length for survey respondents to review and respond to.

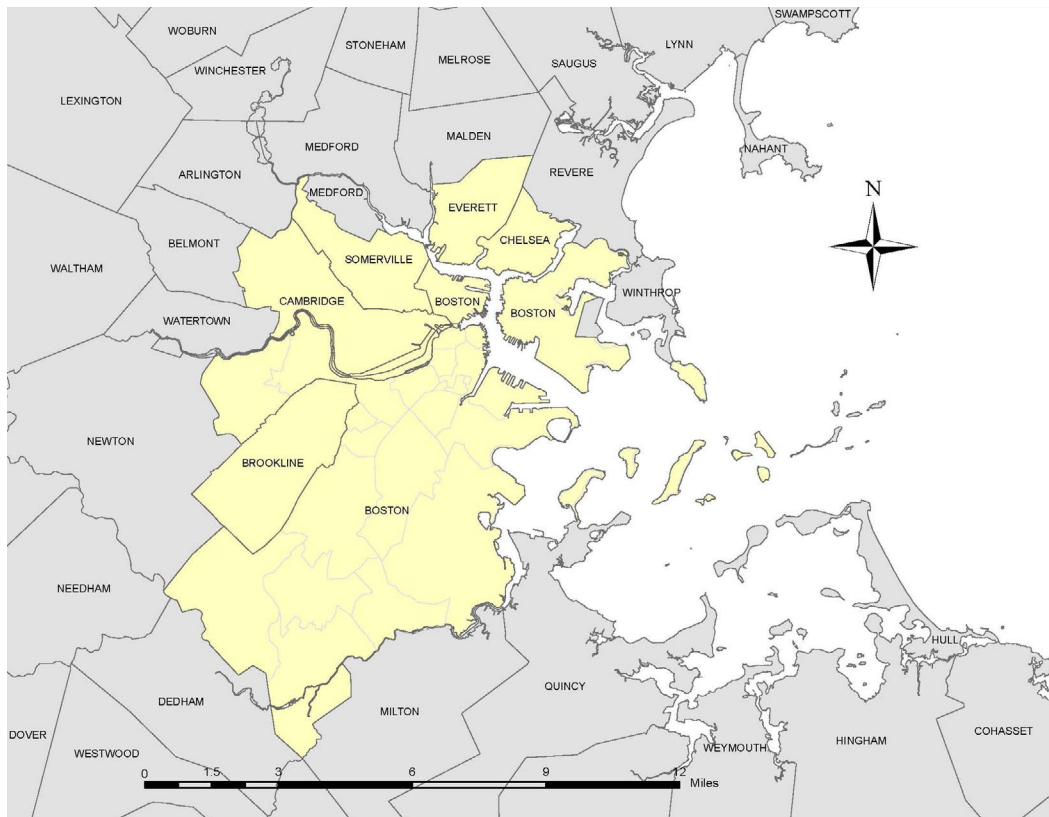


Figure A1. Municipalities included in the 5-mile radius of Downtown Boston

Eventually, the stakeholder list grew to 280 names. Using Qualtrics, we launched the online survey with a roster of 280 stakeholders in mid-September of 2020. Invitations to complete SSL's stakeholder mapping survey were sent out to all 280 actors on the stakeholder list. Respondents had the option to nominate additional stakeholders not included in the list of 280. This resulted in 21 additional names that we added to the stakeholder list. In early November, when the first round of the stakeholder survey closed, 175 stakeholders responded to our survey. However, due to missing data and errors from 28 respondents, the first-round stakeholder network dataset included the responses of 147 stakeholders.

In February of 2021, we presented preliminary results on this network of 147 stakeholders to a group of SSL partners. The main goal of this presentation was to get a “gut check” on whether the stakeholder maps reflected common understandings about the climate adaptation field in Metro Boston and to elicit reactions and reflections. On the basis of this, we decided to open the stakeholder mapping survey again in order to increase the number of stakeholder mapping respondents from our base of 147. In the first dataset of 147 respondents, we found that there was a group of stakeholders who were connected to many of those who had responded, but who themselves had not responded to our original survey. Therefore, in March of 2021, we reached out to those highly connected, non-responding stakeholders. This outreach yielded responses from an additional 22 stakeholders, for a final map of 169 stakeholders. The stakeholder networks discussed in this report are composed of the connections among these 169 stakeholders only. This represents a response rate of 60% — meaning that, of the 280 stakeholders who we originally reached out to, 60% completed the stakeholder mapping survey.

The stakeholder mapping survey asked respondents to indicate if they had a relationship with any of the stakeholders on the roster. The survey asked about two types of relationships: 1) collaboration on climate or environmentally related work, and; 2) collaboration in response to the COVID-19 crises. Respondents were also asked to rate the strength of their collaborative relationships using a scale of 1-5, with 1 being “weak relationship/seldom collaborate” and 5 being “strong relationship/frequently collaborate”. Collaboration was defined as working together to achieve a shared purpose or outcome, including sharing information, knowledge, resources, and/or effort. In the results discussed below, the networks are based on collaborative ties rated at a strength of 3 or above. Some respondents shared with us that they were connected to people in other informal ways, even if they did not collaborate on climate or environmentally-related work. For the sake of clarity and consistency, we asked respondents to not mark informal ties (e.g., occasional friendly going out for coffee) as collaborations. Survey responses were cleaned and imported into Visone, a program developed by Ulrik Brandes and Dorothea Wagner to generate network visualizations for analysis and interpretation.



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