Community Engagement Lab: Crown Heights, Brooklyn

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CEL 1: A SES Profile of Crown Heights, Brooklyn

The intersection of social and environmental issues has never been more evident. Ever-growing social and economic inequality and environmental degradation and inaction have made underserved populations more vulnerable than ever. A social-ecological systems (SES) approach to environmental management holistically tackles environmental issues and accounts for the human dimension. SES calls for increased interdisciplinary integration of the natural and social sciences in urgent environmental management projects (Virapongse et al., 2016). The SES approach challenges conservationists to work directly with and develop a comprehensive understanding of affected communities. I will now take the first step in the SES approach by profiling the community I hope to engage: Crown Heights, Brooklyn.

Crown Heights, Brooklyn is located in Central Brooklyn in the Long Island Sound Coastal Lowland ecoregion (59g) within the Atlantic Coastal Pine Barrens (8.5.4) ecoregion (Environmental Protection Agency, 2016). An ecoregion is an area where the ecosystems are all relatively similar, sharing like ecosystem components (both biotic and abiotic). Ecoregions are particularly useful in community centric conservation as the framework considers humans part of the ecosystem. Historically, the Long Island Sound Coastal Lowland ecoregion was characterized by a temperate and humid climate and common northeastern hardwood trees (oak, maple, beech, birch, etc.) (Forgione, Pregitzer, Charlop-Powers, & Gunther, 2016). However, this has not described Brooklyn in hundreds of years. Intense urbanization, industrial development, and gentrification have transformed the landscape. There is almost no forest cover left in New York's most populous borough. All that remains are sparse parks and preserves, isolated by congested roadways and dense urban development. That being said, Brooklyn still supports a thriving urban ecosystem.

While ecosystem services may seem incongruous with an urban environment, even highly developed areas have ecological value. Parks, coastline, and even vacant

lots provide myriad services including carbon sequestration, stormwater retention and filtration, air filtration, local climate regulation, and recreation (Kremer, Hamstead, & McPhearson, 2016). These urban ecosystem services are partially responsible for determining the environmental quality of a neighborhood, and by the same token, quality of life. The issue, however, is that these ecosystem services are not equitably distributed (Langemeyer & Connolly, 2020).

Urban planning in New York City, as with many major metropolitan areas, has historically isolated underserved and disadvantaged minority populations and blocked their access to vital ecosystem services. More affluent, often white, communities are afforded access to greenspace and are the target of urban greening initiatives while minority communities see substantially less funding and attention (Langemeyer & Connolly, 2020). This is evident in the communities surrounding Prospect Park in Brooklyn.

Crown Heights and Park Slope both share a border with Prospect Park, a sprawling urban oasis of manicured fields and dense hardwood forest. Despite access to the popular greenspace, the neighborhoods look very different. The population of Crown Heights is 57% Black (United States Census Bureau, 2018). The streets are lined with largely impermeable concrete and asphalt. A few small parks serve this densely populated Brooklyn neighborhood. Vacant lots abound. The population of Park Slope is 76% white (United States Census Bureau, 2018). Planters and street trees line the avenues. There are a number of community gardens, green roofs, and even an urban farm. The two neighborhoods look vastly different, despite sharing a border with Prospect Park, due in large part to an inequitable and unjust distribution of resources.

The unequal distribution of resources and access to ecosystem services in neighborhoods like Crown Heights disproportionately affects vulnerable populations (Wolch, Byrne, & Newell, 2014). According to the Centers for Disease Control and Prevention (2020), Crown Heights has a moderate to high level of vulnerability (6.9

SVI). There are myriad environmental issues facing the New York metropolitan area and communities, like those in Crown Heights, are most at risk.

One major issue facing the Crown Heights community is combined sewage overflow (CSO). Antiquated combined sewer systems (like the one in New York City) collect runoff, industrial wastewater, and raw sewage into a single pipe and transport the collected material to a treatment plant. Heavy precipitation events and increased water usage can overload this system causing CSO where untreated water discharges directly into nearby waterways (Newtown Creek Alliance, 2020). The discharge contains human waste and industrial toxins that pollute and contaminate important watersheds. CSO is of particular concern in areas with a high proportion of impermeable surfaces, like Crown Heights, where the precipitation cannot be absorbed (Newtown Creek Alliance, 2020). CSO can cause dramatic declines in water quality and create health hazards for humans and animals living near contaminated water bodies. The nearest CSO outfall is at Newton Creek, just over two miles north of the Crown Heights border. The New York Department of Environmental Protection and the Newtown Creek Alliance (NCA), a Central Brooklyn community-based organization, are responsible for water quality monitoring and found Newtown Creek to be in violation of the Clean Water Act (Newtown Creek Alliance, 2020). The New York Department of Environmental Protection and local stakeholders are working to build infrastructure to combat CSO. NCA is working with volunteer community members to build bioswales, or rain gardens, to draw precipitation into groundwater stores rather than an overtaxed sewer system. They are also working on an urban greening initiative to plant trees in the watershed, absorb rainwater, and sequester carbon (Newtown Creek Alliance, 2020).

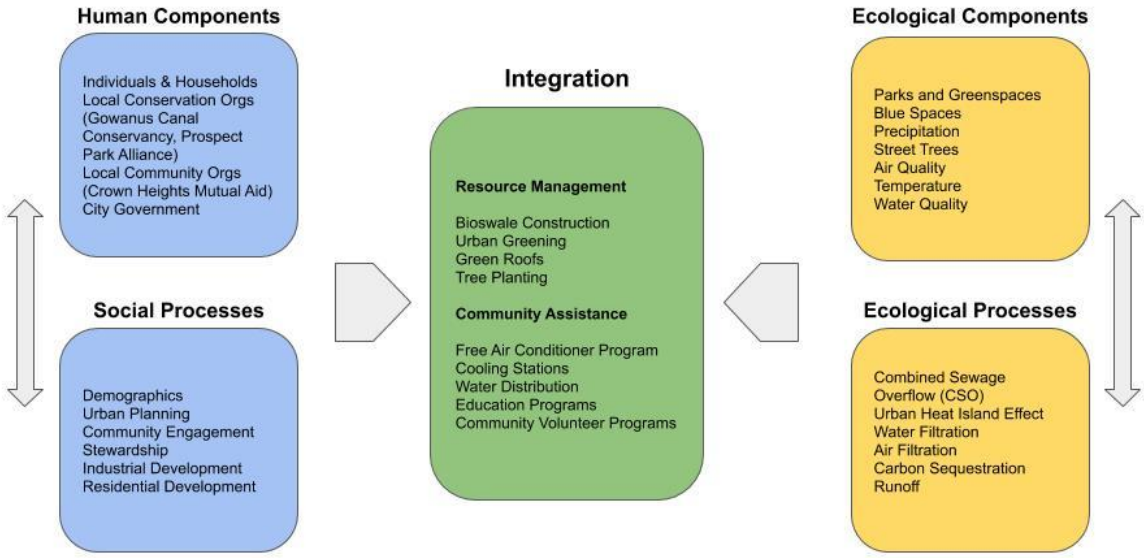
Crown Heights also faces particularly high heat vulnerability. Crown Heights scored a 4 on the Heat Vulnerability Index (HVI), a scale from 1 (being the lowest risk) to 5 (being the highest risk) (NYC Department of Health, 2020). For comparison, Park Slope scored a 2. Scores are calculated using a statistical model that accounts for both social and environmental factors. One important social factor measured by the HVI is

income, which may determine one's access to air conditioning. HVI also accounts for age and chronic health conditions (often respiratory), which are more common in disadvantaged and minority populations (NYC Department of Health, 2020). HVI considers environmental factors including the ratio of green space to grey space. Industrial building materials like concrete and asphalt are insulating and retain heat much more than green space, this is called the Urban Heat Island effect (NYC Department of Health, 2020). This issue compounds in areas like Crown Heights where the green space is limited and risk factors are often rooted in racist urban planning policy (NYC Department of Health, 2020). To combat heat vulnerability, the city has initiated a number of programs in Crown Heights and other similarly affected neighborhoods including: providing free air conditioners to low income individuals, building cooling stations with misters around the city, and installing spray caps on fire hydrants in particularly vulnerable areas (NYC Department of Health, 2020). Other groups, like Crown Heights Mutual Aid, are providing water and wellness support programs (Crown Heights Mutual Aid, 2019). Additionally, the same greening initiatives that may help stymie CSO, could reduce heat vulnerability by providing less insulating ground cover.

The Crown Heights community is particularly vulnerable to socio-ecological issues due to the demographics of the community, inequitable urban planning, and (specifically) a lack of green space. CSO and heat vulnerability are the two most urgent socio-ecological issues facing the community. There are efforts in place to help mitigate CSO and heat vulnerability but further efforts to engage the community through an SES framework (Figure 1.) would contribute to more effective programing and increased social equity.

Figure 1

SES Framework for Crown Heights, Brooklyn



Note. A socio-ecological framework (SES) that explores how an interdisciplinary approach could be applied to social and ecological issues in Crown Heights, Brooklyn.

CEL 2: Building Social Capital in Crown Heights, Brooklyn

A SES approach to conservation is inherently community based (Virapongse et al., 2016). Incorporating social science into the environmental equation encourages working with community members to ensure that their vision for their own future is at the forefront of policy and action. Community-based conservation requires an understanding of and ability to leverage social capital. Social capital is the currency in which communities trade. It refers to the relationships and networks that bond communities together, social norms, trust in each other and in institutions, and mutual aid (Pretty, 2003; Putnam, 1995). This applies directly to action-oriented conservation work as those in communities with high social capital are more likely to engage in collective action because they trust that others will do so as well (Pretty, 2003).

Social capital can apply to relationships within communities (bonding), between communities (bridging), and with outside interests (linking) (Pretty, 2003). Bonding social capital is high in Crown Heights with numerous mutual aid groups leading the charge and rallying other community organizations to tackle some of the most pressing needs in the neighborhood (food insecurity, heat-vulnerability, and COVID-19 relief to name a few). Crown Heights also has high bridging social capital with organizations working across interests to improve the neighborhood. However, the linking capital in Crown Heights is low, especially when it comes to conservation.

Social justice and arts-oriented non-profits take the spotlight in Crown Heights while environmental groups wait in the wings. Other similar neighborhoods have organized around hyper local environmental conservation. The most visible conservation organization in Crown Heights is Prospect Park Alliance (PPA). PPA is responsible for the stewardship and advancement of Prospect Park for the benefit of *all* the communities it serves (Prospect Park Alliance, 2020). While this does include Crown Heights, PPA doesn't often branch out into the surrounding neighborhoods and focuses on the insular park community. As such, there is very little linking social capital between PPA and the Crown Heights community. That being said, the park does serve Crown Heights and provides an essential oasis of green space.

Outside PPA, the conservation organizations with a presence in Crown Heights are city-wide and inter-borough. GROWNYC and Green City Force are two such organizations with a particularly strong presence in the neighborhood. GROWNYC runs the popular greenmarket at Grand Army Plaza which provides more equitable access to fresh, local produce and promotes social capital growth through education and volunteer programs (GROWNYC, 2020). Green City Force's AmeriCorps program provides work opportunities in environmental stewardship, building green infrastructure, and urban farming for youth living in the New York City Housing Authority (NYCHA) (Green City Force, 2020).

New York City Environmental Justice Alliance (NYC-EJA) is attempting to build social capital citywide at the intersection of social justice and environmentalism. NYC-EJA is an inter-borough network of environmental justice organizations in underserved communities and communities of color (NYC-EJA). NYC-EJA leverages its network to mobilize support for environmental justice issues, affect local and state policy, and foster social cohesion. The network member in Crown Heights is the Brooklyn Movement Center, a strong voice in the Crown Heights community. Brooklyn Movement Center is at the forefront of social justice action in Central Brooklyn and would be an ideal partner for environmental justice work.

I believe Crown Heights to be socially resilient as evidenced by the mutual aid response to COVID-19 and its history of organizing around communities of color and issues of social justice. There are many public service groups working throughout the neighborhood that help solidify social cohesion and build social capital. However, none of these groups *focus* on the environment. Crown Heights lacks the greenspace of its more well served neighbors and suffers from heat vulnerability and pollution. The neighborhood is not environmentally resilient and issues of environmental justice abound.

I could contribute to building social capital by working within the existing network of community service organizations and applying a community based social marketing (CBSM) approach to local environmental causes (McKenzie-Mohr, 2011). CBSM calls for five steps: selecting a behavior, identifying barriers and benefits, developing strategies, conducting a pilot, and wide-scale implementation (McKenzie-Mohr, 2011). I intend to select a behavior by listening to what issues the Crown Heights community identifies as important and, in turn, empowering them to affect change in their own neighborhood.

CEL 3: Formulating Community Questions

The SES and CBSM approach to community organizing and action centers on the voice of the community. Organizers ensure that the members of the community are at the forefront by first collecting information on which issues affect the community and warrant targeting. I began this process by exploring the work of community organizations and comparing their projects with SVI scores and data on a number of local environmental issues. I narrowed down these issues to CSO and heat vulnerability. Of the two, I believe heat vulnerability demands the more immediate attention.

Extreme heat is a public health crisis. Extreme heat events are now the deadliest weather event in the United States and cause more deaths than hurricanes, floods, or tornadoes (Lim & Skidmore, 2020). There are a number of heat-health associations that contribute to the deadly nature of these events (Wilhelmi & Hayden, 2010). Heat related illness occurs when a person's body temperature rises faster than the body can cool itself resulting in organ and tissue damage (CDC Extreme Heat, 2017). Extreme heat exposure also exacerbates a myriad of comorbidities including: lung disease, heart disease, obesity, mental illness, and dehydration.

A number of natural and social stressors amplify extreme heat events and a population's vulnerability to them. As climate change continues its inexorable march, the intensity and negative impacts of extreme heat events increase. The five hottest years in US history have occurred since 2006 and that trend is expected to continue (Wilhelmi & Hayden, 2010). Additionally, the Urban Heat Island Effect (UHI) exacerbates extreme heat in densely populated urban areas where impermeable substrates raise the surface temperature *(Filho et al., 2018)*. While these environmental factors increase the intensity of extreme heat, a number of social factors determine a community's vulnerability. Socio-economic inequality, poverty, housing density, and access to

resources can all determine a community's vulnerability to extreme heat events (Lim & Skidmore, 2020).

Community based strategies to reduce heat intensity and adaptability have been proven to reduce heat-related mortality. Lim and Skidmore (2020) found that locally implemented measures (tree planting, roof painting, air conditioner distribution, awareness campaigns, etc.) reduce the annual death rate from extreme heat by 15%. The researchers conducted a falsification test that validated the life-saving role of community-based heat mitigation measures (Lim & Skidmore, 2020). Writ large, a better understanding of extreme heat phenomena and community context is vital to making vulnerable communities more resilient to UHI and extreme heat events (Filho et al., 2018).

In order to formulate a better understanding of Crown Heights relationship with heat vulnerability and develop a CBSM plan, the next step will be to listen to the Crown Heights community through semi-structured interviews and a focus group. A semi-structured interview allows me to bring a set of targeted, thematic questions to the table and still leave the conversation open to whichever direction the community member(s) takes it, resulting in a more authentic representation of the community's position and needs (Longhurst, 2010). I plan to focus on the following questions:

- How would you describe Crown Heights' community interest in environmental and environmental justice issues?
- What environmental and environmental justice issues are most relevant to the Crown Heights community?
- In what ways is Crown Heights socially and environmentally resilient?
- What is your understanding of heat vulnerability as a phenomenon?
- In what ways do you believe Crown Heights is vulnerable to extreme heat events?

- What heat vulnerability resources are you aware of, if any? If none, why do you believe that is?

I plan to reach out to two specific community members and conduct a focus group with a local community organization. I hope to speak with a member of both the Brooklyn Movement Center and Crown Heights Mutual Aid. I also plan on conducting a focus group with Public Assistants, a Crown Heights arts and justice organization. I have the contact information for these three organizations and will reach out in the coming weeks. If I do not receive a response, I have a number of connections to these groups that may be able to put me in touch. Finally, I could try an in person request as all three organizations have headquarters within walking distance.

I will include the following basic explanatory and consent statement in my initial ask:

I am conducting some initial information gathering on environmental justice, heat vulnerability, and water quality in Crown Heights and Central Brooklyn as a part of my graduate coursework in a Master's program at Miami University. I want to keep the Crown Heights community at the center of this work and would love to hear from you! I have several interview questions and the virtual conversation should take about 30 minutes in total. Feel free to let me know if you want to quit at any time. Your responses will be presented anonymously, and the report I produce will not be published or disseminated outside of my graduate studies. Participating in this interview is considered consent. If you have any questions you can ask now or contact me at patter40@miami.edu.

CEL 4: Listening to Your Community

Crown Heights is a vibrant neighborhood with a strong social resilience built on a framework of community organizing and mutual aid. However, Crown Heights suffers from low environmental resiliency due to decades of City Hall divestment and neglectful

urban planning. Of particular concern to Crown Heights is heat vulnerability. Crown Heights scored a staggering 4 out of 5 on the city's heat vulnerability index (HVI). This high HVI score is due to a lack of open, green space, a high ratio of impermeable surfaces, non-weatherized, energy intensive housing, and poor community outreach.

To better understand the community perspective on heat vulnerability and environmental issues by and large, I conducted a series of semi-structured interviews. I interviewed three Central Brooklynites with various degrees of community involvement and awareness: a local community organizer, a journalist with a major news outlet, and a building superintendent. All three interviewees agreed that environmental and environmental justice issues are not a priority in Crown Heights. The organizer said that issues of food scarcity and racial justice, though interconnected, were more important than the environment to this community. The journalist and superintendent recalled specific environmental engagement they had seen or participated in the neighborhood but noted a lack of organized effort. The three interviewees thought access to resources and a lack of outreach and organizing were the most relevant issues to the community.

The three interviewees had varied responses to the topic of heat vulnerability. The organizer identified it as a crucial issue for Central Brooklyn (including Crown Heights). The journalist was familiar with the concept but didn't know whether Crown Heights would be particularly vulnerable. The superintendent had never considered the formal concept of heat vulnerability but repeated a number of symptoms and underlying causes in his community all the same.

The interviewees had vastly differing views on what makes Crown Heights particularly vulnerable to extreme heat events. The journalist focused on lack of green space, suboptimal use of existing green space, and inadequate infrastructure and housing. The superintendent cited rising energy costs, poor weatherization and insulation, and lack of access to air conditioning as the communities main cause for

concern. Neither the journalist nor the superintendent could identify any heat vulnerability resources.

When asked about the ways in which Crown Heights was vulnerable to heat events, the organizer shared the concerns of the other interviewees but focused largely on the lackluster efforts of City Hall and lack of community outreach around the issue. She went on to say that the city's Cool Neighborhoods strategy was merely a band-aid or an analgesic, addressing the symptoms of heat vulnerability, not the cause. Cool Neighborhoods NYC is the operation responsible for raising awareness of heat vulnerability, monitoring and analyzing heat vulnerability data, and mitigation efforts (roof painting, tree planting, air conditioner distribution, etc.) (NYC Department of Health, 2020). The organizer believes that while these mitigation and outreach strategies are important, they do not sufficiently address the environmental injustices that are ingrained in the city's history of redlining. The organizer instead directed me toward the New York City Climate Justice Agenda developed by New York City Environmental Justice Alliance (NYCEJA) (NYCEJA, 2020). NYCEJA's robust plan looks at the issue of climate justice in New York holistically. It calls for immediate action to mitigate the effects of environmental injustice and policy change that addresses the systemic causes. Included in the agenda are preparedness guidelines for heat vulnerable neighborhoods that reflect some of Cool Neighborhoods' approaches but call for greater communication and coordination with community leaders by the city. NYCEJA's agenda addresses the systemic roots of heat vulnerability with calls for: community-controlled renewable energy cooperatives and supplemental renewable power plants to account for the summertime surge in energy demand; generating green jobs to reduce the added risks to low income communities; and investing in a development fund to support weatherization, insulation, and other climate retrofitting in affordable and public housing. The organizer suggested that NYCEJA's holistic framework would better serve the Crown Heights community in both the short and long terms.

The interviews confirmed my initial belief that despite being particularly vulnerable, the Crown Heights community did not prioritize environmental issues as there were seemingly more urgent issues to address. The interviewees ran the gamut when it came to awareness of and interest in environmental and environmental justice issues. Despite a formal understanding of the issue, the superintendent showed an intimate understanding of the risks and causes of heat vulnerability. This may reflect a community wide trend and warrant further research. NYCEJA's Climate Justice Agenda, shared by the organizer, underscored the need for a holistic approach to issues of environmental justice in vulnerable and underserved communities. Outreach and education from City Hall has been largely ineffective in Crown Heights because the Cool Neighborhoods plan doesn't utilize the right messengers or address the systemic issues at play. This suggests that working within NYCEJA's Climate Agenda framework and activating the grassroots social marketing potential of the community may be the best way to address heat vulnerability in Crown Heights. As such, I plan to work in tandem with NYCEJA and their community-level partners to implement a concurrent CBSM plan to address heat vulnerability in Crown Heights.

I initially sent interview requests to Brooklyn Movement Center, Crown Heights Mutual Aid, and Public Assistants. However, due to increased pressure from COVID-19 and the build up to the general election, these organizations did not have time to respond to my requests. I plan to continue to work towards building a relationship with these organizations (and NYCEJA) to develop a CBSM plan to address heat vulnerability in Crown Heights. The interview questions I wrote generated thoughtful and informative conversation. I hope to expand on these and introduce focus groups as I move forward with this project.

CEL 5: Participatory Mapping

Community-based research is based on an open dialogue between researcher and community and is intended to help community members to recognize their own needs, identify barriers, and empower them to take action (Heffner, Zandee, & Schwander, 2011). Participatory mapping is a form of community-based research that utilizes the individual mental maps of community members as drawn along socio-cultural rather than traditional Cartesian lines (Rocheleau, 2005). The end result is a participatory or community map that can be a powerful tool in highlighting uneven power dynamics (Rocheleau, 2005). In this way, participatory maps serve an important role in understanding community interpretations of their urban ecosystem.

Heat vulnerability is an immediate environmental threat to the communities of Central Brooklyn. Central Brooklyn and Crown Heights face particularly high heat vulnerability due to historic redlining, a lack of open, green space, a high ratio of impermeable surfaces, non-weatherized, energy intensive housing, and poor community outreach. Following a series of semi-structured interviews, I conducted a participatory mapping project with members of the Crown Heights and Central Brooklyn communities in order to interpret community understanding of heat vulnerability and the relevant contributing factors. For the community mapping portion of this project, I expanded the geographic location from Crown Heights to include the surrounding neighborhoods of Central Brooklyn in order to provide a more complete picture of the issue at hand. I selected three community members from different parts of Central Brooklyn: a teacher, parks department employee, and a barista. I selected these three participants based on their connection to local families, local green spaces, and local businesses respectively. When initially approached, I provided the participants with the following consent statement:

I am conducting a community mapping exercise on the topics of environmental justice and heat vulnerability in Crown Heights and Central

Brooklyn as a part of my graduate coursework in a Master's program at Miami University. I want to keep the Crown Heights community at the center of this work and would love to hear from you! This mapping exercise should take about 30 minutes in total. Feel free to let me know if you want to quit at any time. Your responses will be presented anonymously, and the map I produce will not be published or disseminated outside of my graduate studies. Participating in this exercise is considered consent. If you have any questions you can ask now or contact me at patter40@miami.edu.

I provided each participant with a printed map of Brooklyn (Figure 2) and a marker. I then prompted them to identify a number of factors contributing to heat vulnerability in their community based on city and state HVI reports: commercial areas accepting Electronic Benefit Transfer (EBT) or food stamps, subsidised housing, unhoused shelters, adult care centers, senior or assisted living residences, public air conditioned spaces, and public green spaces (NYC Department of Health, 2020). I then combined the three hand-drawn maps into a digital GIS map using Google My Maps (Figure 3). I categorized the above factors into socioeconomic factors and environmental/urban factors based on the New York State HVI (NYC Department of Health, 2020).

Figure 2

Map of Central Brooklyn provided to participatory mapping particpants.

Figure 3

A participatory map of Central Brooklyn

Note: This participatory map represents the Central Brooklyn community's interpretation of the factors contributing to heat vulnerability.

I gained many insights into heat vulnerability in Central Brooklyn by analyzing the community interpretation of the issue through the participatory map. There is a stark line of demarcation between Central Brooklyn neighborhoods that appears to be drawn along access to public green space, a key factor affecting heat vulnerability. The further east one travels from Prospect and Fort Greene parks, the number of socioeconomic factors contributing to heat vulnerability grows. This aligns with the city's history of redlining and racist urban planning addressed by the organizer in our interview. The confluence of environmental factors (lack of green space) and socioeconomic factors underscore the Central Brooklyn community's dangerously high HVI score. Additionally, none of the participants could identify air conditioned public spaces. This is particularly concerning in conjunction with the lack of public green spaces.

It is evident that the community members have a good sense of the factors contributing to heat vulnerability. Through this participatory mapping exercise, they underscored the distinction between the Central Brooklyn community writ large and the confined area adjacent to public green space. When reflecting on her map, the teacher noted that she may have instinctively understood but never visualized the relationship

between green spaces, social justice, and environmental vulnerability. All three participants agreed that the mapping exercise helped make the environmental and social threats to their community concrete.

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