Chapter 6
Learning to Lead with Equity: Advancing Climate Resilience Planning to Address Urban Flooding Across Multiple Sectors and Scales

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Introduction

The ways in which communities try to achieve equitable climate planning in the water sector generally have not been well documented or fully conceptualized. The complex intersection of water, climate resilience, and equity issues are generally not well understood, but awareness of and attention to the myriad challenges at this intersection are increasing due to extreme rainfall events that have exposed economic and racial disparities associated with the impacts of urban flooding across the United States (The Meridian Institute, 2019). A review of the community flood risk management literature in the United States underscored that socially vulnerable populations—typically characterized as having a combination of higher poverty rates, lower median household incomes, and higher percentages of non-Hispanic white residents, among other factors—face unique challenges when it comes to flood risk management. They are less prepared for flood disasters, face higher risks, are significantly overrepresented in inland flood zones, suffer disproportionately in terms of flood injuries and deaths, lack the financial capacity to prepare and respond to disasters, have limited access to social and political resources, and are less likely to receive disaster information and obey evacuation warnings (Tyler et al., 2019). The study notes that one of the best practices—in addition to increasing nature-based solutions to mitigation flooding, robust flood modeling practices and ensuring mitigation plans are implemented—includes engaging community members in flood planning and investing in flood management activities specifically for socially

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vulnerable populations before, during, and after flood events (Tyler et al., 2019). A community-driven and equitable climate resilience planning process allows the residents of vulnerable and impacted communities to define for themselves the complex climate challenges they face and the climate solutions most relevant to their unique assets and threats. When climate resilience plans are developed without community capacity to drive the vision forward and to build power, they can become empty investments (National Association of Climate Resilience Planners, 2017).

The Kresge Foundation, a private, national foundation that works to expand opportunities in America's cities low-income people, works to change that dynamic. Through grantmaking and social investments, Kresge's Environment Program helps cities combat and adapt to climate change while advancing racial and economic equity. The program defines "climate resilience" as addressing climate change mitigation, adaptation, and social cohesion concurrently. By factoring climate change into decisions about infrastructure investments, land-use, public health, and other planning issues, urban leaders can make communities stronger and more equitable. Kresge's concept of equity is informed by definitions from leaders in the equity space, *Race Forward* and *PolicyLink*. Equity means fairness and justice and focuses on outcomes that are most appropriate for a given group, recognizing different challenges, needs, and histories (Race Forward, 2015). *PolicyLink's* equity manifesto provides an expanded definition of equity: "just and fair inclusion into a society in which all can participate, prosper, and reach their full potential. Unlocking the promise of the nation by unleashing the promise in us all" (PolicyLink, 2020).

Historically, some planning practices and federal policies have been inequitable, causing more low-income communities and communities of color to be at a higher risk for the negative consequences of climate change. Due to a long-standing history of structural racism in the United States where low-income, Black, and immigrant families were intentionally segregated by local laws and social practices, people of color are more likely to live in neighborhoods with higher levels of pollution, increased flooding, and power outages caused by heat waves—all directly connected to climate change (US Water Alliance, 2020). As an example, redlining, an official federal policy designed to encourage white homeownership and reinforce existing boundaries of segregation in American cities, was officially codified into law in 1933. Neighborhoods of color and those with high numbers of immigrants saw property values drop or stagnate, and with that, resident- and city-led improvements to infrastructure—such as water management systems and community greening—also stalled. While not an explicit active policy, the effects of redlining persist to this day. In fact, the same communities that have a higher risk of flooding are also in neighborhoods with lower-quality services, exposed to more environmental hazards (such as wastewater treatment plants, toxic dump sites), and lack critical resources like savings, insurance, etc. to be resilient, particularly those that experience repeated flooding and the cascading losses that result (University of Maryland, 2018). In fact, from 1980 to 2019, severe storms and flooding have caused the highest number of billion-dollar disasters in the United States (Climate.gov). While people generally understand the necessity of water, there is a research gap around flooding and climate impacts on urban communities, which leads to a messaging

gap in communities and among decision-makers at the local, state, and federal levels, regarding the importance of functional stormwater and wastewater infrastructure (Tyler et al., 2019).

A recent study by the National Academy of Sciences demonstrates that impacts from flooding tend to fall disproportionately on the most vulnerable and resource-constrained members of society (Table 6.1). Importantly, some individuals have multiple characteristics that increase their vulnerability.

The typical adaptations and protections that are present in white, or wealthier, communities—investments in green storm water infrastructure, pervious surfaces, adequate treatment facilities to manage water systems—are not equitably distributed in communities across the country, perpetuating repeated water disasters in places where there are the fewest resources to fund solutions. Similarly, immediate aid and relief funding flow more freely to white and affluent communities as opposed to other communities (US Water Alliance, 2017). This chapter shares case examples

Table 6.1 Profiles of populations socially vulnerable to floods (adapted from National Academy of Sciences, 2019)

Characteristic and experienced impacts from flooding
Age—children and elderly
• Higher mortality
• Higher morbidity
• Higher mental trauma during and post-flood
• Lower recovery rates
Race, immigration status, language—non-white, recent immigrants, undocumented immigrants, non-native English speakers
• Higher death and injury rates
• Negative post-flood health outcomes
• Less flood insurance
• Lower trust in authority for post-flood assistance
Income—at or below the poverty level
• Limited mitigation and recovery resources
• Limited post-flood housing
• Higher post-flood health impacts
• Disproportionately reside in flood-prone areas
• Differential rates of flood exposure, evacuation, and return
• Lower recovery rates
Housing tenure—renters
• Limited flood mitigation funding
• Less access to post-disaster housing programs
• Lower post-flood return rate
Transportation—household lacking vehicle access
• Evacuation barriers
Education—low educational attainment
• Lower flood awareness and understanding of flood mitigation
• Lower rates of flood insurance coverage and settlements

that represent strategies that are emerging and promising practices for achieving equitable climate planning based on the experiences and efforts of the Kresge Foundation's Climate Resilient and Equitable Water Systems (CREWS) Initiative partners. These strategies will demonstrate how much of their work is laying the groundwork for improved and equitable water systems.

The Kresge Foundation's Climate Resilient and Equitable Water Systems (CREWS) Initiative

The Kresge Foundation—a private, national foundation that works to expand opportunities in America's cities through grantmaking and social investing in arts and culture, education, environment, health, human services, and community development in Detroit—is responding to the inequitable systems and institutions that exacerbate social vulnerability due to flooding. In 2016, the Foundation's Environment Program began exploring a new approach to grantmaking at the intersection of water, climate change, and equity, with a specific emphasis on the impacts of climate-driven flooding on low-income communities. The Climate Resilient and Equitable Water Systems (CREWS) Initiative was created to transform urban stormwater and wastewater systems to provide reliable, equitable, and innovative services to communities despite the uncertainties introduced by climate change (The Kresge Foundation, 2019a, b). The CREWS Initiative includes a diverse set of leaders from more than 40 organizations—water utilities, community-based organizations, environmental advocates, researchers, municipal leaders, equity advocates, policy-focused organizations, and others—who work at multiple scales and geographies across the United States.

Water equity is realized when all communities are resilient in the face of floods, drought, and other climate risks; have a role in the decision-making processes related to water management in their communities; and share in the economic, social, and environmental benefits of water systems. Kresge's CREWS grantee partners use a variety of tactics to promote water equity, as depicted in a graphic recording of the initiative's first in-person convening (Fig. 6.1). Over the past 4 years, evidence collected from conversations with expert partners advancing social change in communities and policies, grantee experiences and achievements, and an evaluation of the Initiative have helped Kresge identify a set of seven strategies that are promising practices for achieving equitable climate planning:

1. *Advocacy and solidarity*—Creating significant changes in systems often requires advocacy both within and outside those systems, and this strategy focuses on aligning stakeholders to create an equitable climate plan using messaging, education, public will, and pressure to effect change.
2. *Applied learning*—Bringing together a diverse set of stakeholders to learn about how to use climate data and improved water management practices to effect

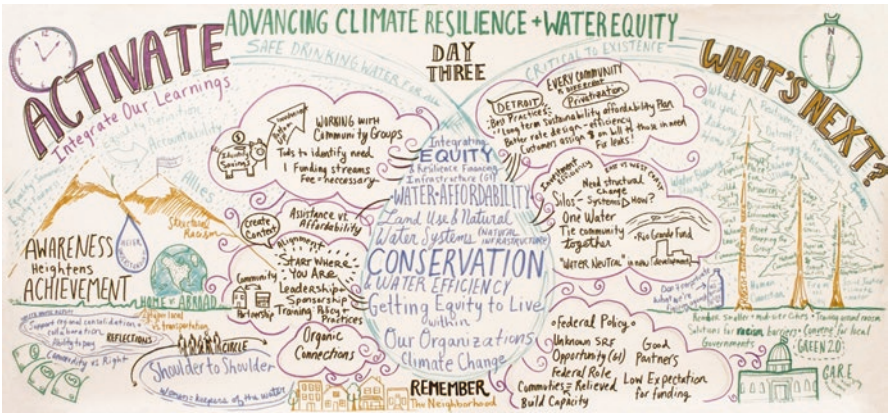

Fig. 6.1 Graphic recording from the first annual CREWS grantee convening held in Detroit, Michigan, 2017

change (stakeholders include utility leaders, community leaders, residents, local and state government leaders, community-based organizations, advocates).

3. *Applying critical data sources*—Using data actively and intentionally, including data on climate, historical racist policies and practices, demography, socioeconomics, and other relevant sources to develop plans to manage water more effectively.
4. *Expanding the toolbox and technical assistance*—Creating places where information is aggregated and easily accessible, along with practitioners who can help apply knowledge, is vital to helping communities create a strong and equitable climate plan, as finding knowledge about how to plan equitably is disconnected and limited.
5. *People-centered*—Prioritizing all people affected by the water system must be included and considered, and not just those who have the greatest wealth or the loudest voice, for climate planning to be equitable.
6. *Shared learning*—Creating opportunities for stakeholders to learn from each other's experience and promising strategies given the lack of a gold standard for equitable climate planning.
7. *Using racial equity analysis*—Considering the combination of characteristics that can place an individual or place at risk of experiencing more negative consequences of flooding will create more comprehensive, effective, and equitable solutions. A racial equity analysis is a systematic examination of how different racial and ethnic groups will likely be affected by a proposed action or decision (Race Forward, 2015).

If used effectively and in concert with one another, these strategies can create comprehensive and equitable water management systems. Though these strategies are not uncommon to movements working to effect social change, applying them in the context of local water systems is unique. We identify several CREWS partners

whose work exemplifies the strategies shared above and detail how these organizations are working to advance climate resilience planning by addressing systemic and institutional racism in their unique social and political environments under these key elements of equitable climate planning (Table 6.2). We also highlight barriers that continue to inhibit equitable climate planning. Table 6.2 provides some background information for each organization that will be featured in the following narrative.

Advocacy and Solidarity

The voices of climate-vulnerable communities through place-based organizations and national coalitions are becoming strong influencers in climate planning through advocacy and solidarity efforts. GreenLatinos, the only national environmental nonprofit organization focused on the priorities of Latinx in environmental policy, ensures the needs of low-income communities (LIC) and communities of color (COC) are met by informing and shaping the conversation of mainstream environmental coalitions. Historically, these coalitions have been white-led organizations that typically have not elevated the concerns and needs of, or collaborate with, LIC/COC. Large financial resources and state priorities are often set through federal environmental policy that can help or hinder communities and local leaders to engage in planning. The Clean Water Act—the main federal rule that governs water policy and resource distribution—did not include ethnically diverse voices and needs, keeping certain groups at risk. GreenLatinos was asked to join The Clean Water for All Coalition, a national coalition formed by several DC-based environmental groups shortly after the 2016 election to safeguard national water regulations. At the start of the coalition, the policy and planning discussions lacked a strong foundation of equity principles and equitable representation. GreenLatinos—and other social justice/environmental justice organizations—advocacy within this coalition has created a process to ensure diverse leadership and engagement and to ensure environmental justice considerations in all proposed policy and planning solutions related to water infrastructure, water affordability, and green jobs.

The Milwaukee Water Commons (MWC) also has a long history of building partnerships and solidarity in communities and with municipal and state government, utility, environment, and health stakeholders. Historically, Milwaukee's low-income communities and communities of color have been excluded from decision-making processes around the use and care of local waters and have borne the brunt of inequitable planning, including lack of water infrastructure, lack of tree coverage, urban heat islands, urban flooding, and a crisis of lead in the city's drinking water. MWC works to build engagement and power of low-income communities and communities of color that is commensurate with the climate challenges they face to improve the city's water infrastructure. Building solidarity has been a tactic of MWC to advance equitable climate planning. MWC is known for convening and spearheading city-wide initiatives, bridging conversations and building community

Table 6.2 Organizations representing case examples

Organization and focal geography	What they do
Anthropocene Alliance—Higher Ground (https://anthropocenealliance.org/) In 20 states and Puerto Rico	Anthropocene supports grassroots organizations to organize communities to stop flooding, mitigate global warming, and end environmental injustice and connects those organizations to scientists, legal experts, and planners
Deep South Center for Environmental Justice (DSCEJ) (https://www.dscej.org/) Houston, TX; Mobile, AL; New Orleans, LA; Gulfport, MS; Pensacola, FL	DSCEJ leads the regional learning network for the Gulf Coast to solidify partnerships to define and influence flood-related water management policies at local, state, and regional levels. It also provides formal courses and hands-on training in stormwater management and water planning
Earth Economics (https://www.eartheconomics.org/) National	Earth Economics specializes in quantifying and valuing the benefits that nature provides and provides technical assistance to CBO and nongovernmental organization partners to accelerate investment in green infrastructure and achieve greater resilience and equity in urban areas
Freshwater Future (FWF) (https://freshwaterfuture.org/) Midwest	Freshwater Future supports community-based organizations in the collection and use of real-time flooding data to ensure the equitable placement of green and gray infrastructure to address urban flooding and affordability issues in multiple neighborhoods in Detroit, Michigan, and Toledo, Ohio
Georgetown Climate Center (GCC) (https://www.georgetownclimate.org) National	The nonpartisan Georgetown Climate Center seeks to advance effective climate and energy policies in the United States and serves as a resource to state and local communities that are working to cut carbon pollution and prepare for climate change
Green Infrastructure Leadership Exchange (GIX) (https://giexchange.org/) National	GIX is a national network of over 90 municipal leaders working to achieve more equitable green stormwater infrastructure delivery in cities experiencing repeated flooding
GreenLatinos (http://www.greenlatinos.org) National	GreenLatinos educates, mobilizes, and trains Latino communities to advocate for equitable policy-making, actions, and solutions that address the impacts of climate-exacerbated flooding and works towards creating more environmentally just and climate-resilient communities
Greenprint Partners (GPP) (https://www.greenprintpartners.com/) National	GPP is a Chicago-based green stormwater infrastructure delivery partner that helps cities build high-impact, community-driven green stormwater infrastructure at scale. They support community-focused green stormwater infrastructure planning processes and implement innovative financing mechanisms

(continued)

Table 6.2 (continued)

Organization and focal geography	What they do
Groundwork USA (https://groundworkusa.org/) National	Groundwork USA is the only network of local organizations devoted to transforming the natural and built environment of low- and moderate-income communities working at the intersection of the environment, equity, and civic engagement. It created five local "trusts" that develop programs of community action to define and implement strategies for meeting the climate safety needs of vulnerable neighborhoods
Milwaukee Water Commons (MWC) (https://www.milwaukeewatercommons.org/) Milwaukee, statewide	Through water stewardship, access, and shared decision-making, Milwaukee Water Commons helps to catalyze Milwaukee as a model water city—where all have a stake in the health and care of their waters. It brings a people-centered approach to influence change
New Jersey Future (NJF) (https://www.njfuture.org/2018/12/18/sewage-free-streets-rivers/) Multiple cities, statewide	New Jersey Future is a nonprofit, nonpartisan organization that promotes sensible growth, redevelopment, and infrastructure investments to foster vibrant cities and towns; protect natural lands and waterways; enhance transportation choices; provide access to safe, affordable, and aging-friendly neighborhoods; and fuel a strong economy
Southeast Sustainability Directors Network (SSDN) (https://www.southeastsdn.org/) National	SSDN is a member-driven network of over 50 local government sustainability professionals located in 9 states throughout Southeastern United States, designed to accelerate the adoption of sustainability best practices and influence the regional conversation about sustainable local policy in the Southeast
US Water Alliance (http://uswateralliance.org/) National	The US Water Alliance network provides an opportunity for cutting-edge water leaders to participate in exclusive peer-to-peer exchange opportunities, enhance organizational effectiveness, and play an influential role in water policy and stewardship
Water Equity and Climate Resilience Caucus (WERC) (conveners: PolicyLink and The Gulf Coast Center for Law and Policy) (https://www.policylink.org/our-work/community/water-climate) National	WERC is a national network of organizations that work together to address water equity and climate resilience, centering the voices and solutions of frontline communities of color and low-income communities. The Caucus promotes peer learning, tool and knowledge development, and shared local, state, federal, and tribal advocacy with leaders from over 80 organizations across the nation

through relationships. MWC is the convener and facilitator for the Milwaukee Community Water Assembly (CWA), a community-led forum for community members and organizations to engage around water issues. The CWA includes a diverse group of 21 individuals coming from a wide range of organizations and communities. The assembly is based on a collective impact model that involves individuals, organizations, and institutions from the nonprofit, government, and private sectors that are collectively taking responsibility for and resourcing its initiatives. One of the many results of their solidarity work has resulted in being appointed by the Governor of Wisconsin to serve as a member of the state's climate change task force that is charged with developing a set of recommendations to help chart a path and plan to meet Wisconsin's goal of 100% carbon-free energy by 2050, improve the state's economy and environment, and address land and water resources. As part of the planning process, MWC has been called on to ensure this work maintains a lens of environmental justice. For each working group of the Governor's task force, MWC provides training and guidance to ensure that as the members of the task force are finalizing elements of the climate plan, the process, input, and analysis include a strong equity frame.

An illustrative example of both advocacy and solidarity can be seen through the work of the Water Equity and Climate Resilience Caucus (WECR). Before the Caucus, there was no national network—led by advocates from low-income communities and communities of color—to convene and build a collective movement on water equity issues (PolicyLink, 2020). With over 100 members, partners, and allies, the Caucus' strategies for equitable climate action and planning in the water sector have proven an effective and needed platform, at the federal, state, and local levels. Solidarity among the diverse sets of partners, in addition to shared policy and planning platforms, has led to many successes: being asked on several occasions to educate federal, state, and local policy leaders on provisions and resources for equitable climate planning and implementation; organizing discussions and briefings with, for example, the US Senate Environmental Justice Caucus and the House United for Climate and Environmental Justice Congressional Task Force; and partnering with the Congressional Special Committee on Climate Change, which led to a win in increased funding for clean water in 2019 and contributed to pending legislation that would prohibit water shutoffs for low-income households during the COVID-19 pandemic. The concerted effort to build solidarity, draft shared policy, and plan platforms around key water issues, coupled with layered advocacy at all levels, will not only result in much needed policy changes but also greatly influence how funding decisions and authorizations are made. Overall, these efforts directly impact how financial resources are distributed by states to address climate change.

Applied Learning

The diverse set of leaders that compose the water sector—water utility leaders, residents/customers, local community leaders, green stormwater infrastructure professionals, and many others—have fortified their climate planning through creating avenues to learn together and share best practices on ways to operationalize equity and climate data. The Green Infrastructure Leadership Exchange (The Exchange) convenes municipal leaders working to advance innovative solutions to address climate-driven urban flooding. In addition to the landmark reports, guidance, and tools they have developed, The Exchange is advancing equitable practices through training, support, and cohort-style learning. This work is done specifically through their Collaborative Grant Program, which provides Exchange members an opportunity to solve problems together focused on improving the speed, cost, or effectiveness of green stormwater infrastructure (GSI) planning and programs. As shown in Fig. 6.2, The Exchange provides examples of how to explicitly integrate equity into proposals, defining the key elements of the different forms of equity that result in strong planning outcomes that benefit climate-vulnerable communities.

The US Water Alliance uses applied learning to help nine communities build cross-sector capacity to create equitable climate resilience strategies that address urban flooding by hosting a "Bootcamp." Utilities, city agencies, community-based

Examples of ways to integrate equity into a project include:

Project type	Procedural equity	Distributional equity	Structural equity	Intergenerational equity
Collaborative research	Engage frontline community-led groups to inform a research design that addresses equity impacts	Design research with frontline community-led groups so community members with the highest need are not overlooked	Identify existing decision-making structures of the topic and ways to fill gaps so that decision-makers are accountable to all community members	Forecast downstream impacts of the research topic and identify how to improve conditions for future generations
Expert training	Invite equity experts, including those with lived experience, to discuss the equity impacts of the topic	Incorporate local demographic data and key community points of need into a training content	Hire an equity expert to identify past harm caused by the subject matter and present ways to make decision-makers more accountable	Build a training session to address how the subject will impact future generations and steps needed to improve outcomes for all
New program approaches	Request feedback from frontline community-led groups on the impacts that new work will have on the community and best approaches	Determine with frontline community-led groups any equity gaps in program approach, to ensure these are filled prior to program roll-out	Determine with frontline community-led groups ways to improve accountability in existing decision-making structures	Identify long-term impacts of programmatic approaches on future generations
A custom concept	Ask frontline community leaders to weigh in on the development of a custom concept and the ramifications it will have on the community	Identify with frontline community-led groups any needs associated with the concept and identify ways to ensure resources / burdens are fairly distributed	Identify decision-making structures needed to implement the custom concept and determine ways to add accountability to the process	Determine the long-term impact of custom concepts on future generations and adjust the concept accordingly
In-depth peer learning	Compensate frontline community representatives to join discussion that shed light on the equity impacts of the topic	Build an equity and community impact discussion component into each learning session	Engage frontline community-led groups in a discussion about existing decision-making structures for the topic and ways to increase accountability	Discuss ways to improve long-term impacts of the topic on future generations with community stakeholders

Fig. 6.2 Green Infrastructure Leadership Exchange Collaborative Grant Program, examples of how to integrate equity into proposals

organizations and climate justice advocates, and environmental groups gathered to learn the latest science on climate change and flooding and to discuss how to address urban flooding through infrastructural and community-based solutions. Alliance staff arranged to have each local team visit a site in their city that floods frequently and faces flooding inequities, giving city agencies the opportunity to learn directly from residents most vulnerable to climate-related flooding challenges before convening as a full, national group (US Water Alliance, 2020).

Applied learning is effective when used in specific places. The Sewage-Free Streets and Rivers Campaign, run by New Jersey Future (NJF), uses applied learning to build the capacity of communities to influence state regulatory processes. The campaign's purpose is to build a coalition to connect organizations that have deep roots in community with larger statewide organizations that have histories of working on water and wastewater infrastructure and climate change (New Jersey Future, 2020). The capacity building arm of this campaign shares action-oriented tools and technical resources through workshops, training, and specific technical assistance, both in-person and online to community members. For instance, NJF held a forum on "Climate-Ready Combined Sewer Overflow (CSO) Plans" to publicly make the connection between climate change planning and developing solutions to combined sewer overflows. This foundational effort gave communities an opportunity to engage in the current permitting process led by the New Jersey Department of Environmental Protection (NJDEP). The NJDEP, the state regulating agency, issued a permit that requires these communities to develop plans by 2020 to reduce sewage in nearby waterways. Implementing these plans will cost billions of dollars over the coming decades but will have significant effects on residents and business owners for generations to come. This planning process has been more inclusive, pulling in community organizations that have deep on-the-ground knowledge of the impacts of flooding and climate change on their communities, as well as policy and planning knowledge that helps strengthen their interactions with local decision-makers. In fact, these efforts have made a difference: The Mayor of Jersey City connected the need for sewer upgrades, green infrastructure, and public engagement at a town hall on climate change, and the City is adopting policies in advance of the CSO Long Term Control Plan to address flooding and stormwater issues. The Newark City Council formed a committee specifically to focus on stormwater and the plans to address CSOs after a presentation by Newark DIG (Doing Infrastructure Green), a partner of the Sewage-Free Streets and Rivers campaign. The City of Elizabeth sponsored the Climate-Ready CSO Forum, and the Mayor of the City of Elizabeth spoke about the importance and challenges of addressing climate change and combined sewer overflows at the forum.

Applying Critical Data Sources

Flooding-related adaptation projects in cities often lack the appropriate granular-level data to create climate adaptation plans, specifically as these plans include the placement of physical infrastructure to prevent or manage localized flooding at the neighborhood level. Freshwater Future (FWF) has supported community leaders

interested in implementing green stormwater infrastructure (GSI) solutions to local flooding in the Great Lakes Region for many years. By partnering with Earth Economics, the organization developed a participatory flood mapping tool that would apply critical data sources by supplementing local city-generated flooding data with community-sourced knowledge while empowering community members to build knowledge of flooding issues and identify appropriate solutions. These geospatial tools have proven critical in defining both the problems and solutions to building climate resilience. Earth Economics worked with FWF staff and community volunteers over the course of 2019 to develop and pilot a flood mapping tool with Detroit residents. The tool allows users to enter the location of flooding, a description of approximate depth and duration of the flooding, as well as a photo via mobile phone. FWF staff and partner organizations then access the database of entries through the online tool and create maps for select time periods to share with community members and eventually local decision-makers to improve planning.

To acknowledge and begin to reconcile the historical practices that multiplied the climate and health risks for communities, Groundwork USA launched the Climate Safe Neighborhoods Partnership (CSN) (Groundwork USA, 2020). Through the CSN, five local Groundwork Trusts—Groundwork Denver (CO), Groundwork Elizabeth (NJ), Groundwork Rhode Island, Groundwork Richmond (CA), and Groundwork RVA (Richmond, VA)—partner with residents to advocate for a more equitable distribution of resources and equitable planning practices to reduce the social, health, and economic impact of extreme heat and flooding.

Groundwork Trusts and partnering organizations leveraged historical data and geographic information systems (GIS) to advance a data-driven, community organizing strategy that provides residents with the tools to overcome many of the biggest barriers to equitable climate planning. By digitizing and combining historical redlining maps, heat-island locations, and flood vulnerability data (see Fig. 6.3), Groundwork Trusts and its partners were able to create shared language for understanding challenges and help move forward equitable policy solutions. This layered analysis work in Richmond, VA, has been used to inform multiple planning processes and inputs into the Richmond 300 Master Planning Process, RVA Green 2050 Sustainability Plan, and a Climate Equity Index. This process has been recognized nationally as a model that has helped move forward several policy processes in Trust cities.

Expanding the Toolbox and Technical Assistance

Good climate planning requires an understanding of the multiple legal and policy barriers that can inhibit equitable adaptation, and Georgetown Climate Center (GCC) created a tool to help. Its Adaptation Clearinghouse (Georgetown Climate Center, 2017) is a state-of-the-art database of resources for communities, policymakers, and adaptation professionals to help plan for the impacts of climate change and expands the adaptation toolbox. For example, if amendments and/or revisions

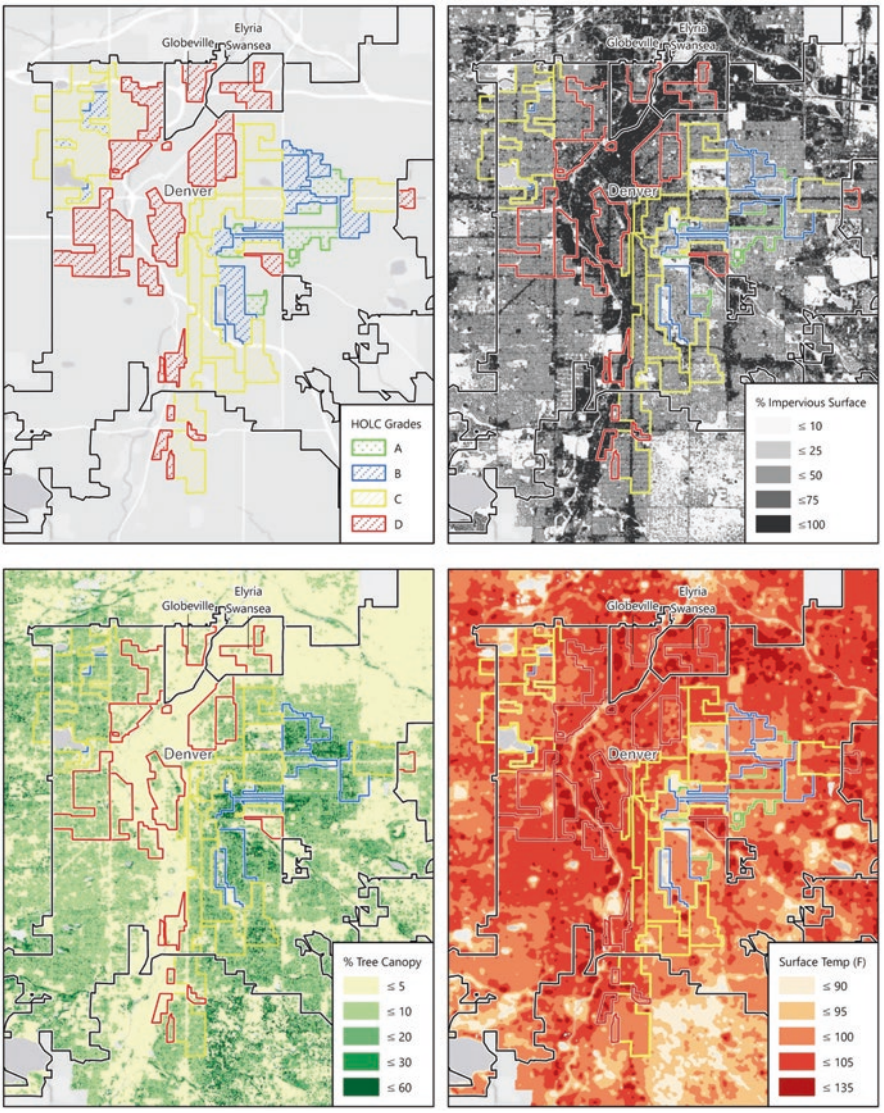

Fig. 6.3 Clockwise from upper left. Denver overlaid with a digitized redlining map (colored shapes), impermeable pavement (NLC 2012), tree canopy (NLC 2012), land surface temperature (Landsat-8 2018). (Map Credit: Lawrence Hoffman)

to local ordinances or plans are not analyzed with an equity lens, the resulting "climate resilience policy" could cause more harm, such as gentrification. At the same time, policies can avert inequitable outcomes, by promoting items such as tenant-protection provisions and establishment of community land trusts that prevent the displacement of front-line, low-income communities, and/or communities of color.

The Clearinghouse's network pages highlight the potential for organizations to partner with others, create their own mini-clearinghouse, share resources on external websites, and connect with other adaptation professionals. GCC recently released its Equitable Adaptation Toolkit as part of the portal to provide legal and policy solutions to the most pressing questions about how communities can ensure an equity-centered approach to adaptation planning and implementation processes.

Anthropocene Alliance (AA) has helped build collaborative partnerships with CBOs by connecting them to scientists, legal experts, planners, and others to build strong equitable climate plans through technical assistance. Through AA's relationship with the Thriving Earth Exchange of the America Geophysical Union—a group of scientists who co-develop projects that address community priorities—AA was able to match Community In-Power and Development Association, Inc. (CIDA), an award-winning nonprofit that works to empower residents in low-income communities of color in Port Arthur, Texas, with a pro bono scientist to develop a hydrological model to help residents understand their flood risk and access federal funding for planning home buyouts and/or adaptation measures such as elevation.

People-Centered

Centering people who will be affected by the water system is imperative to achieving equitable climate planning and requires the deliberate inclusion of their voices and needs throughout the process by those affected, not only using research or statistics. Greenprint Partners (GP) is a green stormwater infrastructure (GSI) delivery partner that advances equitable climate planning in two ways: making equity and including those affected by the water system as a central part of the GSI design process and developing mechanisms to address financial challenges that encourage GSI projects in low-to-moderate-income communities. While the main goal of GP is to upgrade aging water infrastructure using natural solutions to adapt to climate-driven flooding, GP uses what they have termed the GP's Benefits-Driven Design approach to project development, which centers the voice and opinions of people in the planning process and requires any partners to be community-focused and mission-driven. The planning process empowers community stakeholders to prioritize the outcomes they wish to achieve through GSI designs and draws upon a core menu of benefit-specific design principles that were developed based on the research between landscape design choices and co-benefit impacts. Using this menu with community members enables GP to apply a benefit-specific lens to every site, optimizing the design for the benefits prioritized by the organization's community. In this way, GP has developed a holistic service to promote the scalability of GSI in an optimal and equitable manner. Moreover, moving from planning to implementation requires financing. With larger-scale GSI projects—usually in the million-dollar range—the landowners GP targets cannot participate without bridge financing. To address this, GP secures project financing from mission-driven lenders and works

with construction firms that can float construction costs, thereby allowing the project team to carry all upfront project costs on behalf of landowners.

A project with Catholic Charities of St. Louis is a good example of these approaches in action. Located in the Central West End neighborhood, Catholic Charities oversees the Cathedral Tower and Queen of Peace Center, which offer clinical and therapeutic services for women with substance abuse disorders and provides affordable assisted living to senior adults. Catholic Charities sought to enhance their current services through the restorative benefits of GSI by increasing physical and mental health and enhancing community pride and site beautification. Catholic Charities was able to participate in the Metropolitan St. Louis Sewer District's GI2 program because of GP's bridge financing, technical expertise, and project support. Using its Benefits-Driven Design approach, local representatives were able to articulate what changes they wished to see through GSI, which informed the final designs. The GSI project will manage about 560,000 gallons of rainwater annually over 4.1 acres through permeable pavement and native rain gardens, and enhanced vegetation will offer visually interesting focal points encouraging residents to exercise and relax in nature while also increasing the property's curb appeal.

Shared Learning

In the South, city and county sustainability efforts are chronically under-resourced, limiting the number of staff working on sustainability and resilience and restricting the resources for project implementation, partnership development, and access to research. There are also systemic structural barriers that inhibit collaboration between city and county governments such as different political agendas and the presence of departmental and governmental silos. Additionally, traditional local government approaches are not accustomed to out-of-the-box partnerships that promote more equitable outcomes. To address these challenges, Southeast Sustainability Directors Network uses a shared learning approach to advance its members' approach to equitable climate planning. The power of SSDN's network model lies in its capacity to identify what is working by using the experiences of its members and quickly sharing it broadly with a diverse set of stakeholders to further test emerging best practices in other places. In fact, it created the Southeast Sustainable Communities Fund (SSCF) to invest in opportunities for cities and counties to develop regional best practices around equitable climate planning and actions and then to collaborate and learn from each other via a cohort model. Out of these learning conversations, an issue members have raised to help equitable climate planning is finding ways to demonstrate how racial equity can be at the center of all government operations, plans, policies, budgets. In the past 2 years, cities like Atlanta and Asheville and Athens-Clarke County have created an Equity Officer (or similar) position to establish baseline expectations and practices for any climate and

resilience planning effort, as well as other planning efforts throughout city and county government operations.

Sharing learning beyond the institution and within a community is crucial to advancing equitable climate planning. Deep South Center for Environmental Justice (DSCEJ) is a nonprofit organization that supports Gulf region communities facing disproportionate pollution burdens and climate vulnerabilities. DSCEJ engaged Earth Economics to research and produce fact sheets that highlight the historical and current water-related concerns of five gulf-coast communities. These fact sheets were not only used to help inform and make the economic case to local officials for investing in existing natural assets and/or new stormwater infrastructure. They were also used as communication tool to engage with residents to raise awareness of the issues they face on the ground, advocate for nature-based solutions, and interpret local knowledge, concerns, and ideas in economic terms that could be used in future planning scenarios for each community.

Using a Racial Equity Analysis

Considering the combination of characteristics that can place an individual or place at risk of experiencing more negative consequences of flooding amplifies the need to bring together multiple perspectives across the water sector to create solutions that address the multiple and compounding risks of people and place. The US Water Alliance (USWA) has been a critical forum for bringing together the highly fragmented water sector to promote solutions and applied learning that considers the full spectrum of issues that can influence water policies and planning. Helping to spur the "One Water Movement," the USWA has accelerated the adoption of innovative, inclusive, and integrated approaches with the aim of accelerating the development and adoption of sustainable and equitable water policies and practices. To better understand and articulate the necessary connections between water issues and equity, particularly for an organization that had historically been composed of only water utility leaders, the USWA made intentional efforts to build knowledge around water equity and climate planning and broaden their members and partners in the sector. To do so, the USWA conducted a national scan aimed to understand how various stakeholder groups—including water, wastewater, and stormwater utilities, community-based organizations, national nonprofits, private sector companies, governmental agencies, philanthropic organizations, research institutions, and investors—are working on issues related to water and equity to inform the development of a national briefing paper and online clearinghouse. Stakeholder discussions, surveys, and national listening sessions helped inform and develop a national framing paper, An Equitable Water Future, that defined water equity and framed three water equity pillars for a diverse set of stakeholders. To support one of those pillars, "community resilience in the face of a changing climate," the USWA launched an online, searchable database as a resource for practitioners to learn from each other and build partnerships across sectors and geography. The Alliance applied an

intersectional lens directly into planning through the Water Equity Task Force. This task force, composed of water utilities in seven cities (Atlanta, Buffalo, Camden, Cleveland, Louisville, Milwaukee, and Pittsburgh), was tasked to create a Water Equity Roadmap—a document that articulates the challenges, opportunities, and promising practices related to water management and planning to support vulnerable communities in their city or region. The city-level learning teams in the task force convened for over 2 years and consisted of local water utilities, community-based organizations, environmental groups, city government, and philanthropy. Roadmaps highlighted the existing assets and initiatives that can be leveraged to advance water equity, point out gaps and needs in the local context, and set shared priorities for action and planning. For example, the Cleveland Team created a roadmap with specific recommendations for action focused on affordability, community engagement, climate resiliency, and workforce development. One of the key recommendations in the roadmap was to establish a Water Champions program, which will hire and train ambassadors from Cleveland's vulnerable communities to serve as liaisons between the water utilities, community members, and frontline community organizations.

Using a racial equity analysis goes beyond the various perspectives of people brought together but includes also the sources of data that are brought together to inform planning, as there is no single data source that is sufficient to build equitable solutions. SSDN cities and counties are using climate data, census data, health data, and economic data to fully understand the big picture of human stressors. Cities and counties are learning to leverage demographic data to show where frontline communities will be affected by climate change and how cities can work with those communities first. Several cities, including Charleston, South Carolina, Raleigh, North Carolina, and Asheville, North Carolina, are working with the National Environmental Modeling and Analysis Center (NEMAC) at the University of North Carolina Asheville to assess climate threats and vulnerabilities throughout their communities and realizing the correlation between equity and potential risks. Many cities are coupling this sustainable research with equity assessments.

Barriers to Equitable Climate Planning

The case examples and tactics described above are promising and have provided unique pathways to equitable climate planning. Two years into the initiative, CREWS engaged in a developmental evaluation study to better understand the experiences of its grantee partners and identify opportunities to better support them (Arabella Advisors, 2018). The study found evidence of partnerships among stakeholders being formed that have not occurred in the past and greater use of GSI and other innovative water management approaches that will help support improved equitable planning. However, these tactics are met with significant barriers that delay or limit progress and threaten better practices. Evaluators conducted interviews with a sample of grantee partners, some of which are included in this chapter,

to learn about barriers and how they impede progress. Below are common challenges experienced by equitable water advocates and organizations in the water sector infrastructure when implementing approaches to promote equitable climate planning and reducing environmental injustice.

Lack of a consistent institutional direction requires relationship-building, which takes time. While strong support from powerful decision-makers such as mayors and utility leaders can be instrumental in advancing change, leadership and staff turnover at those institutions can slow or disrupt progress. When such events occur, outside partner organizations are forced to rebuild relationships with new decision-makers and educate them about the benefits and purpose of community involvement and green infrastructure.

Changing the culture of water decision-making: sharing power. Once equipped with the tools and knowledge to be change agents in their communities, community members can face difficulty when attempting to use their power to influence water decision-makers. Too often decision-makers are defensive in response to community input. According to CREWS partners, in certain cities, city administrators are skeptical or fearful of community pressure due to personal beliefs, biases, or fear of being sued. Change agents' work can be particularly challenging when decision-makers fail to recognize that inviting them to influence policy is an acceptable practice.

Limited institutional capacity influences whether improved practices can be adopted. It can be challenging to work with water utilities and other decision-making bodies that lack strong leadership or capacity to innovate and adopt new practices. With limited staff and resources, utility staff do not always have the knowledge or awareness that is necessary to assess and adopt innovative practices and might instead rely on old solutions (gray infrastructure). Though limited capacity creates an opportunity to build strengths, there must be a will and resources within an institution to do so.

Lack of financial resources affects solutions even if there is will for change. State and city budget crises and general lack of financial resources are significant barriers to change, which means that even if there is a vocal set of organizations pushing for change, progress can be slow. For instance, in places where there is a shrinking tax base, municipal leaders are left without the resources to improve water infrastructure and promote economic development, creating a vicious cycle of underinvestment and repeated water disasters, despite outcries when such disasters hit.

Inequity is embedded in social, economic, and political structures that influence water system decisions and cannot be addressed solely within the water sector. In the majority of CREWS cities, inequity issues are expressed through the disproportionate impacts and costs of urban flooding on marginalized communities and people of color. However, these inequities commonly have deep historic roots and are embedded in social, economic, and political circumstances that extend far beyond water issues. Effectively advancing equity requires knowledge of this much broader (and deeper) context.

Conflict and disunity among stakeholder groups and with city officials works against change. Advancing equity and climate-smart water management is a society-wide effort that requires collaboration, commitment, and unity among diverse social and cultural groups and between city residents and their elected and appointed officials. In circumstances where conflict and disunity exist, building alliances and forging collective progress may not be achievable without first getting past prevailing differences. Ignoring such issues will undermine the pace of progress and may preclude success in building equitable and climate-resilient water systems.

Conclusion

These case examples highlight just a few of the organizations that are working to advance climate resilience and equitable water planning, addressing barriers of institutional and structural racism alongside other challenges that further environmental injustice. Despite these barriers, climate change demands that a diverse set of water leaders operationalize multiple tactics and strategies to ensure the safety, health, and well-being of low-income communities, communities of color, and those that are highly vulnerable to climate-driven urban flooding. The seven strategies that we outlined can help to create participatory and inclusive ways to fix our water infrastructures and move towards more inclusive climate action planning. The problems associated with a warming climate and aging infrastructures are not going away, and it will take intentional and committed planners to implement equitable and resilient solutions.

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