Environmental Justice, Resilience Justice, and Watershed Planning

Craig Anthony (Tony) Arnold  
University of Louisville

Resilience Justice Project Researchers

Follow this and additional works at: https://scholarship.law.wm.edu/wmelpr

Part of the Environmental Law Commons, and the Water Law Commons

Repository Citation

Copyright c 2024 by the authors. This article is brought to you by the William & Mary Law School Scholarship Repository.  
https://scholarship.law.wm.edu/wmelpr
ENVIRONMENTAL JUSTICE, RESILIENCE JUSTICE, AND WATERSHED PLANNING

CRAIG ANTHONY (TONY) ARNOLD* & RESILIENCE JUSTICE PROJECT RESEARCHERS**

ABSTRACT

Watershed planning is an increasingly used governance tool for addressing environmental problems at ecosystem scales of watersheds, which are areas of land that drain to a common body of water. In recent years, watershed planning in the United States has been undergoing an “equity evolution”: watershed planners have begun integrating environmental justice considerations into their plans, often in response to demands by low-income communities of color. This Article explores a comprehensive set of principles, processes, analytical tools, and strategies for equitable watershed planning. It integrates a resilience justice perspective with environmental justice. Resilience justice is concerned with the systemically unequal vulnerabilities and adaptive capacities of marginalized and oppressed communities, who are vulnerable to disruptions and changes like natural disasters, climate change, and housing insecurity (e.g., gentrification) and have been marginalized from governance systems affecting their capacities to thrive. Watershed plans should not only address unequal environmental harms and decision-making but also empower low-income communities of color and facilitate their resilience. An equity transformation, not merely an equity evolution, is needed in watershed planning. This Article examines a case study of the University of Louisville Resilience Justice Project’s work with government agencies and communities to integrate environmental and resilience justice into planning for the Mill Creek watershed, composed of marginalized neighborhoods in Southwest Louisville, Kentucky.

INTRODUCTION .......................................... 554
I. CORE CONCEPTS ................................... 560

* Boehl Chair in Property & Land Use, Professor of Law, Affiliated Professor of Urban & Public Affairs, and Director, Resilience Justice Project, University of Louisville. Funding information for this research and acknowledgments are listed in the Appendix.
** Thirty-nine student researchers contributed to this Article and their full information is listed in the Appendix.
INTRODUCTION

In 2022, the Louisville-Jefferson County Metropolitan Sewer District (“MSD”) began a watershed planning process in the Mill Creek watershed of southwestern Louisville, Kentucky, ostensibly to address non-point source pollution (i.e., pollution from water runoff, not from an industrial or sewer facility pipe discharge) arising in this area and ending up in Mill Creek and eventually the Ohio River.¹ Watersheds are

¹ For sources of details about the Mill Creek watershed and its planning processes, see sources cited infra Part IV. This Article’s case study of Louisville, Kentucky’s Mill Creek watershed should be distinguished from studies that have explored watershed planning, stream restoration, and/or environmental justice in other Mill Creek watershed cities, such as Philadelphia, PA and Cincinnati, OH. See, e.g., Anne Whiston Spirn, Restoring Mill Creek: Landscape Literacy, Environmental Justice and City Planning and Design, 30 LandscapERsCh. 395, 395–96 (2005) (Philadelphia); Shawn Dayson Shifflett, Tammy Newcomer-Johnson, Tanner Yess & Scott Jacobs, Interdisciplinary Collaboration on
areas of land that drain to a common body of water; the Mill Creek watershed is a 34-square-mile area of land in Southwest Louisville that drains to Mill Creek.2

The Mill Creek watershed planning process was funded by the U.S. Environmental Protection Agency (“EPA”) under § 319(h) of the Clean Water Act (“CWA”), administered by the Commonwealth of Kentucky’s Division of Water to support local watershed planning.3 MSD asked governmental, environmental, and community entities to join the effort as planning partners. The planning process has occurred somewhat contemporaneously with several other planning processes affecting the Mill Creek watershed, including state-led planning to restore ecological conditions in the lower part of Mill Creek, planning by the Louisville Metro Parks and Recreation Department (“Metro Parks”) for a greenway park system along Mill Creek’s restored portion, and various land use, transportation, and economic development plans for areas in the watershed.4 In all these respects, the planning going on in Mill Creek looks a lot like the planning occurring in many watersheds across the United States.

Planning for the Mill Creek watershed is distinctive, however, in that MSD asked the University of Louisville Resilience Justice Project (“RJ Project”) to join the effort as a partner to incorporate environmental justice, resilience justice (i.e., equitable community resilience), and inclusive community engagement into the Mill Creek watershed plan and planning processes.5 These features aim to make watershed conditions, policies, and governance systems equitable for low-income communities of color. In some respects, Mill Creek watershed planning obviously needs specific attention to equity. Mill Creek is a degraded, channelized, and

---


5 See Arnold, supra note 2.
polluted urban/suburban stream that flows through an area of Louisville with many environmental-injustice features: below-median household income overall and several neighborhoods with high concentrations of poverty and residents of color; two major industrial areas; both of Louisville’s major power plants; high levels of air pollution, toxic releases, and contaminated lands (brownfields); and disproportionately high rates of cancer and asthma and less and worse green and blue infrastructure, such as parks and tree canopy. Unlike some of Louisville’s watersheds dominated by wealthy, white neighborhoods, Mill Creek does not have a watershed-focused community-based group to engage area residents in watershed planning and action. From a broader perspective, however, new methods to address environmental justice, community marginalization, and vulnerabilities in Mill Creek watershed planning are an example of an equity evolution in watershed planning nationwide.

In the United States, there is growing interest in integrating equity principles, processes, and methods into watershed planning. Julian Agyeman and Dale Bryan describe a process by which an existing watershed planning structure in Boston’s Mystic River watershed undertook an environmental justice focused critical-dialogue project in the early 2000s to integrate environmental justice considerations in watershed governance and to address local environmental justice issues at a watershed scale. In 2018, environmental scholars Richard Smardon, Sharon Moran, and April Karen Baptiste published the book Revitalizing Urban Waterway Communities: Streams of Environmental Justice, which reflected on environmental justice and watershed-planning lessons learned from three years helping plan for an urban stream restoration in the Onondaga Creek watershed in Syracuse, New York. Other scholars have explored environmental justice principles for watershed planning in Native American (American Indian) landscapes, low-income communities of

---

7 See Environmental Justice Across the Mystic: Bridging Agendas in a Watershed, in COMMUNITY RESEARCH IN ENVIRONMENTAL HEALTH: STUDIES IN SCIENCE, ADVOCACY AND ETHICS 81, 82 (Doug Brugge & H. Patricia Hynes eds., 2016).
8 See generally REVITALIZING URBAN WATERWAYS: STREAMS OF ENVIRONMENTAL JUSTICE.
color in small-town and rural areas, and large river basins, such as the Mississippi River Basin. California has included environmental justice concerns and interests in watershed planning in its Central Valley Region, but scholars have critiqued these efforts as being relatively marginalized in planning processes dominated by large-scale powerful interests. The federal government is increasingly prioritizing environmental justice and equitable climate resilience in its policies and programs, including EPA guidelines and funding for state and local watershed planning under the CWA § 319 Nonpoint Source Management program.

Equitable watershed planning is about addressing the unequal environmental conditions and vulnerabilities of low-income communities of color at watershed scales and the processes and systems of marginalization and exclusion of these communities in watershed governance. Low-income communities of color are disproportionately more likely to live in flood-prone areas, near degraded streams, or in environments with polluted waters. They are more likely to have unsafe drinking water or


15 Bethany B. Cutts, Andrew J. Greenlee, Natalie K. Prochaska, Carolina V. Chantrill, Annie B. Contractor, Juliana M. Wilhoit, Nancy Abts & Kaitlyn Hornik, Is a Clean River Fun for All? Recognizing Social Vulnerability in Watershed Planning, PLOS ONE, May 1,
lack sufficient access to water due to scarcity, quality, and/or cost.16 Low-income people of color often live among or near industrial and other intensive land uses and sources of toxic pollution,17 and they have fewer or worse parks, trees, and green places that contribute to health and adaptability to climate change and disasters.18 They and their neighborhood communities have less capacity to adapt to water-related stresses and crises due to fewer resources and less sociopolitical power.19 Residents of low-income communities of color are typically under-represented in and marginalized by watershed planning processes dominated by people with the following characteristics: “male sex, middle aged, married, parent of school-age children, homeowner, access to transportation, long-term resident, high level of income and wealth, employed in paid work, and high level of formal education.”20 The unequal vulnerabilities of low-income communities of color are typically structural and systematized, resulting from racism, colonialism, and class inequality, among other social forces.21

Climate change disproportionately makes the environmental and water crises of low-income communities of color worse.\footnote{Cutts et al., \textit{supra} note 15, at 2; Zoll, \textit{supra} note 21, at 6.}

This Article uses both the equity evolution in watershed planning and RJ Project experiences with Mill Creek watershed planning as starting points to articulate a systematic set of principles, processes, analytical tools, and strategies for integrating environmental and resilience justice into watershed planning. Without a systematic and conceptually grounded approach, watershed planning is likely to fall short of achieving equity, characterized merely by vague aspirations, symbolic policies, incremental “add-ons” to structurally inequitable strategies, and a few additional opportunities for public participation in fundamentally top-down planning processes. Moreover, resilience justice should be the organizing concept for equitable watershed planning because it builds upon and includes environmental justice but encompasses broader and deeper sets of injustices and conditions affecting low-income communities of color in their watersheds.\footnote{See infra Section II.B.} Watersheds are characterized not only by unequal environmental conditions like pollution but also by a wider array of inequitable community conditions that affect communities’ resilience, including climate change and disasters, insufficient green and blue infrastructure, housing insecurity and the dynamics of gentrification and displacement, structural inequalities in wealth and employment, societal racism, and marginalization and exclusion from governance power.\footnote{Id.}

Expanding beyond distributive and procedural justice concerns that typically dominate environmental justice analyses, resilience justice concepts seek to address the capacities, vulnerabilities, and empowerment of low-income communities of color and other marginalized and oppressed communities.\footnote{See \textit{id}.}

This Article is premised on the belief that an equity transformation, not merely an equity evolution, is needed in watershed planning. Transformation means systemic or structural change. The first step in this transformation is to identify how to do watershed planning in a fundamentally different—equitable—way in which both the principles driving watershed planning and the methods by which plans are developed and implemented are pervasively focused on justice and resilience for and in low-income communities of color. That is the focus of this Article. However, the next step will be to evaluate the structural obstacles
to equitable watershed planning and to identify the legal, governance, and social changes needed to eliminate these obstacles. Even though this Article concludes with some preliminary observations about these obstacles, a more complete picture will emerge after the Mill Creek watershed planning process concludes in 2025. It would be premature to attempt a definitive assessment of Mill Creek watershed planning process in early 2024. Thus, a second article addressing structural barriers to equitable watershed planning will follow this one.

Part I of this Article defines and describes what watershed planning, environmental justice, and resilience justice are. Part II makes the case for equitable watershed planning, drawing on insights from the emergence of environmental justice approaches to watershed planning and the need for resilience justice in watershed planning. Part III develops a framework of principles, processes, analytical tools, and strategies for integrating environmental and resilience justice into watershed planning. Part IV is a case study of how this framework has been applied in Louisville’s Mill Creek watershed planning. We conclude by identifying several structural challenges to applying an equity framework to watershed planning and ideas for additional study of what is needed to achieve an equity transformation.

I. Core Concepts

A. Watershed Planning

Watershed planning is planning at the geographic scale of a watershed or with a substantial focus on the functions and processes of a watershed. A watershed is an area of land that drains to a common body of water. Watersheds have nested scales, with smaller areas draining to smaller water bodies nested within larger areas draining to larger


water bodies. For example, a small area of land in southwestern Louisville, Kentucky, drains into Black Pond Creek, which flows into Mill Creek in the lower Mill Creek subwatershed (an area of land draining into the lower portion of Mill Creek), and Mill Creek flows into the Ohio River, which receives runoff from all or parts of fourteen states and flows into the Mississippi River and ultimately into the Gulf of Mexico. Sometimes, the terms “catchment” or “subwatershed” are used to refer to watersheds at smaller scales, while the terms “basin” or “subbasin” are used to refer to watersheds at larger scales. This Article uses the term “watershed” generically, except when a cited source has used a synonymous term, such as “basin.”

The four key components of watersheds are water, land, biotic communities, and human communities. Watersheds are ecological systems—or ecosystems—characterized by a range of hydrological and ecological processes and functions. Watersheds support human life and society and are organizing units for governance and management of natural resources and environments; thus, watersheds are more accurately described as social-ecological-institutional systems. Watersheds serve a diverse range of functions in society, reflected in the many ways the U.S. legal system conceptualizes (or “frames”) watersheds and addresses watershed issues.

---


33 This includes framing watersheds as a water supply; drinking water source; drainage
Planning is a process of establishing goals and strategies for the accomplishment of future actions and outcomes.35 “Plans are means by which current conditions are assessed, future conditions are projected, aspirations are identified, decisions and commitments are made, and formal and informal rules for action are set.”36 Watershed planning typically involves deciding goals and strategies to guide governance and management of watershed conditions and actions affecting the watersheds.37

Watershed planning is broad and encompasses many varied types of plans, watershed types and scales, and planning problems, purposes, and entities. In prior publications, we have explored several quite diverse examples of watershed planning, often related to watershed management activities or watershed governance institutions, and the ways in which watershed planning can vary substantially.38 For example, watershed planning can be undertaken by a local government agency to address stormwater runoff, pollution, and flooding in a small urban watershed characterized by channelized and degraded streams or by a collaboration of federal and state government agencies and other stakeholders to address water supply management, instream flows, and aquatic habitats in a large rural watershed characterized by dams, overuse, and scarcity.39 Some of the possible primary purposes of watershed plans include:

sink; disease source and conduit; floodway; navigational highway; recreational amenity; naturally flowing waters; aquatic habitat; hydrologic ecosystem; history; community center and public forum; special or sacred place; object of the public trust; and object of power. Arnold, Framing Watersheds, supra note 26, at 285–94.

35 See Frank S. So, Bruce D. McDowell & Irving Hand, The Practice of State and Regional Planning 3–4 (1986); Tom Daniels & Katherine Daniels, The Environmental Planning Handbook for Sustainable Communities and Regions 11–12, 20–28 (2003); Arnold, Adaptive Watershed Planning, supra note 26, at 440 (“Adaptive planning is an iterative and evolving process of identifying goals and making decisions for future action.”).


control or management of stormwater runoff and non-point source pollution;
• improvement of water quality and reduction of water pollution;
• flood management and protection;
• water supply management, allocation, and conservation;
• improvement and protection of streamflows and habitat conditions;
• stream restoration.\footnote{40}

The sources of law and policy that mandate, authorize, or facilitate watershed planning are also quite varied. There is no single source of law driving watershed planning. For example, a watershed-centric planning process for the restoration and revitalization of the Los Angeles River in California is actually an agglomeration of at least four different plans developed or led by the U.S. Army Corps of Engineers, the State of California, the County of Los Angeles, and the City of Los Angeles, with each entity having different legal jurisdiction and responsibilities with respect to various parts of the Los Angeles River and its watershed.\footnote{41}

Some laws create watershed planning entities and duties. The Washington legislature statutorily created watershed planning units statewide and mandated that they develop watershed plans.\footnote{42} An interstate compact, entered into by four states and approved by Congress, created the Delaware River Basin Commission specifically to develop “[a] comprehensive plan, after consultation with water users and interested public bodies, for the immediate and long range development and uses of the water resources of the basin,”\footnote{43} among other responsibilities.\footnote{44} The Comprehensive Everglades Restoration Plan (“CERP”)\footnote{45} for the adaptive management of the Florida Everglades Basin was developed by the Army Corps of Engineers and the South Florida Water Management District, pursuant to express federal and state authorization in the Water Resources

\footnote{40}{Arnold, \textit{Fourth Generation}, \textit{supra} note 26, at 842–43.}
\footnote{41}{Arnold et al., \textit{supra} note 18, at 699.}
\footnote{42}{\textit{WASH. REV. CODE} \S\ 90.82.03 (2023).}
\footnote{43}{\textit{DEL. CODE ANN.} tit. 7, \S\ 6501 (West 2023).}
\footnote{44}{\textit{Id.} \S\ 3.2(a).}
Development Act of 1992, the Everglades Forever Act in 1994, and the Everglades Restoration Act of 2000. The Santa Ana Watershed Project Authority (“SAWPA”) in California describes its legal authority, scope, and mission (including watershed planning duties) as follows:

[SAWPA] was formed in 1968 as a joint power authority under California law, composed of five member agencies; Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District, San Bernardino Valley Municipal Water District, and Western Municipal Water District.

SAWPA focuses on a broad range of water resource issues including water supply reliability, water quality improvement, recycled water, wastewater treatment, groundwater management, brine disposal, and integrated regional planning.

Its stated mission is to develop and maintain regional plans, programs, and projects that will protect the Santa Ana River basin water resources to maximize beneficial uses within the watershed in an economically and environmentally responsible manner.

In other cases, existing legal authority is used to enable planning entities to develop watershed plans. The Chicago Metropolitan Agency for Planning uses its regional planning powers and resources to help local entities voluntarily and collaboratively develop watershed plans. New York City used its extraterritorial land use regulatory and eminent domain powers to develop a strategy for protecting the watershed source of the city’s drinking water supplies. The U.S. Forest Service has a watershed restoration policy that implements statutorily mandated national forest planning and management duties by planning watershed-scale restoration

47 FLA. STAT. § 373.4592 (2023).
and management activities. Under a variety of laws and policies, the Army Corps of Engineers, in collaboration with the Ohio River Valley Water Sanitation Commission and the Ohio River Basin Alliance, is developing a basin-wide multi-purpose plan for the Ohio River Basin.

And in still other examples, laws facilitate watershed planning. Perhaps the most widely known is the federal CWA § 319 Nonpoint Source Management Program, which helps states to meet their duties to develop watershed-by-watershed plans for the control of non-point source pollution by providing funding and technical assistance to both state and local units of government. Notably, the Blackfoot Challenge, a voluntary multi-stakeholder collaborative planning process for the Blackfoot River watershed in Montana, emerged out of the threat of strict and inflexible regulatory controls under the federal Endangered Species Act.

Despite this wide variety, watershed planning is a coherent category for equity analysis and systematic integration of environmental and resilience justice. First, there are no bright lines among the different types and purposes of watershed planning. This is because of the inherently and systemically interconnected structures, functions, and processes of watersheds. Many watershed water-supply or water-flow plans address water quality, and vice versa. Stream restoration planning calls for consideration of stormwater runoff, non-point source pollution, and water quality.

---

55 Id. § 1329(a)–(b), (e)–(f), (h).
57 As discussed, watershed features, processes, and functions are simultaneously and interdependently hydrologic, terrestrial, biotic, and social. See supra text accompanying note 32.
58 See, e.g., Arnold, Framing Watersheds, supra note 26, at 294–96 (describing Washington watershed plans that went beyond mandatory water-supply planning to include water-quality planning, instream flows, aquatic habitat, land use, and climate change impacts); Craig Anthony (Tony) Arnold, Frank Bencomo-Suarez, Pierce Stevenson, Elijah Beau Eisert, Henna Kahn, Rachel Utz & Rebecca Wells-Gonzales, Justice, Resilience, and Disruptive Histories: A South Florida Case Study, 34 COLO. ENV’T L.J. 213, 236–38 (2023) [hereinafter Arnold et al., Disruptive Histories] (describing CERP planning for water flows and quality in the Everglades).
59 Arnold et al., Anacostia, supra note 39, at 57–69.
Watershed governance and management, like for the Anacostia and Los Angeles River Basins, frequently involve many distinct yet interrelated plans undertaken by various federal, state, and local agencies and multi-stakeholder groups.\textsuperscript{60} Watershed planning by the SAWPA illustrates the integration of many different watershed problems and areas of law and governance into a single plan: water supply and demands for water uses, water quality and pollution, water conservation, instream flows, groundwater, flooding, stormwater runoff, green and blue infrastructure, land development, drought, and climate change, among others.\textsuperscript{61}

Second, watershed planning deserves attention as a category because it serves as an example of “fourth-generation environmental law.”\textsuperscript{62} An emergent phenomenon in the U.S. legal system, fourth-generation environmental law aims to overcome the problems of fragmentation across legal regimes, entities, and subject matters by creating holistic, integrated planning and management institutions at social-ecological-institutional scales.\textsuperscript{63} At the same time, it aims to avoid the problems of one-size-fits-all (unimodal) approaches by embracing the use of many different methods and tools of planning, regulation, and governance (multimodal or toolbox design of institutions).\textsuperscript{64}

Third and most importantly for this Article, certain patterns of social and racial inequity are evident in most watershed planning. This makes watershed planning a particularly important category for equity analysis. In general, planning empowers professional experts, government agencies, and private entities and groups with the resources to influence planning decisions, while excluding and marginalizing low-income people, people of color, and people without specialized education and training.\textsuperscript{65} This top-down, expert-driven, inequity-reinforcing nature of planning is all the more so for watershed planning because of the specialized knowledge and resources needed to understand the systemic nuances of watershed features and functions, as well as the technical aspects of relationships among watershed conditions, human behavior, and societal forces.\textsuperscript{66} For example, many watershed plans are filled with detailed technical information about measures of pollutants in streams, stormwater runoff

\textsuperscript{60} Id.; Arnold et al., supra note 18, at 699.
\textsuperscript{61} Arnold, supra note 56, at 35–37.
\textsuperscript{62} Arnold, Fourth Generation, supra note 26, at 774.
\textsuperscript{63} Id. at 792–97.
\textsuperscript{64} Id. at 795.
\textsuperscript{65} See generally John Friedmann, Insurgencies: Essays in Planning Theory (2011).
\textsuperscript{66} Smardon et al., supra note 8, at 48–50; Meenar et al., supra note 10, at 55–56; Cutts et al., supra note 15, at 2.
patterns and sources, flood projections, water usage projects, streamflows, wildlife habitat and vegetation, engineered water-control facilities, riparian and wetlands restoration projects, and the like. While necessary, these elements center the roles and power of scientists, engineers, and professional planners in the watershed planning process and disempower residents of low-income communities of color.

Moreover, watershed plans affect powerful and well-resourced interests, which influence the development and implementation of plans in ways that harm marginalized and vulnerable communities and groups. For example, a study of the California Bay-Delta Program (“Calfed”) showed that grassroots environmental justice groups had very little real influence, despite legal requirements that environmental justice concerns be included in the plan and grassroots environmental justice groups be included in the multi-stakeholder planning process. Large, powerful, and well-funded government agencies and water-market buyers and sellers used the planning process to perpetuate values and policy choices that favored their interests over the interests of low-income communities of color. Subsequent studies have documented that despite watershed planning, low-income, Black, Latine, and immigrant populations in California’s Central Valley—are unequally more vulnerable to unstable or inadequate water supplies, water contamination, unaffordable spikes in water prices, and exclusion from the processes of creating and implementing water policies.


68 Shilling et al., supra note 12, at 697–98; Cutts et al., supra note 15, at 2.

69 See generally Shilling et al., supra note 12.

70 Id.

71 This Article uses the gender-neutral “Latine” to refer to people of Latin American background, which is more appropriate to Spanish-speaking users than the term “Latinx.” “Latine is used when referring to a group of people of multiple genders or for someone identifying as nonbinary, gender fluid, genderqueer, bigender, agender, and gender nonconforming. Latine is what’s commonly used among Spanish speakers as it’s more easily pronounced than Latinx and can be used in plural forms.” A Brief Explainer on Latine and Latinx, HISPANIC EXEC. (June 5, 2023), https://hispanicexecutive.com/latinx-latine-explainer [https://perma.cc/V6NW-8XUZ].

72 See, e.g., Camille Pannu, Drinking Water and Exclusion: A Case Study from California's
Moreover, the complex interlocking of hydrological, ecological, political, economic, social, and institutional systems affecting watershed conditions and functions tend to facilitate and perpetuate systems of inequality, including systemic racism and structural wealth inequality.\(^{73}\)

For example, many notorious examples of green gentrification and displacement have arisen out of well-intentioned stream restoration and watershed plans, including for the Anacostia River in Washington, D.C.,\(^{74}\) the Los Angeles River,\(^{75}\) the Proctor Creek Watershed in Atlanta,\(^{76}\) and Philadelphia’s watershed-based green-infrastructure strategies.\(^{77}\) These patterns of injustice in watershed planning are explored further in Part II and later sections on environmental and resilience justice.

**B. Environmental Justice**

The EPA defines environmental justice as

the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and

---


\(^{76}\) See Cassandra Johnson Gaither, *Socioecological Production of Parks in Atlanta, Georgia’s Proctor Creek Watershed: Creating Ecosystem Services or Negative Externalities?*, 12 ENV’T J. 231, 231 (2019).

enforcement of environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys:

- The same degree of protection from environmental and health hazards, and
- Equal access to the decision-making process to have a healthy environment in which to live, learn, and work.\(^\text{78}\)

Environmental justice activists and scholars often define environmental justice more broadly. Julie Sze contends environmental justice issues emanate from society’s toxic intersection of “race, indigeneity, poverty, and environmental inequality.”\(^\text{79}\) Dorceta Taylor argues environmental justice is a new paradigm of environmentalist thinking based in the social construction of environments and articulated in seventeen principles adopted by the First National People of Color Environmental Leadership Summit in 1991.\(^\text{80}\) Taylor identifies six major themes of the principles: “a) ecological principles; b) justice and environmental rights; c) autonomy/self-determination; d) corporate-community relations; e) policy, politics, and economic processes, and f) social movement building.\(^\text{81}\)

Another way to conceptualize environmental justice is around three dimensions that roughly correspond to concerns for distributive justice, procedural and remedial justice, and social justice.\(^\text{82}\) The first dimension concerns the unequal environmental conditions that disproportionately harm and burden low-income communities of color, especially those environmental conditions that motivated the rise of the environmental justice movement: pollution, toxics, waste, and industrial facilities in low-income communities of color.\(^\text{83}\) One synthesis of numerous major studies highlighted five major observations:


\(^{79}\) Supra note 16, at 5.


\(^{81}\) Supra note 80, at 538–39.


\(^{83}\) Taylor, supra note 17, at 6–32; see also Robert D. Bullard, Dumping in Dixie: Race, Class, and Environmental Quality 1–2 (1st ed. 1990).
1. Communities of color have higher exposure rates to air pollution than their white, non-Hispanic counterparts.

2. Landfills, hazardous waste sites, and other industrial facilities are most often located in communities of color.


4. Climate change disproportionately affects low-income communities and communities of color.

5. Water contamination plagues low-income areas and communities of color across the nation.

The struggle for environmental justice is often about grassroots opposition to these environmental harms and inequities, such as the resistance of residents in Chester, Pennsylvania, to the siting of more waste facilities in a predominantly Black and poor community already overconcentrated with waste facilities, the protests by the Standing Rock Sioux Tribe against the Dakota Access Pipeline threatening their lands and waters, and the fight of low-income Black residents of Flint, Michigan, and Latine farmworkers in California’s Central Valley against drinking water contamination. More positively, environmental justice is about a vision for and work toward environmental conditions in low-income communities of color that are fair, healthy, vibrant, sustainable, and empowering.

The second dimension of environmental justice is about how governance of environments is structured in ways that marginalize the communities, voices, power, and lives of low-income people of color. Environmental justice is, at least in part, about redressing power disparities over environments that have resulted from racially segregating land use laws and policies, inadequate environmental laws and regulations, biased permitting processes, federal-government and white-colonizers’ power

---


87 Id. at 51–75.

88 See, e.g., ARNOLD, *FAIR AND HEALTHY*, *supra* note 17, at 32–34; *see also* JUST SUSTAINABILITIES: DEVELOPMENT IN AN UNEQUAL WORLD 9 (Julian Agyeman, Robert D. Bullard & Bob Evans eds., 2003).
over indigenous peoples’ environments, discriminatory private markets, and exploitative industrial capitalism. The environmental justice movement uses grassroots organizing and activism to assert the voices of low-income communities of color and to change the biased and exclusionary processes by which environmental decisions are made and implemented. Equitable reforms to environmental governance require robust methods of both participation and inclusion, access to information, “institutional spaces to address the impacts of policies on communities,” and attention to uneven power dynamics and resources.

The third dimension focuses on the systemic and structural nature of environmental inequity in society. From the earliest literature on environmental justice, it has been conceptualized in terms of both systemic racism and structural class inequality. Sze writes: “[U]njust environments are rooted in racism, capitalism, militarism, colonialism, land theft from Native peoples, and gender violence. The status quo is too deeply invested in institutional forces and ideological structures that exacerbate already existing conditions of environmental and social injustice.” According to Sze, environmental justice movements resist and contest these systems of environmental violence, racism, colonialism, and class exploitation, while imaginatively envisioning and seeking transformation of social and governance institutions.

C. Resilience Justice

The third and perhaps most important concept for equitable watershed planning is resilience justice.

Resilience justice is about the unequal vulnerabilities and adaptive capacities of marginalized and oppressed communities, particularly low-income neighborhoods of color, to

89 See generally Taylor, supra note 17.
90 See Cole & Foster, supra note 85, at 10.
91 See Smardon et al., supra note 8, at 44–46.
93 Supra note 16, at 7.
94 Id. at 1–24.
95 This subsection synthesizes three prior foundational articles in which we have explored the meaning and implications of resilience justice. See Arnold et al., Water Planning, supra note 16, at 1403; Arnold et al., supra note 18, at 685–86; Arnold et al., Disruptive Histories, supra note 58, at 263.
systemic shocks, disturbances, and changing conditions. The resilience justice concept or framework is a way to study and see marginalized communities’ unequal vulnerabilities under conditions that are inevitably dynamic, such as climate change, unprecedented drought, pollution, economic shocks, political or social upheaval, gentrification, and the like. It is also a means by which we can identify policy and planning reforms and governance system changes that can empower marginalized communities and build their adaptive capacities to navigate and thrive in an uncertain and changing future.96

Resilience justice is a conceptual framework, an organized way of thinking,97 although it is also viewed as a theoretical or ideological reframing of resilience in contemporary society.98 The resilience justice framework is useful for a range of equity-focused activities: assessing community conditions and inequities; analyzing plans, policies, and laws; community organizing, engagement, and activism; reforming plans, policies, and laws; and transforming unjust institutions and systems.99

Five features of resilience justice thinking help to explain it. First, it builds on but goes beyond environmental justice. Second, it is a systems-based conceptualization of community resilience in an ever-changing world. Third, its theoretical foundations include justice defined by capacities and vulnerabilities, not traditional distributive and procedural justice theories. Fourth, it offers a critical equity concept that merges a resilience perspective on justice with a justice perspective on resilience. And fifth, resilience justice is both an analytical framework and a transformative agenda.

Resilience justice builds on and includes environmental justice in its conceptualization of what justice means and how to achieve it.100 Low-income communities of color cannot thrive and be resilient in a dynamic world if they are harmed by inequitable environmental conditions and oppressed by unjust systems of environmental governance.101 But as a concept, analytical framework, and grassroots movement for change, resilience justice goes beyond environmental conditions and addresses the

96 Arnold et al., Water Planning, supra note 16, at 1417.
97 Arnold et al., supra note 18, at 685–86.
98 Arnold et al., Disruptive Histories, supra note 58, at 225–27.
99 Arnold et al., supra note 18, at 685–86; id. at 226.
100 Arnold et al., Water Planning, supra note 16, at 1418–19.
101 Id.
many unjust social, economic, political, and institutional conditions and systems that make frontline environmental justice communities also more vulnerable to climate change, housing insecure, economically marginalized, and excluded from governance power.102

Environmental justice thought and language concern racially and socially unequal environmental conditions and unfair environmental policies.103 In contrast, the thought and language of resilience justice concern the capacities, vulnerabilities, and resilience of communities that are typically marginalized or oppressed, such as low-income neighborhoods of color, indigenous communities, immigrant and refugee populations, the unhoused, and others.104 The vulnerabilities of marginalized and oppressed communities arise from the interconnections of environmental inequities with systemic racism and structural inequalities and the many inequities systemically manifested across interdependent dimensions of climate change, disaster risk and response, health, housing, food, jobs, poverty, economic investment, neighborhood gentrification and displacement, community cooperation and problem-solving, political power, and other factors.105

Thus, resilience justice is based in systems thinking, particularly the science of systemic dynamics and resilience, as applied to human communities. Community resilience is the capacity of a community as a dynamic system to adapt to cross-system disturbances and changes while retaining the community’s core structure and functions and to thrive in a disruptive and ever-changing world.106

A resilient community is one that has four different types or dimensions of resilience:

(1) . . . strength to resist unwanted disturbances and changes (maintenance of function);
(2) . . . recovery capacity to bounce back from shocks and disasters (return to function);
(3) . . . flexibility to adapt to changing conditions (evolution of function); and
(4) . . . transformative capacity to use disturbances and changes to restructure itself in desired ways (transformation of function)

102 Id.
103 See supra Section I.B.
105 Id.
106 Arnold et al., supra note 18, at 686, 688.
All four types of resilience are desired, depending on the circumstances and type of disturbance or change (e.g., resistance to discrimination and oppression; bounceback from a flood incident; adaptation to changing climate patterns; transformation in response to new investments of resources).\textsuperscript{107}

Vulnerability is the functional opposite of resilience.\textsuperscript{108} The vulnerability of an individual, community, or system (e.g., watershed) to harm from a set of disrupted or changing conditions is a combination of the exposure to the impacts of the changes or disruptions and sensitivity to those impacts (i.e., how much the individual, community, or system is affected), but the vulnerability is reduced or moderated by the adaptive capacity of the individual, community, or system.\textsuperscript{109} The systems that marginalize and oppress low-income communities of color and create their inequitable environmental, social, economic, and political conditions make them more vulnerable to undesired disruptions and changes, decline, and even collapse of the community’s core identity, features, culture, social ties, and capacities to sustain its residents.\textsuperscript{110} Resilience justice calls attention not just to the triggers of unwanted community change, such as hurricanes, floods, droughts, and pollution exposure but more importantly to the unjust systems that make marginalized and oppressed communities less resilient to these stressors.\textsuperscript{111}

Therefore, the resilience justice concept is built on theories of justice that define injustice and justice with respect to vulnerabilities and capacities, in contrast to theories of distributive and procedural justice.\textsuperscript{112} The vulnerability-centric conceptualization of justice has been developed

\begin{flushleft}
\textsuperscript{107} Id. at 687.
\textsuperscript{108} Id.
\textsuperscript{110} Arnold et al., supra note 18, at 686; Arnold et al., Disruptive Histories, supra note 58, at 225–28.
\textsuperscript{111} Arnold et al., Water Planning, supra note 16, at 1420–21; Arnold et al., supra note 18, at 685–86; see Arnold et al., Disruptive Histories, supra note 58, at 228–29, 234 (exploring the systemic causes of the unjust water vulnerabilities of the Miccosukee and Seminole Tribes in the Everglades and the systemic causes of the unjust climate-change vulnerabilities of low-income communities and Black communities in Miami).
\textsuperscript{112} Arnold et al., Water Planning, supra note 16, at 1418–22; Arnold et al., Disruptive Histories, supra note 58, at 226–27.
\end{flushleft}
by Martha Fineman113 and used by Clifford Villa to reframe environmental justice around the disproportionate vulnerabilities that Blacks, Latinos, and indigenous peoples experience due to systemic racism.114 The human capabilities conceptualization of justice developed by feminist philosopher Martha Nussbaum and Global South economist Amartya Sen defines justice “by the conditions that are necessary to support the essential capabilities of all humans to function, have well-being, and determine their own future, including control over one’s environment and effective participation in political life.”115 A communities-capacities conceptualization of justice extends human capabilities thinking to communities that shape human capabilities and defines justice with respect to communities’ equitable capacities to function and thrive.116

Resilience justice is a reconceptualization of justice from a resilience perspective and a reconceptualization of resilience from a justice perspective.117 These reconceptualizations draw on critical social justice concepts and emergent collective thinking and action—the lived experiences and struggles—of marginalized and oppressed communities in the Global South and in North American low-income communities of color.118 Resilience justice thinking and action contest eco- and structural resilience framings of resilience, which reflect and perpetuate the inequitable power of economic, political, educational, and professional elites and

117 Arnold et al., Disruptive Histories, supra note 58, at 226.
118 Id. at 225; Arnold et al., Water Planning, supra note 16, at 1418, 1422–23.
racist, colonialist, neoliberal systems. Instead, resilience justice illuminates and challenges inequitable systems of community vulnerabilities and capacities with bottom-up “anti-racist, anti-colonialist, anti-inequality, anti-domination, and anti-oppression concepts of social justice . . . .”

Finally, resilience justice is both an analytical framework and a transformative agenda, with both critical and constructive dimensions. The resilience justice perspective can be a critique of injustice, focused on inequitable vulnerabilities of communities and understanding and fighting the conditions, policies, and systems that create these injustices. However, resilience justice also offers a positive vision of justice, focused on understanding and seeking transformations in conditions, policies, and systems so that low-income communities of color have equitable capacities, empowerment, and the ability to thrive in a changing, disruptive world. To support both functions of resilience justice, we have developed the Resilience Justice Framework for Assessing Plans, Policies, and Laws, which contains seven questions to guide critical qualitative analysis of plans, policies, and laws that affect community vulnerabilities, resilience, and inequities. This framework is described in Section III.D.

II. MAKING WATERSHED PLANNING EQUITABLE

A. The Emergence of Environmental Justice in Watershed Planning

The increasing attention to environmental justice in many U.S. watershed plans and planning processes signals an equity evolution in watershed planning. One noteworthy example of this phenomenon is the express inclusion of environmental justice as a foundational value in the plan for the Ohio River Basin, released by the Army Corps of Engineers, the Ohio River Valley Water Sanitation Commission, and the Ohio River Basin Alliance in 2020:

119 Arnold et al., Water Planning, supra note 16, at 1422; Arnold et al., supra note 18, at 689; Arnold et al., Disruptive Histories, supra note 58, at 225.
120 Id. at 1422.
121 Id. at 1421–23.
122 Id.
123 Id.
124 Id. at 1424–25.
Consideration of Vulnerable Populations. Prioritize the needs and vulnerabilities of at-risk, low-income or underserved communities given the history of ecological and social injustice. Ensure that all strategic actions are just and equitable with a focus on flood risk management measures that target areas most in need, address issues of environmental justice, and recognize the importance of tribal communities’ contributions to our culture and history. Giving representation to vulnerable populations when decisions are being made can help support restoration priorities, policy solutions, and investment decisions that lead to equitable and just outcomes so that all of the people in the region benefit from the implementation of the regional strategy.125

In addition, the South Carolina Department of Health and Environmental Control’s guide for watershed planning specifically states that environmental justice considerations should be expressly discussed and addressed in watershed plans, including prioritizing and addressing the needs and concerns of disadvantaged communities, non-point source pollution in disadvantaged communities, and plan funding and implementation actions to benefit disadvantaged communities.126

There are many varied ways by which environmental justice is included in watershed planning. Watershed planning might arise out of the activism and even litigation of grassroots environmental justice groups seeking to address pollution, degraded waterways, insufficient green and blue infrastructure, and other inequitable environmental conditions in their communities. For example, environmental justice was a catalyst for the Anacostia River watershed restoration plan in the District of Columbia and Maryland, as well as the dozens of watershed-focused partnerships, initiatives, and plans that are making the river cleaner and the watershed greener.127 As groups like the Anacostia Watershed Society engaged with leaders and residents of low-income Black neighborhoods

125 Supra note 53, at 14 (emphasis omitted).
126 2022 GUIDE TO DEVELOPING WATERSHED PLANS 6. In contrast, EPA and other state guides do not address environmental justice. See, e.g., EPA, HANDBOOK FOR DEVELOPING WATERSHED PLANS TO RESTORE AND PROTECT OUR WATERS (2008); KY. WATERWAYS ALL. & KY. DIV. OF WATER, WATERSHED PLANNING GUIDEBOOK FOR KENTUCKY COMMUNITIES (2010).
disproportionately affected by water pollution and river degradation, they found watershed issues were increasingly framed as racial and social justice issues, leading to litigation against government agencies and polluters, activism, greater community engagement, and eventually the creation of partnerships for watershed planning and restoration.\textsuperscript{128} The Bronx River Restoration Project in New York was developed by the Bronx River Working Group (now the Bronx River Alliance), a multi-stakeholder organization formed out of South Bronx environmental justice concerns and consisting of grassroots community groups, as well as government agencies and non-profits.\textsuperscript{129} Restoration of the Los Angeles River under multiple watershed plans arose out of activism from partnerships among environmental groups and grassroots neighborhood-based justice groups.\textsuperscript{130} Bayou City Waterkeeper has been a catalyst for several watershed initiatives aimed at addressing the unequal environmental, water, and climate-resilience conditions of low-income communities of color in the lower Galveston Bay watershed in the greater Houston, Texas area.\textsuperscript{131} The action plan for the Walnut Creek watershed in the greater Raleigh, North Carolina, region resulted from the efforts of Partners for Environmental Justice in Southeast Raleigh neighborhoods.\textsuperscript{132}

Watershed planning processes can include specific methods for engaging and including grassroots environmental justice groups and residents of low-income communities of color in formulating and/or implementing watershed plans. For example, the process for developing the Onondaga Creek revitalization plan in Syracuse, New York, involved many methods for extensive engagement of community members, including the Onondaga Nation (an indigenous tribal nation) and residents of

\begin{small}
\textsuperscript{128} Id.; SMARDON ET AL., supra note 8, at 64, 71–72, 74, 76; Arnold, Fourth Generation, supra note 26, at 852–53.
\textsuperscript{129} SMARDON ET AL., supra note 8, at 64, 67–68, 73–74, 76, 78.
\textsuperscript{130} Arnold et al., supra note 18, at 699. See generally Eric D. Carter, Environmental Justice 2.0: New Latino Environmentalism in Los Angeles, 21 LOC. ENV’T 3 (2016); Kim, supra note 75; Garcia & Mok, supra note 75.
\end{small}
predominantly Black and low-income Southside neighborhoods: community members’ participation in a working group, the creation of a community-based group called the Partnership for Onondaga Creek, community forums, surveys, workshops, participatory mapping, a design charrette, and an internet site.\textsuperscript{133} The Chesapeake Bay Watershed Program, which implements the Chesapeake Bay Watershed Plan, has specific inclusion goals—including numeric (percentage) targets—for increasing the diversity of people and groups engaged in decision-making, restoration activities, and watershed-conservation careers; “creating meaningful opportunities to recruit, engage and involve people who have been historically excluded, underserved or unfairly impacted by state and federal policies and programs”; and asking marginalized community residents about their needs and goals before developing plans for tree plantings, parks, or stream restorations.\textsuperscript{134} Moreover, the Chesapeake Bay Trust received a $17 million grant from the U.S. Department of Agriculture to establish an Environmental Justice Participatory Fund to facilitate participation in Chesapeake Bay watershed planning and management by environmental justice communities.\textsuperscript{135} Planning for the San Francisco Bay/Sacramento-San Joaquin Delta (“Bay-Delta”) watershed had an Environmental Justice Subcommittee to the Bay-Delta Public Advisory Committee in its early iteration as the CALFED process in the late 1990s and early 2000s,\textsuperscript{136} and the 2023 process for updating the latest iteration of the Bay-Delta Water Quality Control Plan featured two environmental justice focused listening sessions and a tribal listening session and workshop.\textsuperscript{137}

Watershed plans might adopt environmental justice goals and strategies. For example, the Santa Ana River Watershed Project Authority’s

One Water One Watershed ("OWOW") plan has expressly addressed environmental justice in both the 1.0 version that identifies a holistic set of vision, goals, and strategies for governance and management of the watershed and the 2.0 version that focuses on implementation strategies and actions.\textsuperscript{138} In OWOW 1.0, one of its six visions for the watershed is a “[w]atershed in which environmental justice deficiencies are corrected.”\textsuperscript{139} OWOW 1.0 was developed with several principles including a bottom-up planning process, involvement of environmental justice communities, and objectives to address the needs of disadvantaged communities.\textsuperscript{140} OWOW 1.0 contains an entire chapter devoted to environmental justice issues and strategies, which was produced through “a combination of personal interviews, as well as community forums with residents of disadvantaged and minority communities in the three counties that comprise the Santa Ana River watershed: San Bernardino, Orange and Riverside.”\textsuperscript{141} OWOW 2.0’s chapter on disadvantaged and tribal communities updates OWOW 1.0’s environmental justice chapter by describing watershed planners’ extensive and ongoing engagement with Native American tribes and disadvantaged communities, the status of ongoing and new environmental justice issues in the watershed, and further strategies to address these issues.\textsuperscript{142} In contrast to the Santa Ana method of a separate section on environmental justice, the Mendocino County Resource Conservation District in Northern California has integrated environmental justice throughout its Russian River Integrated Coastal Watershed Management Plan, including in conjunctive management and groundwater storage strategies, flood risk management, a precautionary approach to water quality protection and improvement, and recreation and access projects.\textsuperscript{143}

The Chesapeake Bay Program expressly emphasizes environmental justice in its program implementation:


\textsuperscript{139} OWOW 1.0, \textit{supra} note 138, Executive Summary at 1.

\textsuperscript{140} \textit{Id.} at 2.

\textsuperscript{141} OWOW 1.0, \textit{supra} note 138, ch. 5.10, at 1.

\textsuperscript{142} OWOW 2.0, \textit{supra} note 138, at 5-167 to -170.

Everyone should be able to benefit from the lands and waters of the . . . watershed equally. However, lower-income neighborhoods and communities of color often endure greater environmental health hazards such as polluted water and air, extreme heat and loss of green space, and in many cases, were not chosen for environmental restoration due to racist policies. Environmental justice work seeks to mitigate those disparities and make it so a broader range of people are included in decisions related to environmental protection and restoration.144

In addition to engagement with environmental justice communities discussed previously in this subsection, the Chesapeake Bay Program devotes specific attention to addressing a variety of environmental justice issues in the watershed, including: water and air pollution and the major sources of pollution in low-income communities of color; degraded waterways and the historic under-selection of low-income communities of color for stream restoration; lack of green space in low-income communities of color and the need for more trees and land conservation; and the use of environmental justice data tools developed at the watershed scale to identify environmental inequities.145

In Seattle, Washington’s Green/Duwamish Watershed, several different plans involve and address the concerns of environmental justice communities, especially the Duwamish Tribe and low-income neighborhoods of color in the Lower Duwamish Valley. The Our Green/Duwamish (“OGD”) initiative, a watershed-scale partnership of King County and the City of Seattle, states that advancing equity and social justice is a key part of its mission.146 The OGD’s preliminary background report identified the need to take action on equity and social justice concerns and linked the OGD planning process to a number of existing racial and social equity plans, including the Washington State Action Plan to Eliminate Health Disparities; King County’s Communities of Opportunity program and Equity and Social Justice Strategic Plan; Seattle’s Race and Social Justice Initiative and Equity and Environment Initiative; and the Duwamish River Cleanup Coalition’s Duwamish Valley Vision and Healthy

144 Environmental Justice, supra note 134.
145 Id.
River / Healthy Communities Project. Next, OGD’s Watershed-Wide Stormwater Strategy committed to “use a pro-equity approach to selecting and implementing stormwater actions.” The OGD Implementation Plan states that OGD partners will “ensure environmental justice communities are reflected in action prioritization in the Watershed,” use existing environmental justice strategies and working groups, change green infrastructure incentives to “prioritize environmental justice in the funding structure,” and manage the quality and quantity of stormwater runoff to advance equity and social justice. Other environmental justice plans in the watershed include the Duwamish Valley Action Plan and the Duwamish Tribe’s environmental justice collaborations with the King County Conservation District and other partners for conservation master planning, trail systems, water quality monitoring, and forest and native habitat restoration.

Watershed planning processes might address specific environmental justice problems, such as particular types or sources of pollution, restoration of degraded watershed features, water-supply insecurity, or flood control and management. For example, watershed plans in the Anacostia, Bronx, and Green/Duwamish basins have addressed the disproportionate and harmful impacts of pollution on low-income communities of color by prioritizing cleanup of toxics and other contaminants in waters, Superfund site cleanups, and regulation of industrial and institutional sources of pollution. Equitable control of the quantity and quality of stormwater runoff is also a major concern of the Anacostia and Green/Duwamish watershed plans. Watershed plans for the Anacostia,

152 Arnold et al., Anacostia, supra note 39, at 57–69; SMARDON ET AL., supra note 8, at 81; CITY OF SEATTLE, supra note 150.
153 Arnold et al., Anacostia, supra note 39, at 57–69; OUR GREEN/DUWAMISH, supra note 146, at 13, 55–56, 73, 97, 99.
Bronx, and Los Angeles Rivers were driven in part by the need of low-income communities of color for green and blue infrastructure, particularly parks and green spaces, water-based recreational opportunities, and restored streams and wetlands. The California Bay-Delta Water Quality Control Plan addresses the needs of disadvantaged communities for safe and affordable water supplies, but it also addresses the unequal access to watershed resources by communities of color and indigenous communities because of the effects of segregating, exclusionary, and forced-migration policies. A newly planned project in the Upper Mississippi River Basin is focused on climate resilience for vulnerable and disadvantaged communities in the watershed, particularly to flood risk and other disasters.

Beyond specific examples, the general capacity of watershed planners and frontline environmental justice communities to integrate environmental justice into watershed planning has grown. In the past two decades, a growing number of texts articulate overarching environmental justice principles of planning and identify various environmental justice strategies and tools for specific types of planning that may be related to watershed planning, including comprehensive local planning, land use planning, and climate adaptation planning. Numerous researchers have developed specific environmental justice analytical

---

154 Arnold et al., Anacostia, supra note 39, at 57–69; SMARDON ET AL., supra note 8, at 81; Arnold et al., supra note 18, at 699.
155 Bay-Delta Watershed, supra note 137; STATE WATER RES. CONTROL Bd., supra note 137, § 10.1.
158 See generally ARNOLD, FAIR AND HEALTHY, supra note 17.
and management methods that can be used systematically in watershed planning and have applied them in specific watersheds. They include

- an environmental justice framework for watershed-wide flood-mitigation and stormwater planning and management (applied in the environmental justice community of West Ambler in southeastern Pennsylvania);\(^{160}\)
- geographic analysis of the racial and class distribution of federally funded wetlands projects (applied in 138 watersheds in Maryland)\(^ {161}\) and stream restoration projects (applied in Pennsylvania’s watersheds);\(^ {162}\)
- a model to measure the stormwater-runoff management benefits of green infrastructure projects in low-income communities of color (applied to the Walnut Creek watershed in Raleigh, North Carolina);\(^ {163}\)
- community-led participatory mapping of environmental stressors (applied in Atlanta’s Proctor Creek watershed);\(^ {164}\)
- environmental justice landscape literacy (applied in Philadelphia’s Mill Creek watershed);\(^ {165}\)
- decision support tools for multi-stakeholder planning (applied in the Columbia River Basin in the Pacific Northwest);\(^ {166}\)

\(^{160}\) See generally Meenar et al., supra note 10.

\(^{161}\) See generally Matthew Adam Dernoga, Sacoby Wilson, Chengsheng Kiang & Fred Tutman, Environmental Justice Disparities in Maryland’s Watershed Restoration Programs, 45 ENV'T SCI. & POL’Y 67 (2015).


\(^{163}\) See generally Laura Garcia-Cuerva, Emily Zechman Berglund & Louie Rivers III, An Integrated Approach to Place Green Infrastructure Strategies in Marginalized Communities and Evaluate Stormwater Mitigation, 559 J. HYDROLOGY 648 (2018).


\(^{165}\) See generally Spirn, supra note 1.

\(^{166}\) See generally Gregory Hill, Steven Kolmes, Michael Humphreys, Rebecca McLain & Eric T. Jones, Using Decision Support Tools in Multistakeholder Environmental
equity assessments of systems-level cumulative risks/impacts to tribal watershed resources and cultural ties to the watersheds (applied to Native American tribal watersheds);\textsuperscript{167}

- environmental justice modeling of present and future ecosystem services (applied in the urban-coastal watershed of Jamaica Bay, New York);\textsuperscript{168}

- climate risk communication methods and climate justice mapping (applied in Michigan’s Huron River watershed),\textsuperscript{169} and

- various types of social vulnerability analysis (applied in the Milwaukee River Basin in Wisconsin).\textsuperscript{170}

The last four studies in this list suggest the potential for watershed planning to go beyond the traditional environmental justice concerns with unequal exposure to pollution and address the systemic inequalities in community vulnerabilities and resilience.

\textbf{B. The Need for Resilience Justice in Watershed Planning}

A systematic and conceptually grounded approach to equitable watershed planning requires resilience justice, not merely environmental justice. Climate change is an important starting point for understanding the role that resilience justice can and should play in watershed planning. Climate injustice is the prototypical—and one of the most severe forms of—cross-system inequity that manifests itself in the watershed conditions and vulnerabilities experienced by low-income communities of color.\textsuperscript{171} These communities are disproportionately vulnerable to

\textsuperscript{167} \textit{See generally} Harris & Harper, \textit{supra} note 9.

\textsuperscript{168} \textit{See generally} Marcia S. Meixler, Max R. Piana & Alexis Henry, \textit{Modeling Present and Future Ecosystem Services and Environmental Justice Within an Urban-Coastal Watershed, 232 LANDSCAPE & URB. PLAN. 104,659 (2023).}

\textsuperscript{169} \textit{See generally} Chingwen Cheng, Jiun-Yi Tsai, Y.C. Ethan Yang, Rebecca Esselman, Margaret Kalce, Xin Xu & Paul Mohai, \textit{Risk Communication and Climate Justice Planning: A Case of Michigan’s Huron River Watershed, 2 URB. PLAN. 34, 36, 47 (2017).}

\textsuperscript{170} \textit{See generally} Cutts et al., \textit{supra} note 15.

\textsuperscript{171} \textit{See, e.g., Climate Justice/Justicia Climática, DUWAMISH RIVER CMY. COAL., https://www.drcc.org/climate-justicé [https://perma.cc/9DV7-K42H] (last visited May 6, 2024); Cheng et al., \textit{supra} note 169, at 34–35; see also} Sheila M. Saia, Kelly M. Sutlles, Bethany
flooding, storms, drought, extreme heat, and wildfire, all of which involve watershed features and functions and are often caused or worsened by climate change.\textsuperscript{172}

This inequitable climate-watershed-community nexus has many intersecting systemic causes. Climate-driven high-intensity rainfall events will generate more stormwater runoff and flood-waters that will in turn increase residents’ exposure to pollution and toxic chemicals in watersheds with more industrial sources of pollution, more contaminated lands (e.g., brownfields, livestock operations), and a greater percentage of impervious surfaces.\textsuperscript{173} Land use and housing patterns and policies segregate low-income residents of color into the areas of watersheds that have the worst disaster exposure and risk and the least adaptive features, including less and worse green and blue infrastructure, less resilient housing construction, and fewer food and health resources.\textsuperscript{174} Governments and private-sector entities invest substantially more in climate-adaptation strategies in communities that are more white and have more wealth than in communities that have more poverty and higher percentages of residents of color.\textsuperscript{175} Disaster preparedness, response, and recovery policies often fail low-income people and people of color.\textsuperscript{176} The experiences of white, wealthy residents who are dislocated from a climate-disrupted watershed are very different from those of low-income residents of color.\textsuperscript{177} Moreover, fleeing a flooding community or dangerous heat conditions is often unrealistic for those who lack the money, transportation, physical mobility, portable health care, and support network to go


\textsuperscript{172} Zoll, \textit{supra} note 21, at 6.


\textsuperscript{174} Zoll, \textit{supra} note 21, at 6.

\textsuperscript{175} Id. at 5.


\textsuperscript{177} Verchick, \textit{supra} note 19, at 39–40, 41–44; CTR. FOR PROGRESSIVE REFORM, \textit{supra} note 176, at 1.
elsewhere or fear encountering discrimination on the basis of their race or ethnicity, language, immigration status, family status, or disability.\textsuperscript{178}

These climate injustices are symptomatic of more than only unequal environmental conditions and unjust environmental policies. Although some scholars have included climate injustices in their evolving and expanding conceptualizations of environmental justice,\textsuperscript{179} others have articulated standalone concepts or frameworks of “climate justice” or “disaster justice” as lenses for evaluating and reforming laws and policies.\textsuperscript{180} But climate justice, disaster justice, and environmental justice are strongly interconnected with land use justice, housing justice, food justice, transportation justice, health justice, economic justice, and the broader forces of systemic racism, colonialism, racial capitalism, and structural class inequality.\textsuperscript{181} Climate injustices require us to inquire how and why low-income communities of color have more vulnerability and less resilience to climate change. And we must identify and seek changes to laws, policies, and institutional systems, including watershed planning, to decrease these inequitable vulnerabilities and improve the resilience of marginalized and oppressed communities. These are issues addressed by resilience justice.

Another aspect of watershed planning for which resilience justice thinking improves upon environmental justice thinking is green and blue infrastructure. Green and blue infrastructure is defined as “the biotic and aquatic aspects of the environment on which human communities and economies depend.”\textsuperscript{182} It includes

\begin{itemize}
  \item “trees and forests;
  \item vegetation, wildlife, and wildlife habitat;
  \item parks and recreational lands;
  \item biotic infiltration and retention of stormwater;
  \item waterways, wetlands, and watershed lands;
\end{itemize}

\textsuperscript{178} Verchick, \textit{supra} note 19, at 39–40, 41–44.
\textsuperscript{179} \textit{See generally} Manuel Pastor, Robert Bullard, James K. Boyce, Alice Fothergill, Rachel Morello-Frosch & Beverly Wright, \textit{In the Wake of the Storm: Environment, Disaster, and Race After Katrina}, 13 \textit{Race, Poverty, \\& Env't} 1, 21–26 (2006).
\textsuperscript{181} For a sense of the breadth and depth of the many interconnected manifestations and systemic causes of environmentally related injustices, see generally \textit{The Routledge Handbook of Environmental Justice, supra} note 15, and \textit{Resilience, Environmental Justice, and the City} (Beth Schaefer Caniglia, Manuel Vallee \\& Beatrice Frank eds., 2017).
\textsuperscript{182} Arnold et al., \textit{supra} note 18, at 671.
agricultural lands and soils, including produce

gardens and orchards;

• open space, corridors, and linkages; and

• oceans, marine systems, and coastal lands."

Green and blue infrastructure is essential to the healthy functioning of
watersheds as well as the resilience and well-being of the human communities that inhabit watersheds. It filters water and air pollution; moderates flood-waters, heat, and the impacts of storms; manages stormwater runoff, riparian areas, and coastal environments; provides aquatic and terrestrial species’ habitat and human recreation opportunities; supports the hydrologic cycle and food production; and sustains waterways and groundwater. It is also positively correlated with human physical, mental, and emotional health, social cohesion, sense of place, property values, and economic activity. Not surprisingly, watershed plans often identify increasing, improving, and/or restoring green and blue infrastructure as an important strategy.

183 Id. at 673–74.
184 Id. at 675–78.
185 Id.
186 Id.

As stated, “low-income communities of color have inequitably less and worse green and blue infrastructure, such as parks and green spaces, trees, restored waterways, biotic stormwater controls, food gardens, and wetlands.” Access to, funding of, and participation in governance of green and blue infrastructure are also inequitable by race, ethnicity, and class. We cited more than two dozen well-known studies documenting the disparities in quantity, quality, distribution, access, funding, and governance of green and blue infrastructure in and for low-income communities of color, although we believe from our ongoing research and awareness of the literature that the number of such studies numbers in the many hundreds, probably thousands, worldwide. Our own empirical study of tree density, relative park acreage, and proportion of green space in low-income neighborhoods of color in Tampa, Florida, and Louisville demonstrate major disparities.

Some scholars have addressed inequitable green and blue infrastructure in their evolving and expanding conceptualizations of environmental justice, but others have conceptualized justice specifically around equitable green and blue infrastructure, using terms like “park equity” and “the justices and injustices of ecosystem services.” One scholar has argued inequitable green infrastructure should be characterized as an

---

188 Arnold et al., supra note 18, at 666.
189 Id. at 680.
190 Id. at 666 n.7, 678–80 nn.62–81.
191 Id. at 680–83.
192 See generally SMARDON ET AL., supra note 8 (examining the (in)equities of waterway restoration and watershed planning through the lens of environmental justice); Harris & Harper, supra note 9 (conceptualizing water conditions, systems, and infrastructure from an environmental justice perspective); Byrne, supra note 18, at 437–48 (treating inequitable parks and greenspace as an environmental justice issue).
aspect of racial capitalism, not merely through the equity lens of distribu-
tional justice.\textsuperscript{195}

Equitable green and blue infrastructure is a central feature of the resil-
ience justice concept and framework.\textsuperscript{196} It makes low-income com-
nunities of color and the watersheds they inhabit more resilient to climate
change and disasters, whereas inadequate and inequitable green and
blue infrastructure make them more vulnerable to climate change and
disasters.\textsuperscript{197} It supports better health among residents of low-income com-
nunities of color and healthy, well-functioning watersheds, whereas
inadequate and inequitable green and blue infrastructure make them more
vulnerable to pollution, disease, and poor functioning.\textsuperscript{198} And it makes
low-income communities of color and their watersheds places that are
socially, economically, and politically vibrant, whereas inadequate and in-
equitable green and blue infrastructure create places of social, economic,
and political decline and stagnation.\textsuperscript{199} Moreover, green and blue infra-
structure inequities intersect with, reinforce, and are reinforced by other
unequal conditions, public policies, and social-institutional systems (e.g.,
 systemic racism, neoliberal political economy), “thus tying the persist-
tently unequal environmental conditions of marginalized neighborhoods
with persistent, unequal, and racist systems of poverty, unemployment,
housing insecurity, and barriers to accumulation of wealth.”\textsuperscript{200}

A resilience justice perspective expands the scope of watershed
problems addressed by planners and the planners’ understanding of the
causes of watershed inequities to include non-environmental problems and
causes. Watersheds are places in which low-income communities of color
experience not only inequitable environmental conditions but also inequi-
table political, economic, and social conditions.\textsuperscript{201} When neighborhoods
in a watershed have high rates of poverty, unaffordable housing and bar-
riers to home ownership, high rates of eviction, no grocery stores or
health services, low participation in voting and governance, and significant


\textsuperscript{196} Arnold et al., \textit{supra} note 18, at 691–92.

\textsuperscript{197} \textit{Id.} at 675–85.

\textsuperscript{198} \textit{Id.}

\textsuperscript{199} \textit{Id.}

\textsuperscript{200} \textit{Id.} at 683–84.

\textsuperscript{201} See, e.g., Agyeman & Bryan, \textit{supra} note 7, at 82–84; Smardon \textit{et al.}, \textit{supra} note 8, at
62–92 (summarizing issues in stream restoration planning in five urban watersheds);
Meenar \textit{et al.}, \textit{supra} note 10, at 57–59.
distrust of government and neighbors, it is unlikely residents will feel that a watershed plan will make their lives better or fairer or that they will engage in good watershed stewardship. It is unlikely watershed planning will do much to improve community resilience or reduce its vulnerabilities to disruptions and decline if non-environmental injustices are ignored. The political, economic, and social conditions of marginalized communities systemically reinforce and perpetuate their systemic inequities, undermining the efficacy of small or targeted environmental interventions by government agencies and multi-stakeholder plans. In resilience science, a system, such as a human community, might be vulnerable to collapse, but it might also become trapped in a state of dysfunction and distress.

Nonetheless, neighborhood decline and unwanted change are also high risks from watershed planning efforts that fail to address non-environmental conditions and systemic vulnerabilities. Resilience justice is especially concerned with the vulnerabilities of low-income communities of color to gentrification and displacement, including green gentrification and displacement. Neighborhoods inevitably evolve over time, and residents of low-income neighborhoods of color want to see their communities improve and change in desired ways. But low-income neighborhoods of color are particularly susceptible to investment-driven gentrification into higher income, predominantly white neighborhoods, from which low-income residents, residents of color, renters, and other vulnerable populations are economically, physically, and culturally displaced.

---

202 See, e.g., infra Section IV.C.
203 Zoll, supra note 21, at 3–7, 17–19.
205 See Arnold et al., supra note 18, at 693–94. See also, e.g., id. at 668–69, 669 n.15, 684–685 & nn.94–99.
206 See generally LANCE FREEMAN, THERE GOES THE HOOD: VIEWS OF GENTRIFICATION FROM THE GROUND UP (2006) (arguing residents have both positive and negative reactions to gentrification).
207 See, e.g., Cydnee V. Bence, A House Is Not a Home: Learning from Our Mistakes to Prevent Unequitable Gentrification on a Local Level, 44 Vt. L. Rev. 429, 431–33 (2019). See generally LORETTA LEES, TOM SLATER & ELVIN WYLY, GENTRIFICATION (2013); PETER MOSKOWITZ, HOW TO KILL A CITY: GENTRIFICATION, INEQUALITY, AND THE FIGHT FOR THE NEIGHBORHOOD (2017) (providing background information on gentrification and displacement). See also, e.g., Josh Poe & Jessica Bellamy, Plantation Urbanism: Legacy, Property and Policing in Louisville, Kentucky, 2 Radical Hous. J. 143 (2020) (some studies argue gentrification and displacement are phenomena of racial capitalism in which the interests of governments, private real-estate investors and developers, and even non-profit organizations...
Watershed planning, with its green and blue infrastructure and restoration projects, often creates the risk of green gentrification and displacement:

New parks and greenways, restored waterways, major new tree-canopy or biotic stormwater controls, and the like, tend to make the neighborhood more attractive to financial investment, land development or redevelopment, and an influx of new residents who can afford higher property or rental values. As a result, low-income residents, many of whom are people of color, are displaced, and the neighborhood becomes whiter and wealthier. Low-income communities of color are especially vulnerable to green gentrification and displacement, because they lack the economic resources, political power, and social opportunities to resist the displacement effects of new green and blue infrastructure investments or adapt and transform in ways that sustain the essential character and structure of their community. Green gentrification and displacement exemplifies the racism, inequality, and injustices deeply embedded in complex social-environmental-institutional systems and the need for the concept and tools of resilience justice.208

Watershed plans and restoration projects often catalyze green gentrification and displacement. Some notorious examples include the Anacostia River in Washington, D.C.,209 the Los Angeles River,210 the Proctor Creek Watershed in Atlanta,211 and Philadelphia’s watershed-based green-infrastructure strategies.212 A study of watershed planning in the Milwaukee River Basin found gentrification to be related to social vulnerability to loss of several key community features, including social capital, community identity and culture, sense of place, institutional memory, and political engagement.213 Resilience justice principles and methods call for

---

208 Arnold et al., supra note 18, at 685.
209 See generally sources cited supra note 74.
210 See Arnold et al., supra note 18, at 699–700; Kim, supra note 75, at 125–63, 214–54; Garcia & Mok, supra note 75.
211 See generally Gaither, supra note 76, for a discussion on gentrification and displacement in Atlanta.
212 See generally Shokry et al., supra note 77.
proactive, early stage strategies to prevent gentrification and displacement, such as community land trusts, pacing of neighborhood investments, linkages between housing supply and affordability policies and green and blue infrastructure improvement plans, and systems of co-governance of green and blue infrastructure in which power is shared by government agencies and neighborhood-based groups.214

Resilience justice is a bottom-up conceptualization of justice focused on the capacities of marginalized, vulnerable, and oppressed communities, especially low-income neighborhoods of color, indigenous communities, the unhoused, immigrant and refugee communities, and others.215 It “emerges from the grassroots experiences, voices, and collective action of communities, especially the most vulnerable and marginalized communities in society.”216 At the same time, though, justice for and the resilience of these communities are interdependent on governance institutions, other communities, and social, economic, and political systems.217

Therefore, resilience justice is about inclusion (not merely participation), community empowerment, and co-governance.218 Many planning processes, including those for watersheds, are merely participatory: top-down opportunities for the public to share their input to government officials about proposed plans drafted by planners or official task forces.219 In contrast, equitable planning is characterized by inclusion, the ongoing process of community building through community and government co-production of not only the content of plans and policies but also the processes of planning and governance.220 Equitable planning processes require proactive outreach to historically marginalized and under-represented

214 See Arnold et al., supra note 18, at 693–704.
215 See id. at 690–96; Arnold et al., Water Planning, supra note 16, at 1400–04; Arnold et al., Disruptive Histories, supra note 58, at 215, 226–27.
216 Arnold et al., Disruptive Histories, supra note 58, at 227.
217 See Arnold et al., supra note 18, at 698–99. Resilience justice is not about community self-sufficiency or self-determination because of the inherent realities of an ecological, social, and institutional world characterized by complexity, change and disruption, and multisystem, multi-scale interdependence across systems and scales. In addition, equitable governance in low-income communities of color requires government resources and expertise, legal and political authority, and public policies. Id.
218 See id. at 692–704; Arnold et al., Disruptive Histories, supra note 58, at 226–27.
219 See Arnold et al., Water Planning, supra note 16, at 1432–33, 1455; Arnold et al., supra note 18, at 697–98.
groups and communities to engage and include them in planning processes and governance structures.\(^{221}\)

Equitable watershed planning for resilience justice prioritizes community capacity building and empowerment through inclusive engagement of under-represented peoples and groups, grassroots organizing and activism in low-income neighborhoods of color, and attention to the strengthening of social capital in marginalized and oppressed neighborhoods.\(^{222}\) Social capital includes community “cooperation, trust, social networks, information sharing, and collective problem-solving.”\(^{223}\)

Moreover, equitable watershed planning is undertaken through co-governance planning structures, and equitable watershed plans create watershed co-governance systems for the implementation of the plans and ongoing governance and management of the watershed and its projects. Co-governance is a structure of policymaking and policy implementation in which power is shared by governmental entities and local grassroots communities.\(^{224}\) As a tool of resilience justice, co-governance devolves systemically inequitable concentrations of power in government agencies to power-sharing arrangements with marginalized and oppressed communities, such as Native American tribes and low-income neighborhoods of color.\(^{225}\) These institutionalized partnerships among government agencies, neighborhood groups, and other community-based groups can organize, engage, equip, and empower members of low-income communities of color to co-create and co-implement watershed policies that affect their communities.\(^{226}\) But co-governance approaches and other community-engaged planning processes, particularly in watershed planning, fall short when they involve residents only in identification of goals and strategies and not in the implementation of the plans or the feedback loops by which conditions are monitored and assessed, lessons are learned, and plans are modified based on lessons learned from plan implementation.\(^{227}\)

\(^{221}\) See Arnold et al., Water Planning, supra note 16, at 1448, 1455–57.

\(^{222}\) See Arnold et al., supra note 18, at 692–93.


\(^{224}\) Arnold et al., supra note 18, at 694–95.

\(^{225}\) Id. at 694–723.

\(^{226}\) Arnold et al., Water Planning, supra note 16, at 1456.

\(^{227}\) Id. at 1440, 1450; Arnold et al., supra note 18, at 696, 699–700, 702.
Finally, from a resilience justice perspective, equitable watershed planning must be coordinated, and ideally integrated, with other types of planning, such as comprehensive urban planning, land use planning, climate adaptation planning, hazards mitigation planning, housing planning, economic development planning, transportation planning, health equity planning, parks and greenspace planning, forest or tree-canopy planning, and others. From the perspectives of marginalized and oppressed community residents, especially in low-income neighborhoods of color, the unjust environmental conditions of the watersheds in which they live are not separate and distinct from the other unjust environmental, political, economic, social, and institutional conditions that affect their watersheds, communities, and lives. Cross-system vulnerabilities and inequities require cross-system planning.

III. INTEGRATING ENVIRONMENTAL JUSTICE AND RESILIENCE JUSTICE INTO WATERSHED PLANNING

A. Overview

An equitable approach to watershed planning should be characterized by key equitable planning principles, processes, analytical tools, and strategies that integrate environmental justice and resilience justice concepts and methods into watershed planning. Despite growing examples of watershed plans and planning that advance equity, most watershed planning processes lack a systematic, comprehensive, and effective approach to equitable planning. Watershed planning is predominantly concerned with current, projected (future), and desired aquatic and biotic conditions of the watershed and hydrological and ecological functions of the watershed. Watershed plans also often include strategies to improve watershed conditions and functions, including government projects and interventions, environmental stewardship incentives and tools to change human behavior, and even place-making planning methods for stream restoration and green and blue infrastructure projects. In these ways, conventional watershed planning operates under a scientific-technical

---

229 Smardon et al., supra note 8, at 2; Arnold, Fourth Generation, supra note 26, at 841–56.
230 See sources cited supra note 229.
paradigm, in contrast to a human-justice paradigm. In the scientific-technical paradigm, professional elites (e.g., scientists, engineers, planners) manage the watershed as a social-ecological-institutional system primarily for ecosystem function and resilience, while political and economic elites (e.g., government leaders, developers, businesses, industries) use plans and policies to strengthen and maintain existing social, political, and economic systems and institutions.

This Article embraces the alternative human-justice paradigm and explores ways to reform conventional watershed planning by integrating environmental justice and resilience justice concepts and methods into watershed plans and planning processes. We recognize many aspects of conventional watershed planning are likely to and should persist. For example, we do not suggest scientists, engineers, or professional planners be completely sidelined in watershed governance, nor do we suggest throwing out planning principles and strategies around water pollution levels, stormwater runoff patterns, aquatic and riparian habitat functions, flood management methods, and other such scientific-technical aspects of watershed planning.

The planning reformist approach of this Article is a starting point to articulating an alternative equity-driven approach to watershed planning specifically and to environmental and community governance generally. It differs from prior articles in which we have urged the replacement of conventional planning methods with adaptive planning methods for watershed resilience and articulated an approach to transforming watershed governance through activities contesting and disrupting existing planning and management systems, such as litigation and grassroots social-political activism by marginalized and oppressed communities. Furthermore, this planning reformist Article will be followed by a second article exploring a set of proposed structural changes to planning and governance systems to effectuate the system-transforming potential of environmental justice and resilience justice concepts. Nonetheless, the equitable planning methods we propose in this Article are bold and comprehensive and have transformative potential. They can remedy environmental, political, economic, and social inequities in marginalized and oppressed communities, empower these communities, build community resilience, and reduce inequitable community vulnerabilities. Equitable reforms to watershed planning

231 Cf. Agyeman & Bryan, supra note 7, at 82.
232 Arnold et al., Disruptive Histories, supra note 58, at 220–25.
234 See generally Arnold et al., Disruptive Histories, supra note 58.
planning are part of what we have called “revolutionary evolution”; “revolutionary in principles and scope, yet evolutionary in processes.” The rigidly binary thinking that contrasts moderate change and radical change fails to understand the multiple dimensions of and opportunities for systemic change in complex, dynamic systems and that resilience justice can emerge from many different kinds of institutional reforms.

The equitable planning principles, processes, analytical tools, and strategies described in this Section have been synthesized from numerous key works on environmental justice and resilience justice, particularly as they relate to planning.

B. Principles

1. Plans should be premised on watersheds being not only places of hydrological and ecological conditions, processes, and functions

---


236 Id.

but also places of human communities with their many different environmental, social, economic, political, and institutional dimensions and inequities.

2. Plans’ central features should include comprehensive sets of goals, strategies, actions, and metrics for environmental justice, resilience justice (equitable community resilience), and inclusive community engagement. This necessitates expressly identifying and addressing environmental injustices, inequitable community vulnerabilities, and the marginalization and disempowerment of some communities.

3. Plans should prioritize fairness or equity, a healthy and well-functioning environment, resilient and thriving communities, and good quality of life for all peoples.

4. Plans should adopt and implement a vision that empowers community residents. Particular attention should be given to planning processes, goals, strategies, actions, and metrics that empower communities who have been marginalized, under-represented, disempowered, and/or oppressed.

5. Plans should acknowledge and address the systemic effects and causes of inequities in the communities that inhabit the watershed, including climate change, systemic racism, socio-economic structures, the lasting effects of colonialism, and governance systems that marginalize and disempower some communities and peoples. Plans should include processes, goals, strategies, and actions that will be effective at addressing systemic effects and causes of inequities, such as significant transformations of planning and governance structures toward a co-governance structure and anti-displacement strategies.

6. Plans should seek and create equitable environmental conditions for all peoples, including:
   a) the avoidance, minimization, mitigation, and remediation of all environmental harms;
   b) the equitable distribution of, types and amounts of, and exposures to environmental harms, such pollution and flooding (to the extent they cannot be prevented);
   c) the provision of environmental benefits that promote health, support society and economies, contribute to thriving and resilient communities, and create good quality of life, such as restored streams and wetlands, healthy watersheds, parks, and trees and vegetation;
d) equitable distribution of, types and amounts of, and access to environmental benefits;

e) equitable and robust implementation and enforcement of environmental laws, regulations, and policies.

7. Planning processes should proactively provide all community members, especially those residents of marginalized communities, accessible and inclusive opportunities for meaningful involvement in and influence over the key decisions that affect their environments, health, communities, and lives.

8. Plans should be based on mutual respect and justice for all peoples. Plans and planning processes should be critically examined for any forms of discrimination or bias, which should be eliminated or prevented.

9. Planning processes should recognize and be based on the rights of all peoples to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement, evaluation, and feedback loops.

10. Plans and their implementation should include education of the public and the people who live, work, and play in the watershed in ways that:

a) promote good stewardship;

b) seek justice;

c) encourage environmental responsibility;

d) respect and include diverse cultural perspectives;

e) respect and include the lay/local knowledge and expertise of people in the watershed.

11. Plans should give particular attention to the neighborhoods and people that are especially marginalized or vulnerable, including low-income neighborhoods of color.

12. Plans should include remediation of past or ongoing harms to the watershed and its communities by addressing:

a) ecological and hydrological conditions;

b) other environmental injustices and harms;

c) the persistent and unequal effects of these harms on the social, economic, political, and health conditions and vulnerabilities of the watershed’s communities (e.g., neighborhoods), especially marginalized communities.

13. Plans should include new investments in community infrastructure, especially green and blue infrastructure, that make up for past and ongoing underinvestment and disinvestment in community infrastructure, particularly in marginalized neighborhoods.
14. Plans should contribute to the resilience (i.e., adaptive capacities) of all communities and neighborhoods in the watershed. Community resilience includes:
   a) the community’s strength to resist unwanted shocks and changes;
   b) the community’s recovery capacity to bounce back from shocks and changes;
   c) the community’s flexibility to adapt to unwanted shocks and changes;
   d) the community’s empowerment to use shocks and changes to transform in desired ways and thrive.

15. Plans should reduce the inequitable vulnerabilities of low-income neighborhoods of color to shocks/disturbances and changes and give particular attention to the resilience and capacities of these marginalized communities.

16. Plans should expressly acknowledge, analyze, and address the interdependent effects of the following systems on one another:
   a) the watershed as a system, including its conditions, functions, and health;
   b) other environmental and land use conditions, such as housing, brownfields, industrial land uses, transportation systems, vacant and abandoned properties, air quality, food systems, and climate change;
   c) social, political, economic, health, and institutional systems;
   d) systemic or structural inequalities, such as poverty, unemployment, and racism;
   e) community cooperation, problem-solving, and trust (social capital) and neighborhoods as geographic-social systems.

17. Plans should address the essential features of resilience justice in and for marginalized communities:
   a) green and blue infrastructure that benefits and supports communities to adapt and thrive, including restored streams and wetlands, riparian lands, healthy watershed, parks and green spaces, trees and vegetation, outdoors recreational areas, etc.;
   b) social cooperation: cooperation, community problem-solving, trust, and information-sharing;
   c) community empowerment and engagement, including grassroots or bottom-up organizing, activism, and advocacy;
d) co-governance systems in which governments and communities share power over the conditions and environments that affect communities;

e) proactive efforts to prevent and mitigate the watershed-related shocks/disturbances and changes to which marginalized communities are most vulnerable, including green gentrification and displacement, environmental disasters, pollution exposures, health crises, and climate change;

f) coordination with other plans, policies, and institutions that could affect whether or not watershed planning and management result in both justice and resilience in the watershed's marginalized and vulnerable communities.

18. Plans should primarily seek pollution prevention and elimination and secondarily seek pollution containment and mitigation.

19. Plans should preserve, strengthen, and value the diverse cultural assets and neighborhood identities and networks in the watershed's communities.

C. Processes

1. Planning processes should primarily focus on inclusively engaging diverse community members in watershed planning, governance, and stewardship and empowering all communities in the watershed, but especially marginalized and oppressed communities such as low-income neighborhoods of color. Participation in watershed planning processes by community residents should be meaningful, substantial, heard, valued, and effective.

2. Planning processes and strategies should maximize bottom-up (i.e., community-based, grassroots-driven) approaches and minimize top-down (professional-based, government-driven) approaches. Government agencies and officials, planning professionals, and major stakeholders necessarily have important roles to play in developing and implementing watershed plans, but they should undertake intentional efforts to share power and devolve planning to the community level, given the historic power disparities and injustices in planning and governance.

3. Inclusive community engagement should give special attention and effort to proactive outreach to those who have historically been under-represented or disempowered in planning and governance processes.
4. Planning processes should use methods that call for community members, including members of marginalized, vulnerable, and oppressed communities, to share their perspectives, needs, concerns, insights, and experiences in their own words and to engage in conversations about watershed planning and governance. These methods include in-depth semi-structured interviews, focus groups, iterative charrette processes, community-driven interactive workshops, inclusive community-based task forces or planning committees, listening sessions, and similar methods. These processes should be creative, interactive, accessible, engaging, and inclusive. Planners should ask the community residents what they need or want—what is lacking in their community—and about their community's identity, aspirations, and vision.

5. Planning processes should proactively seek the perspectives, participation, and long-term engagement of a broad and diverse group of people, including:
   a. people of color.
   b. low- and moderate-income people.
   c. recent immigrants and people who do not speak primarily English in the home.
   d. the unhoused.
   e. children and youth.
   f. the elderly.
   g. people with disabilities.
   h. neighborhood- and community-based groups.
   i. faith-based groups, churches, houses of worship, etc.
   j. civic and environmental organizations.
   k. local business owners and employees, especially neighborhood-based businesses.

6. Community residents should be asked to contribute to all phases of the planning process, including:
   a. their insights about watershed conditions and community conditions;
   b. their preferred vision for the watershed and goals for the future;
   c. their ideas about strategies and action items;
   d. their involvement in implementing, monitoring, and assessing the plan.

7. Planning processes should use diverse methods of community engagement and participation, as well as diverse partners and stakeholders to facilitate community engagement. A study of
barriers to diverse participation in watershed planning and governance in the Beargrass Creek and Green River watersheds found three key facts:

a. People of color, low-income people, and farmers experienced relatively substantial barriers to participation in watershed planning and governance, but nearly all watershed residents reported some barriers to participation;

b. Distrust of government (including MSD) was a major barrier to participation in watershed planning and governance, but the roles of more trusted community organizations and informal groups of watershed residents helped to facilitate participation; and

c. Different people preferred different methods of participation, with no method being so popular as to be adequate by itself for inclusive public engagement:
   i. some liked community meetings and focus groups and some did not;
   ii. some liked joining watershed groups and some did not;
   iii. some liked surveys and some did not;
   iv. some liked taking stream samples for testing and some did not;
   v. some liked stream cleanups and hands-on restoration projects and some did not;
   vi. some even liked attending and speaking at formal government hearings (though least popular, some felt the best way to engage was through formal government processes).

8. Watershed planning requires long-term sustained efforts to build relationships and trust between community residents and government officials and within communities. These trust- and

---

This study was funded by the U.S. Geological Survey and undertaken from 2013 to 2015 by Craig Anthony (Tony) Arnold and two student researchers, Alexandra Rose Chase and Jennifer-Grace Ewa. The study’s purpose was to identify barriers to diverse participation in watershed planning and governance, particularly by people who are under-represented in watershed planning and governance processes. The researchers conducted in-depth, semi-structured interviews of residents of Beargrass Creek and Green River watersheds with particular effort to interview those who have historically been under-represented in watershed planning and governance: a) people of color; b) low- and moderate-income people; and c) farmers and agricultural producers. These results are published here for the first time.
relationship-building processes must begin long before and continue long after the specific processes of developing a particular plan.

9. Participatory opportunities in watershed planning and the implementation of watershed plans must be accessible to all members of the watershed’s communities, including those with the least power and resources and the most vulnerability and burden. Meetings, activities, and events should be held at days and times and in locations and languages that are accessible to all the affected people in the watershed. Translation services, disability access, childcare, food, bus passes, and other resources essential to full participation should be automatically provided and advertised in invitations and notices.

10. Government officials should acknowledge and address community members’ concerns, grievances, and needs when they arise or are communicated. Processes must be transparent and responsive.

11. Planners need strong active listening skills, transparency and honesty, non-technical communication (including language, framing, and terms) that is understandable to non-professional community members, a commitment to fairness and inclusion, acknowledged awareness of injustices, the trust of community residents, and skills to engage the marginalized and under-represented members of the community.

12. Participatory, inclusive, and engaging planning activities should be organized and held in the neighborhoods and marginalized or vulnerable areas of the watershed, including organized field trips with open discussion opportunities.

13. Planning processes should incorporate storytelling activities, art forms, drawings, photos, videos, mapping, social media, charades/acting out scenarios, walking tours, bus tours, community events, fairs, picnics, cleanups, recreational activities, and many other methods by which community residents can express themselves about the watershed and their community. Planners, officials, and other stakeholders in the watershed planning process should listen to the histories of marginalized and oppressed communities. Watershed planning should embrace the disruptive narratives (stories) of these communities, because these histories and stories create equity- and resilience-oriented framings of planning issues in the watershed, in contrast to narrowly technical framings, economic or environmental status-quo framings, or socially and politically dominant framings.
14. Communicate upfront and then periodically and frequently the planning processes' objectives, methods, timeline, roles, and procedures. Use many methods to communicate with community members, including websites, emails, written letters, telephone hotline, reports, flyers, newsletters, and others. Communicate clearly, transparently, and often. Use of graphics and other methods of communicating data and ideas should focus on the communication method's usefulness to community members, not the communication method itself. Low-tech communications are sometimes more helpful to community members than high-tech. In the end, people matter, not software, data, or clever ideas.

15. Planners should be accountable for commitments made in the planning process and in the plan. Planning agencies should develop accountability agreements with community residents and groups so that the community has remedies or recourse if actions are not undertaken as promised.

16. The development and implementation of watershed plans should value, respect, and include the knowledge and expertise of community members. Community residents are experts about their communities and often about the watershed in ways that professional planners are not.

17. Watershed planning processes should have designated funding (e.g., from government budgets, grants, non-profits, donors) for inclusive and equity-focused community engagement and outreach in marginalized, oppressed, vulnerable, and frontline environmental justice communities. These funds should reach community residents themselves and grassroots community-based groups, not primarily remain in government agencies or mostly go to for-profit consultants.

18. Some tools to inclusively and equitably engage diverse community members are: multi-stakeholder partnerships, steering committees, task force roundtables, working groups, policy groups, community advisory committees, implementation committees, watershed-focused community organizations, watershed planning academies, training institutes, watershed mentoring programs, and educational series for local residents to receive information and training and prepare for leadership roles.

19. Watershed planning processes should value and embrace the roles of neighborhood-based groups and community organizations in grassroots organizing, activism, stewardship, and planning/governance engagement.
20. Watershed planning should consider a broad and relatively open range of possibilities with respect to content and outcomes, even if this goes beyond what is legally or institutionally required.

21. Watershed planning should use and value community-based participatory mapping, modeling, visioning, and designing activities.

22. Watershed plans should expressly create and provide the resources and support for formal feedback loops in which conditions are monitored and measured, data are analyzed, new disruptions and needs and changing conditions are identified, lessons are learned about whether the plan is achieving its intended goals and targets and whether any changes in the plan are needed, and the plan is revised or modified based on the lessons learned from these feedback loops. Feedback processes should expressly and intentionally focus on equity outcomes: are marginalized and vulnerable communities, such as low-income neighborhoods of color, gaining resilience and experiencing more equitable conditions? For example, there should be monitoring for signs of gentrification and displacement of low-income residents and residents of color from their neighborhoods, with rapid intervention if data indicate it is starting to happen. The plan’s provision for feedback loops should expressly include the participation of residents of marginalized communities in the monitoring, assessment, and plan-revision activities. They are the experts on whether the plan’s equity goals are being achieved.

23. Watershed plans should embrace co-governance processes and structures, in which power is shared among both governments and communities. The watershed plan itself should be developed through a co-governance process. The plan should include strategies and actions for creating a co-governance structure for the plan’s implementation and the watershed’s ongoing governance. And the watershed plan should include co-governance for specific projects, such as green and blue infrastructure projects in certain neighborhoods or sub-areas. Co-governance systems should be designed to engage and empower residents of low-income neighborhoods of color and other marginalized and oppressed communities.

D. Analytical Tools

Equitable watershed planning requires a set of equity-centric analytical tools to identify relevant environmental justice and resilience-justice
issues, conditions, needs, and vulnerabilities in the watershed and its communities. These tools will also help in formulating specific strategies and actions for achieving equity goals and metrics for monitoring progress. We recommend four specific tools: 1) an environmental justice audit; 2) a vulnerability assessment; 3) an analysis of relevant plans, policies, programs, and laws using a resilience justice assessment framework; and 4) a community perceptions and needs study using in-depth, semi-structured interviews of community members.

An environmental justice audit (“EJ audit”) is a framework for systematically engaging structured research and description of the conditions and inequities of a particular area that has been selected for planning. This planning tool was developed in *Fair and Healthy Land Use: Environmental Justice and Planning*. It is meant to provide planners with a snapshot of environmental, land use, social, economic, and cultural facts about the planning area that can then be used to support equitable planning practices and engage both officials and community residents.

A recommended checklist of data to gather for an EJ audit includes:

1) Demographic data (U.S. Census data):
   - Race and ethnicity
   - Income
   - Poverty level
   - Age
   - Type of household
   - Rates of homeownership

2) History and sociocultural features:
   - Area history, including land-use patterns, community identity, local residents, social and political movements, major events, and changes over time
   - Aesthetic and cultural assets/resources
   - Neighborhood groups
   - Major events
   - Historic structures
   - Social networks
   - Community strengths

---

239 Arnold, Fair and Healthy, supra note 17, at 46.
240 Id.
241 Id.
[3]) Environmental and land-use conditions
  • Existing zoning designations
  • Existing land uses (if different from zoning designations)
  • Existing land-use plans for the area’s future
  • Superfund National Priority List sites
  • Sites of hazardous-waste transportation, storage, and disposal facilities (TSDFs) under RCRA
  • Five-year history of data from the Toxic Release Inventory (TRI)
  • Available air-quality data
  • Available water-quality data (both surface water and groundwater)
  • Hydrologic patterns and flooding history (including sewer or stormwater overflow)
  • Vacant or blighted sites
  • Locations of schools
  • Locations of parks
  • Locations of civic centers and other public facilities
  • Locations of sewage and water treatment facilities, power plants, power or gas distribution facilities, cellular towers, and similar facilities
  • Conditions of streets, sewers, stormwater system, water distribution system, and distribution systems for electricity and natural gas
  • Locations of airports, rail lines, ports/docks/amarinas, mass transit routes, and other transportation facilities
  • Locations of freeways, highways, and major arterial streets
  • Emergency evacuation routes and emergency preparedness plans
  • Locations of affordable housing stock (by type)
  • Public health data on residents of area
  • History of environmental and land-use problems or conflicts

[4]) Economic conditions
  • Major employers in area and number of area residents employed by these major employers (if data available)
• Employment/unemployment rates of area residents
• Income levels of residents
• Major economic producers and assets of area
• Community Reinvestment Act data on lending and investment in area
• Area residents’ distance from work and their transportation options and choices
• Ranges and medians for rents and home values in area
• Education and skills levels of area residents
• Number and type of minority-owned businesses in area

An especially valuable source of data and maps for an EJ audit is the EPA’s EJScreen, an online screening and mapping tool that combines environmental and demographic data. EJScreen uses 13 environmental indicators, 7 socio-economic indicators, 13 environmental justice indexes, and 13 supplemental indexes and allows users to generate area-specific reports, color-coded maps, and comparisons of the selected area’s conditions to state or national conditions. EJScreen is a tool for screening, gathering, and visualizing data that can help planners analyze environmental justice issues in an area, but it does not generate the analysis itself. Statewide or local environmental justice screening tools may also be available and offer different or additional data or metrics, such as CalEnviroScreen in California, MD EJScreen in Maryland, HGB EnviroScreen in the Houston-Galveston-Brazoria area of Texas, and NYenviroScreen in New York State. Community-led participatory mapping of environmental conditions in a planning area is also a valuable way to gather data about environmental injustices that affect watersheds and neighborhoods.

---

242 Id. at 47.
247 See ARNOLD, FAIR AND HEALTHY, supra note 17, at 88; Jelks et al., supra note 164.
However, watershed planners, community groups, researchers, or others who are conducting an EJ audit will need to use a wide variety of data sources to give a full picture of the environmental and resilience justice conditions and issues of the area that has been selected for planning. In drafting an EJ audit for the Mill Creek watershed, for example, we used the EPA EJScreen, the CDC Social Vulnerability Index, data and maps from MSD, reports and documents from at least a dozen different government agencies or departments, several academic studies, information from the websites of numerous agencies and organizations, many news articles, photographs and observations from our own field inspections of the watershed and its communities, and even documents from the historical archives housed in the University of Louisville Ekstrom Library.

A second type of analytical tool for equitable watershed planning is a vulnerability assessment. To develop a watershed plan that seeks resilience justice for marginalized and vulnerable communities, planners must understand the spatial distribution of environmental and social vulnerabilities within the watershed. Bethany Cutts and fellow researchers have argued that social vulnerability analysis is essential to making watershed planning equitable.248

There are many different ways of assessing social vulnerability, though, reflecting different conceptualizations of social vulnerability and different variables used to measure relative vulnerability across communities.249 The classic Social Vulnerability Index was developed with fifty-two social variables organized around eleven independent factors that were correlated with the levels of vulnerability to environmental hazards.250 This index has been characterized as relatively complex and requires researchers’ access to data and geographic information systems (“GIS”) mapping software, as well as skills and time.251 Watershed planners,

249 Id. at 3; Saia et al., supra note 171, at 68; see, e.g., Jasmine Cassy Mah, Jodie Lynn Penwarden, Henrique Pott, Olga Theou & Melissa Kathryn Andrew, Social Vulnerability Indices: A Scoping Review, BMC PUB. HEALTH, June 28, 2023, at 1, 2; Bridget R. Scanlon, Robert C. Reedy, Sarah Fakhreddine, Quian Yang & Gregory Pierce, Drinking Water Quality and Social Vulnerability Linkages at the System Level in the United States, ENV’T RES. LETTERS, Sept. 5, 2023, at 1, 3 (2023).
251 Saia et al., supra note 171, at 68; SHANA JONES, N.C. COASTAL RES. L., PLAN. & POL’Y
especially those without the resources or time to develop their own mapping tools and models, might choose to use one of two major online social vulnerability mapping tools. The CDC/ATSDR Social Vulnerability Index, more commonly known as the CDC SVI, is an online mapping tool that uses sixteen U.S. Census data variables to map the relative vulnerabilities of census tracts to natural disasters and public health emergencies. The U.S. Climate Vulnerability Index (“CVI”) is a relatively new mapping tool that is focused on census-tract vulnerability to climate change. Created by the Environmental Defense Fund and Texas A&M University based on academic literature and collaborations with many subject-matter experts and community stakeholders, the CVI is organized around four categories of baseline vulnerabilities that reduce community resilience (health conditions, social and economic conditions, infrastructure conditions, and environmental conditions) and three categories of climate change risks that directly or indirectly impact communities (extreme events, social and economic stressors, and health harms). The CVI builds on the CDC SVI but has added numerous variables.

Other watershed planners, however, might want to create their own vulnerability assessment models and maps adapted to the community vulnerabilities most relevant to watershed planning. Some scholars have adapted or modified the social vulnerability index approach to specific watershed planning needs, such as changing streamflows or vulnerabilities specific to drinking water supplies. Cutts et al. have developed a methodology designed to incorporate community members’ perceptions and conceptualizations of vulnerability into more traditional variable-based approaches.

---


255 Id.

256 See Saia et al., supra note 171.

257 See Scanlon et al., supra note 249.
mapping and mitigate against watershed planners’ preconceptions and biases about vulnerability that might not match community members’ experiences. Using semi-structured interviews of thirty-one stakeholders in the Milwaukee River Basin, including watershed residents, social-equity community advocates, and government watershed managers, they discovered five different framings of vulnerability: social vulnerability from spatial change; social vulnerability from change over time without any particular geographic reference; persistent social vulnerability; increasing social vulnerability due to a more deeply divided society; and residents’ transience that impair social capital and attachment to place. They then used these community-driven concepts to create more nuanced maps of changing social vulnerabilities in the watershed across time and place. In fact, one expert on planning for coastal flood risk and vulnerability has recommended planners engage community residents in participatory modeling of vulnerability and risk and the creation of maps that are useful to community members.

A third analytical tool is the Resilience Justice Framework for Assessing Plans, Policies, and Laws, which the RJ Project developed to provide structured guidance for analyses of government plans, policies, programs, and laws affecting the resilience and vulnerabilities of marginalized and oppressed communities. This framework is “based on our conceptual framework of resilience justice, our syntheses of over three hundred published studies of community resilience and unequal community vulnerabilities, and the features of resilience justice that we have identified from applying qualitative and critical methods to community-engaged resilience justice assessments in low-income communities of color.” The framework contains seven questions to guide critical qualitative analysis of plans, policies, and laws that affect community vulnerabilities, resilience, and inequities:

1) Community Resilience: Do the plans, policies, and/or laws build marginalized communities’ capacities to resist, bounce back from, adapt to, and transform with sudden shocks (or disturbances) and changing conditions?

---

258 Supra note 15, at 2–4.
259 Id. at 5–7.
260 Id. at 8–13.
261 JONES, supra note 251, at 4–9.
263 Id.
2) **Inclusive Community Engagement**: Do the planning processes, including those established by laws and policies, engage marginalized communities’ residents in diverse, inclusive, and meaningful ways of participating in policy making and implementation?

3) **Environmental Conditions**: Do the plans, policies, and/or laws improve marginalized communities’ environmental conditions, including the distribution of and access to green and blue infrastructure?

4) **Economic, Social, and Political Conditions**: Do the plans, policies, and/or laws improve marginalized communities’ economic, social, and political conditions?

5) **Inequalities**: Do the plans, policies, and/or laws reduce disparities in marginalized communities’ conditions and capacities?

6) **Feedback Loops**: Do the plans and planning and implementation processes include feedback loops for ongoing monitoring and revisions of the plans, including engagement of marginalized communities’ residents and monitoring for marginalized communities’ vulnerabilities and adaptive capacities?

7) **Adverse Impacts**: Do the plans, policies, and/or laws anticipate, minimize, and mitigate any adverse effects of plans, policies, laws, and infrastructure management on the resilience of marginalized communities?

This framework has been used in our equity work in the Mill Creek watershed planning process, as well as assessments of urban water planning, river restoration planning, and climate adaptation planning.

---

264 Id. at 1424.
265 See infra Section IV.C.
The fourth analytical tool for equitable watershed planning is the use of in-depth, semi-structured interviews of community members. Semi-structured interviews are a type of qualitative research method that illuminates people’s perceptions and lived experiences, which cannot be observed or studied in detail through other research ways. In the context of watershed planning, semi-structured interviews have been used to gather qualitative information about perceptions of justice/injustice, vulnerability, and community engagement that could not be ascertained from geospatial studies or social and environmental quantitative data.

Interviews occur when a researcher or team of researchers (interviewer) meets with an interview subject (interviewee) in person, by telephone, or on an online platform to ask the interviewee questions and record the interviewee’s answers. In semi-structured interviews, interview questions are prepared in advance and structured around key concepts and factors about which the researchers want to learn (i.e., the interview is not an unstructured, ad hoc, evolving conversation). However, the interview questions are predominantly open-ended, inviting the interviewee to share their perspectives, experiences, and insights in their own words, and the process allows researchers to probe meaning, ask follow-ups, and encourage interviewees’ unfolding sharing of their narrative and perspective. The goal of the semi-structured interview is to

---

269 MICHAEL QUINN PATTON, QUALITATIVE RESEARCH & EVALUATION METHODS 340–41 (3d ed. 2002) (“We interview people to find out from them those things we cannot directly observe. . . . The purpose of interviewing, then, is to allow us to enter into other people’s perspective. Qualitative interviewing begins with the assumption that the perspective of others is meaningful, knowable, and able to be made explicit. We interview to find out what is in and on someone else’s mind, to gather their stories.”); ANNE GALLETTA, MASTERING THE SEMI-STRUCTURED INTERVIEW AND BEYOND: FROM RESEARCH DESIGN TO ANALYSIS AND PUBLICATION 2 (2013) (Semi-structured interviews are “the process of bringing to the surface the multi-dimensional nature of lived experience. It responds to an imperative for fine-grained qualitative analyses in order to open up new possibilities in understanding complicated phenomena often accepted as unproblematic. . . . It creates openings for a narrative to unfold, while also including questions informed by theory.”).

270 See, e.g., Sze et al., supra note 12, at 810, 838 n.3; LOPEZ & PIEREL, supra note 13, at 6; Cutts et al., supra note 15, at 5–7; Jacob C. Sheppard, Clare M. Ryan & Dale J. Blahna, Evaluating Ecological Monitoring of Civic Environmental Stewardship in the Green-Duwamish Watershed, Washington, 158 LANDSCAPE & URB. PLAN. 87, 89 (2017). See also discussion of the Mill Creek Community Study infra Section IV.C.


272 PATTON, supra note 269, at 344–47; GALLETTA, supra note 269, at 45–72.

273 PATTON, supra note 269, at 344–47, 353–79; GALLETTA, supra note 269, at 45–118.
keep the overall interview instrument as open to the interviewee’s self-determined answers as possible. The interviewers should take care not to define terms and concepts for the interviewees but should instead invite each interviewee to talk about terms and concepts in whatever ways the interviewee defines them.274

Interviewers should use a conversational and inviting tone when asking the questions and express empathy and encouragement through facial expressions and body language, but they should avoid making statements of judgment, even if positive, in response to the interviewee’s answers.275 Instead, affirming but neutral statements like “thank you for that,” or “I appreciate your answer,” or “I understand” are appropriate interviewer responses at the end of the interviewee’s response to question. Depending on who is conducting the interview research and for what purpose(s), federal human-subject research protections may apply and institutional review board review and approval may be required.276 Even if these requirements do not apply, the interviewer should disclose clearly and accurately at the beginning of the interview whether the interviewee’s identity will be kept confidential and should emphasize the voluntary nature of the interviewee’s choice to participate in the interview.277

When the interviews are completed, the researchers and planners will need to aggregate and synthesize the results of all the interviews. Ideally, the tools that the interviewers use to record the interview will automatically generate a live transcript of the interview, but there are also tools for generating transcripts of recordings after the interview has taken place.278 The transcripts will contain qualitative textual data—words—that can be analyzed for themes and patterns, as well as key insights.279 The researchers should use a qualitative social-science research

274 See, e.g., Cutts et al., supra note 15, at 5 (using semi-structured interviews to ascertain interviewees’ meanings of social vulnerability in their own words, thus expanding the researchers’ definitions of social vulnerability beyond the standard definitions previously used in watershed planning).
275 PATTON, supra note 269, at 365–66 (referring to the researcher’s need to establish rapport but maintain neutrality).
276 GALLETTA, supra note 269, at 40–41.
277 PATTON, supra note 269, at 405–15.
279 PATTON, supra note 269, at 380; GALLETTA, supra note 269, at 4–5, 119–22.
software program or platform to code the textual data from the interviews.\textsuperscript{280} Coding is a process of attaching or linking to the text words that identify relevant themes, concepts, factors (variables), and insights that are present in the words of the text, in this case in the words of the community members who were interviewed.\textsuperscript{281} The software/platform enables researchers to view, sort, categorize, aggregate, and synthesize these codes from all the coded texts (e.g., transcripts).\textsuperscript{282}

Gathering knowledge and planning input from the texts of in-depth, semi-structured interview transcripts involves qualitative research methods to generate understanding, not proof.\textsuperscript{283} The researchers are not aiming to test a model or hypothesis or generate statistical data to analyze variables. Therefore, when coding interview transcripts, the researchers should be looking carefully for the themes, concepts, factors, and insights that emerge from the interviewees’ words themselves, not attempting to find language that confirms the researchers’ biases or theories.\textsuperscript{284} Researcher bias cannot be completely eliminated, but it can be checked or controlled in the coding process through rigorous and critical self-reflection, aided by tools in qualitative analysis software/platforms that enable researchers to attach their written self-reflections about why they are coding language a certain way to the codes and text themselves.\textsuperscript{285}

Likewise, the process of synthesizing all the codes and writing an integrated report of research results involves rigorous, critical, and self-reflective attentiveness to researcher bias.\textsuperscript{286} Researchers aim to look for the patterns that emerge from the interviews as a whole, particularly

\textsuperscript{281} Id. at 3–8; GALLETTA, supra note 269, at 119–45. Coding can be used to engage in deductive or inductive analyses of other texts, such as the content of government plans, to discover patterns and meanings. See, e.g., Zoll, supra note 21, at 8–11 (using deductive coding of climate adaptation plans’ text for patterns of plan elements and strategies and inductive coding of climate adaptation plans’ text for normative themes of justice or equity).
\textsuperscript{282} SALDAN\’A, supra note 280, at 30–34, 207–08.
\textsuperscript{283} Qualitative research is an inductive process in which inherently subjective and value-laden knowledge is built from the ground up with details from researchers’ interactions with research subjects to discover meaning: “how people make sense of their lives, experiences, and their structures of the world.” JOHN CRESELWELL, RESEARCH DESIGN: QUALITATIVE & QUANTITATIVE APPROACHES 5, 145 (1994); see also PATTON, supra note 269, at 340–41; GALLETTA, supra note 269, at 2.
\textsuperscript{284} GALLETTA, supra note 269, at 119–45.
\textsuperscript{285} SALDAN\’A, supra note 280, at 39–50; PATTON, supra note 269, at 494–95; GALLETTA, supra note 269, at 104–05, 119–45.
\textsuperscript{286} SALDAN\’A, supra note 280, at 39–50; PATTON, supra note 269, at 494–95; GALLETTA, supra note 269, at 104–05, 145–72.
about community conditions and needs, perceived injustices and vulnerabilities, the lived experiences of community residents, and perspectives on governance and their communities, among others. However, the interview/coding/synthesis process also allows researchers to pull out and highlight specific statements of powerful and useful insights, even if the statement came from only one interviewee.

Interviews differ from other forms of gathering input from community members. In-depth, semi-structured interviews give community members opportunities to express their individual perspectives, insights, needs, and lived experiences in their own words. In contrast, opportunities for individuals or community spokespeople to offer comments on proposed plans or projects, whether at hearings and public meetings or through online, telephonic, electronic, or written communications, primarily invite reaction to top-down government-generated ideas and actions. Group discussion activities, such as in workshops, focus groups, or charrette processes, might exclude or marginalize community members, especially if these group events are structured by government planners, dominated by some participants, and scheduled for days, times, and locations that are convenient for some and inaccessible for others. Surveys are predominantly top-down, reaction-based methods of gathering public input and information because planners write the questions and the limited sets of response options based on what they want to learn from the public.

The premise behind the semi-structured interview process is that the production of knowledge and public policy (i.e., plans) should come from the bottom-up expression of perspectives, insights, needs, and lived experiences of community members, as inclusively as possible and in the community members’ own words. It is a means by which the voices of the marginalized and oppressed can be heard in the planning and policy development processes. Given the time and effort to schedule and participate in an interview, the interview method of gathering information and input will result in fewer community members participating than is possible with something like an online five-minute survey, for example.

---

287 See, e.g., Sze et al., supra note 12, at 810, 838 n.3; Lopez & Pierel, supra note 13, at 6; Cutts et al., supra note 15, at 2, 5–7; Speak, supra note 237, at 350, 352–57; Sheppard et al., supra note 270, at 89.

288 The comparisons here are based on the authors’ many experiences using or participating in all four categories of community input in planning processes.

289 Patton, supra note 269, at 388.

290 Galletta, supra note 269, at 2, 45.

291 Id. at 33–43; Patton, supra note 269, at 223–46.
However, researchers should recruit potential interviewees as broadly and inclusively as possible and specifically reach out to under-represented and marginalized people and groups to invite them to participate. In our experiences with in-depth semi-structured interviews of people in communities with significant racial, economic, social, and/or political marginalization, interviewees value the interview process itself because they are being listened to and heard and their voices are being included in the production of knowledge and policy.

E. Strategies

There are many different possible strategies that can be used to advance the goals and processes of equitable watershed planning. We especially recommend five: 1) an equitable climate resilience strategy; 2) an equitable green and blue infrastructure strategy; 3) an anti-displacement strategy; 4) a co-governance strategy; and 5) a multidimensional equity strategy.

An equitable climate resilience strategy must begin with a) the overall planning goal of facilitating the systemic resilience of the watershed and its human communities to climate change and b) the application of multiple plausible climate-change models at the watershed scale to identify and evaluate strategies and actions that would help make the watershed more adaptive to climate change and less vulnerable to decline or collapse from climate disruptions. However, equitable watershed planning must emphasize the equitable climate resilience of the watershed’s marginalized and oppressed communities as a central goal and engage in systematic analysis of communities’ unequal vulnerabilities to climate change in the watershed. The plan must contain specific strategies and actions that will enable marginalized communities to resist, bounce back from, adapt to, transform with, and thrive amidst the effects of climate change, thus reducing these communities’ vulnerabilities to decline and collapse from climate disruptions. The desired strategies and actions will vary, depending on the watershed, its communities, and the results of watershed-specific climate equity analyses.

Likewise, green and blue infrastructure strategies are generally important in watershed plans because of the many co-benefits of green

---

292 See sources cited supra note 291.
293 See generally Arnold, Adaptive Watershed Planning, supra note 26. See also Arnold et al., Water Planning, supra note 16, at 1452–53; Arnold et al., Anacostia, supra note 39, at 69–74; Arnold, supra note 56, at 35–37.
and blue infrastructure in supporting and restoring natural watershed functions and processes, improving the watershed’s overall systemic resilience (including to climate change), and making a watershed’s human communities healthier, more economically and socially vibrant, and more resilient. However, equitable watershed plans systematically identify and address inequities in green and blue infrastructure, including planning specific strategies, actions, and projects to improve the quantity, quality, access, and long-term resilience of green and blue infrastructure in marginalized communities, such as in or among low-income neighborhoods of color. The specifics of park-equity, tree-equity, and equitable stream-restoration and green-space strategies, among others, will vary by watershed and locality, but it is essential that watershed plans have equitable green and blue infrastructure strategies and then monitor them for effectiveness at improving the equity and resilience of the watershed’s marginalized and vulnerable communities.

Both climate-adaptation and green-and-blue-infrastructure strategies pose significant risks of gentrification and displacement in low-income communities of color and are not equitable strategies if they are not accompanied by anti-displacement strategies. The watershed plan must expressly identify, analyze, and address the gentrification(displacement risk and acknowledge that equity and community resilience goals cannot be achieved if there are no strategies and actions to prevent displacement of low-income people and people of color from their communities in the watershed. There is a vast literature on gentrification and displacement, but scholars, government officials, and social justice still struggle to understand which planning strategies and implementation actions are most effective at preventing displacement of low-income people and people of color from gentrification-susceptible communities. Some

294 See, e.g., Arnold et al., supra note 18, at 671–78; Arnold et al., Anacostia, supra note 39, at 63–68, 82–84.
295 Arnold et al., Anacostia, supra note 39, at 67.
297 See, e.g., Freeman, supra note 206; Bence, supra note 207; Lees Et Al., supra note 207; Moskowitz, supra note 207; Poe & Bellamy, supra note 207, at 143–64; Isabelle Anguelovski, From Toxic Sites to Parks as (Green) LULUs? New Challenges of Inequity, Privilege, Gentrification, and Exclusion for Urban Environmental Justice, 31 J. PLAN.
of the more promising approaches include community land or housing trusts, upfront analyses of proposed investments for gentrification/displacement risk, inclusion of affordable housing in green and blue infrastructure projects, community-based co-governance of infrastructure.

projects, and robust, well-funded, and targeted programs that aim to provide and stabilize affordable housing for unhoused populations and low-income and working-class renters.298

Another important strategy for equitable watershed planning is the creation of a co-governance structure for the watershed. Co-governance is a systematic sharing of governance power among governmental entities and community members, especially including residents of low-income neighborhoods of color.299 It differs from mere public participation—even inclusive participation—in watershed planning and governance if the power over watershed planning and governance remains fully vested in governmental entities.300 It also differs from complete devolution of governance power to communities to self-govern the watershed.301 On one hand, the government’s retention of all control, power, and authority over watershed planning and governance has the effect of perpetuating and deepening the marginalization and disempowerment of community members, especially in low-income communities of color, even if the government exercises its power in consultation with community leaders and residents.302 On the other hand, watershed planning and governance are complex, multifaceted, and difficult tasks that require the government’s funding, staffing, expertise, political power, and legal authority. Complete community self-governance of the watershed is a self-reliance strategy that has the effect of perpetuating and worsening the systemic inequities of marginalized communities.303

The creation and use of co-governance structures in watershed plans can, and ideally should, occur at four levels. The watershed plan itself should be created jointly by governmental entities and members of the communities that inhabit the watershed. It should create a power-sharing arrangement among the relevant governmental entities and communities for the implementation of the plan (i.e., for watershed governance and management). It should also create specific co-governance structures for particular projects or aspects of the watershed plan that most directly affect particular neighborhoods or subcommunities within the watershed, such as co-governed parks or co-governed stream restoration projects. And the watershed plan should create a co-governance

298 See, e.g., Arnold et al., supra note 18, at 693–704.
299 Id. at 694.
300 Id.
301 Id.
302 Id. at 694–96.
303 Id. at 698–99.
system in which governmental entities and community members share power and responsibility for feedback loops, which are the ongoing monitoring of conditions in the watershed and the plans’ implementation and effects, analyzing and learning lessons from this monitoring data and modifying the plan as needed to adapt to changing conditions and lessons learned about the plan’s outcomes and effects. In most watershed planning processes, any use of co-governance strategies would be an improvement over the current marginalizing and disempowering status quo. However, the failure to create true power-sharing arrangements at all four levels (planning, implementation, specific parts, and feedback loops) can have inequitable consequences. For example, a co-governance approach to planning the Los Angeles River restoration and revitalization was not accompanied by co-governance in implementation and feedback loop stages, and gentrified displacement of low-income residents of color was the result.\textsuperscript{304} Likewise, the CALFED Bay-Delta basin planning process had superficial representation of environmental justice groups, but the real decision-making power remained concentrated in major government agencies, which were responsive to powerful elite interests and marginalized the environmental justice communities.\textsuperscript{305}

There are many methods of co-governance and many design choices when creating and using a co-governance structure.\textsuperscript{306} We have previously detailed a variety of specific co-governance design and implementation issues, as well as examples that include watershed co-governance structures in Washington, D.C. and Philadelphia.\textsuperscript{307} A resilience-justice perspective on co-governance includes thirteen core principles:

1. Maximize bottom-up or grassroots-driven design and resist top-down or government-driven design.
2. Create processes of inclusion and power-sharing, not mere participation or consultation.
3. Expressly vest the co-governance structure with policy making and policy implementation decisions.
4. Provide sufficient public resources to create and maintain needed green and blue infrastructure and

\textsuperscript{304} Arnold et al., \textit{supra} note 18, at 699–700; Kim, \textit{supra} note 75; Garcia & Mok, \textit{supra} note 75.
\textsuperscript{305} See generally Shilling et al., \textit{supra} note 12.
\textsuperscript{306} Arnold et al., \textit{supra} note 18, at 694–731.
\textsuperscript{307} Id. These details are beyond the scope of this Article, but interested readers may consult the many sources we cite \textit{id}. 
to build social capital, adaptive capacity, and political power within marginalized communities.

(5) Engage in community organizing, capacity building, and empowerment.

(6) Invest in and build social capital within marginalized communities.

(7) Directly and honestly address difficult issues of racism and injustice, including the legacies and continuities of systemic racism, structural inequality, colonialism, and oppression.

(8) Don’t be afraid of conflict, litigation, protest, and resistance, but don’t dwell there; resisting power must become a pathway to exercising power for the good of the community and the cause of resilience justice.

(9) Litigation can be a useful disturbance or trigger to lead to power-sharing, addressing injustices, improving community resilience, and transforming the community’s infrastructure.

(10) Integrate green and blue infrastructure policies with other policies designed to improve marginalized communities’ resilience and reduce marginalized communities’ vulnerabilities, particularly policies for fair and affordable housing and for equitable development.

(11) Create, restore, and transform green and blue infrastructure to be adaptive to disturbances, shocks, and changes, including disasters and climate change.

(12) Plan and create co-governance structures for resilience justice at multiple nested scales from the neighborhood level to the multi-neighborhood level to the city level to the regional level, and intentionally seek to share power at larger scales with marginalized and oppressed communities.

(13) Institutionalize co-governance systems and arrangements with legal and political authority, but design them with adaptive capacity, including flexibility, modularity, innovation, and experimentation.308

308 Arnold et al., supra note 18, at 729–30.
Finally, a multidimensional equity strategy is needed. Equity issues in watersheds are multifaceted; they are manifested across many dimensions and result from many different interacting systems. For example, degraded stream conditions, flood risks and vulnerabilities, or water scarcity intersect with other conditions and vulnerabilities of low-income communities of color, such as exposure to toxic pollution, inadequate green and blue infrastructure, relatively poor health, housing insecurity, and the lack of wealth or income needed to cope and adapt.\textsuperscript{309} The persistent structural effects of redlining, racist and classist land use policies and patterns, and exploitation of low-income neighborhoods of color for gentrifying redevelopment are a few of the many examples of systems inequitably affecting a watershed’s communities.\textsuperscript{310} Watershed planning has to expressly acknowledge and study the multifaceted cross-system nature of injustices that affect the watershed’s marginalized and vulnerable human communities. Furthermore, the watershed plan must include goals, strategies, actions, and metrics that address the aspects of the watershed and its communities that are not merely hydrological or ecological in nature. These aspects include environmental justice, economic, social, and political conditions and issues, the structure of governance institutions, and the unequal vulnerabilities and resilience of the marginalized and oppressed communities that inhabit the watershed.

Finally, watershed planning must be coordinated, aligned, and/or integrated with other types of planning. This means planners must collaborate outside of their separate silos of watershed, land use, transportation, housing, economic development, hazards and disasters, climate change and sustainability, and other kinds of planning. This is not a proposal for a single massive integrated planning process across all the many dimensions of a locality’s or region’s future. Watershed plans serve purposes and have scales and scope that differ from those of other plans, and vice versa. Different governmental agencies and departments have different authority and expertise for different kinds of plans. Moreover, while the vast number and types of planning processes diffuse the potential engagement of low-income residents of color, they also create more opportunities or points of engagement by which low-income residents of color can influence their communities’ conditions and seek a more just and resilient future. Nonetheless, key equity strategies in watershed

\textsuperscript{309} \textit{Id.} at 665–66.

\textsuperscript{310} \textit{Id.} at 668–69.
plans will be ineffective if they lack supporting strategies in other relevant plans or perhaps even conflict with the strategies of other relevant plans. For example, in Louisville’s Mill Creek watershed, there is some coordination among and alignment between watershed planning and parks planning to support environmental justice and resilience justice goals. However, in the first two years of Mill Creek watershed planning, connections with local climate-adaptation, housing, land use, and anti-displacement planning have not materialized in any substantial and sustained way, which undermines environmental justice and resilience justice goals.

IV. Case Study: The Mill Creek Watershed in Louisville, Kentucky

A. The Mill Creek Watershed

The Mill Creek watershed makes an ideal case study of the need for equitable watershed planning based on the concepts and methods of environmental justice and resilience justice. The Mill Creek watershed is a thirty-four-square-mile area draining to Mill Creek, which empties into the Ohio River, in Southwest Louisville, Kentucky. This relatively small urban-suburban watershed is located entirely within the jurisdiction of the Louisville Metro government. Louisville Metro is a consolidated city-county governmental unit since the City of Louisville merged with Jefferson County on January 1, 2003, but with the continuing existence and limited governmental powers of approximately eighty previously incorporated municipalities within the Louisville Metro jurisdiction. The only separately incorporated municipality located in the Mill Creek watershed is the City of Shively.
Many of the neighborhoods in the Mill Creek watershed are relatively marginalized due to poverty, racial and ethnic segregation, housing conditions, and other characteristics. Seven neighborhoods have significantly higher percentages of residents of color, households receiving SNAP benefits, individuals below poverty, and households in poverty than the percentages for the Louisville Metro (Jefferson County), including 88% residents of color in Hallmark, 42% of households receiving SNAP benefits in Hazelwood, 48% of individuals at or below poverty in Rubbertown, and 38% of families at or below poverty in Jacobs. Another three neighborhoods have high concentrations of residents of color, and the percentages of residents at or below poverty in these neighborhoods is at or below the Louisville median. Four neighborhoods are predominantly white and characterized by at least two above average indicia of relative economic distress. In contrast, nine neighborhoods are predominantly white with economic indicia that are mostly at or better than the Louisville median. In the ten neighborhoods with relatively high concentrations of residents of color, six have more than 50% Black population, and the other four have a mix of races and ethnicities.

Out of the 23 total neighborhoods in the Mill Creek watershed:

317 For purposes of describing and analyzing the non-aquatic conditions and issues affecting the Mill Creek watershed and its human communities, we are including the narrow strip of land that runs the length of the watershed between the levee that forms the western boundary of the watershed and the Ohio River. Though this area drains (mostly) directly into the Ohio, the portion of the residential, commercial, and industrial areas within the Mill Creek watershed are seamlessly interconnected with those areas just on the western side of the levee. Furthermore, near the outflows of the Mill Creek Cutoff and Mill Creek into the Ohio, some land westward of the levee drains to both the creek or cutoff and the river.


319 See id. (providing data for Cloverleaf, Shively North-Farnsley & St. Dennis).

320 See id. (providing data for PRP-Northwest Hunters Trace, PRP West Central, Riverside Gardens-Lake Dreamland & Southwest Dixie-Valley Village).

321 See id. (providing data for PRP-Northwest Rockford, PRP Southeast, PRP Southwest-Black Pond, Riverport-Greenwood, St. Andrews, Valley Station Northeast-Street, Valley Station Northwest-Johnstown, Valley Station Southwest-Bethany & Waverly Hills).

322 See id. (providing data for Cloverleaf, Hallmark, Hazelwood, Iroquois, Jacobs, Rubbertown, Shively North-Farnsley, Shively Northeast-7th Street Road, Shively South-Dixie-Watterson & St. Dennis).
21 have below-median value of owner-occupied housing;
- 17 have below-median household income;
- 16 have more than 12% of the households without internet access;
- 12 have more than 45% of the renters paying 30% or more of their income for rent;
- 10 have higher vacant housing rates than the Louisville rate;
- 9 have an unemployment rate more than 7%;
- 8 have more than 10% of the households with no vehicle;
- 7 are designated food deserts; and
- in 6, more than half of the occupied housing units are rentals.\(^{323}\)

For example, the Hazelwood neighborhood has 23% unemployment, 29% of households without a vehicle, 24% of households without internet, 22% of residents age twenty-five or older who did not graduate from high school or earn their GED, 10% foreign-born population, 8% of the population with limited English proficiency, 69% renter-occupied housing, and 15% vacant housing.\(^{324}\) The Jacobs neighborhood has 15% unemployment, 29% of households without a vehicle, 27% of households without internet, 15% of residents age twenty-five or older who did not graduate from high school or earn their GED, 12% foreign-born population, 7% of the population with limited English proficiency, 82% renter-occupied housing, and 13% vacant housing. Jacobs is designated as a food desert.\(^{325}\) Overall, substantial parts of Southwest Louisville have high displacement vulnerability and housing precarity risk (a composite of multiple risk factors), according to one study.\(^{326}\) A different study identified several areas of Southwest Louisville as at moderate risk of displacement.\(^{327}\)

The socio-economic inequities of the neighborhoods in the Mill Creek watershed are accompanied by environmental inequities and

\(^{323}\) See supra notes 318–22.
\(^{324}\) See Neighborhood Data Profiles, supra note 318 (providing data for Hazelwood).
\(^{325}\) See id. (providing data for Jacobs).
\(^{327}\) LOUISVILLE METRO OFF. OF HOU., & CMTY. DEV. & LOUISVILLE AFFORDABLE HOUS. TR. FUND, LOUISVILLE HOUSING NEEDS ASSESSMENT 85 (2019).
vulnerabilities. The Mill Creek watershed is degraded. Its degraded ecolog-
ical functions can be traced back to the early nineteenth century when
swamps in Southwest Louisville were drained to convert the land to agri-
cultural land uses and eventually urban, suburban, and industrial
land uses. The Mill Creek watershed is degraded. Its degraded eco-
logical functions can be traced back to the early nineteenth century when
swamps in Southwest Louisville were drained to convert the land to agri-
cultural land uses and eventually urban, suburban, and industrial
land uses.328 Ditches and cutoffs were created to drain water from natu-
ral areas of collection to humanly preferred destinations (often the Ohio
River).329 To protect residents from flooding and disease, Mill Creek was
channelized, and the watershed was artificially divided in the early 1900s
into two separate, disconnected parts via an engineered stream cutoff to
drain the upper portion of the watershed.330 Upper Mill Creek empties
into the Ohio River via the Mill Creek Cutoff near the LG&E Cane Run
Power Plant and a flood pumping station, whereas lower Mill Creek flows
into the Ohio River near the LG&E Mill Creek Power Plant.331 The Upper
Mill Creek subwatershed is nineteen square miles and contains the
tributary streams of Cane Run, Boxwood Ditch, Lynnview Ditch, and Big
Run.332 The Lower Mill Creek subwatershed is fifteen square miles, con-
taining stream tributaries Black Pond Creek and Valley Creek.333 Notably,
many of the watershed’s neighborhoods with the highest rates of poverty
and residents of color are in the Upper Mill Creek subwatershed, the por-
tion that has been diverted from the stream’s natural flow.334

Beyond a re-engineered—that is non-natural—watershed structure,
the Mill Creek watershed’s degradation includes water pollution, poor
quality habitat and riparian conditions, and the effects of stormwater
runoff. Many of the watershed conditions are considered fair to poor:
significant pollution from nutrients, sediment, and bacteria; degraded

328 EDWARD W. ROBINSON, HISTORY OF LOCAL DRAINAGE IMPROVEMENT EFFORTS, JEFF-
ERSON COUNTY, KENTUCKY 3, 7, 11–12 (1985), https://louisville.edu/cepm/westlou/louis-
329 Id. at 10.
330 Id. at 10.
331 LOUISVILLE METRO EMERGENCY SERVS., 2023 LOUISVILLE METRO HAZARD MITI-
GATION PLAN, at 5-160, https://louisvillemsd.org/sites/default/files/file_repository/Flood
plain%20Management/Louisville%20Five%20Year%20Mitigation%20PlanV7.pdf
[https://perma.cc/HH2Q-U45T]; Following the Flow of Water, supra note 29.
332 LOUISVILLE METRO EMERGENCY SERVS., supra note 330, at 5-160.
333 Id.
334 Id.
335 See Louisville: A Focus on Poverty Competitive City Update 2015, GREATER LOUISVILLE
PROJECT, https://greaterlouisvilleproject.org/content/uploads/2016/11/Final-PDF_GLP
-2015-Poverty-Report.pdf [https://perma.cc/3UVU-CJVV] (last visited May 6, 2024); Tony
Arnold, Environmental Justice and Mill Creek Watershed Planning, UNIV. OF LOUISVILLE
habitat for species; loss of natural wetlands; and deterioration of riparian buffers (lands alongside the streams). Urban land development, significant amounts of impervious surfaces (e.g., roads, buildings, parking lots), and loss of vegetation have worsened stormwater runoff that carries pollution into Mill Creek and its tributaries and deteriorates streambanks and aquatic habitat. Localized flooding has been a concern of Mill Creek watershed residents for decades, probably worsened by its relatively low, flat, former-swamp characteristics, but MSD has taken many actions to control flooding and continues to work on projects to minimize flooding. However, if the major levee on the western edge of the watershed and/or MSD’s pump stations in West and Southwest Louisville were to fail during a major flood event, the communities in the Mill Creek watershed would be overwhelmed by catastrophic flooding. Two of Kentucky’s dams with the highest risk of failure are located in the Mill Creek watershed, as are two moderate-risk dams.

The Mill Creek watershed is also home to much non-stream pollution (e.g., air, land, groundwater pollution), and many of its neighborhoods are environmental justice frontline communities, located among industrial facilities and unhealthy conditions. Two of Louisville’s major industrial districts are located partly or completely in the Mill Creek watershed: Rubbertown (partly in the watershed) and Riverport (fully in the watershed). Riverport is an international shipping port as well as an industrial area. Both of Louisville’s major power plants are located in the Mill Creek watershed: the Cane Run Power Plant, near where the Mill Creek Cutoff empties into the Ohio River; and the Mill Creek Power Plant, near where the lower portion of Mill Creek empties into the Ohio

336 Mill Creek Restoration, supra note 6.
337 STORMWATER MANAGEMENT MASTER PLAN § 9.32 (2010) (Mill Creek section, at 6); LOUISVILLE METRO EMERGENCY SERVS., supra note 330, at 5-160.
339 LOUISVILLE METRO EMERGENCY SERVS., supra note 330, at 5-68 to -71.
The Lee’s Lane Landfill, a Superfund site where toxic wastes were removed and remaining wastes buried on the 112-acre site, is located among Mill Creek watershed neighborhoods. Dixie Highway runs the entire length of the Mill Creek watershed from northeast to southwest; Dixie Highway is a notoriously congested, dangerous, unsightly, and intensely developed transportation and commercial corridor with much runoff-intensifying pavement, vehicle pollution, and many traffic fatalities. Traffic-related harms aren’t limited to the Dixie Highway area, though. On many occasions, we personally observed substantial and continuous industrial large-truck traffic traveling numerous neighborhood streets in the Mill Creek watershed.

Nearly one-third of the sixty-five Louisville facilities on the Toxic Release Inventory Database, a federally mandated reporting system for toxic chemicals released into the environment, are located in or closely adjacent to the Mill Creek watershed, including many of the largest emitters of toxins. Southwest Louisville has disproportionately more pounds of toxic chemical releases, higher cancer death rate, higher inpatient


345 L OUISVILLE METRO EMERGENCY SERVS., supra note 330, at 5-187 to -190.
admissions for asthma, and lower life expectancy. While regulations of industrial polluters have made the air around the Rubbertown industrial district cleaner from two decades ago, it nonetheless exposes low-income people to disproportionate risks of health harms, including over fifty leaks of methanol and formaldehyde from a Hexion chemical facility in 2019. The Riverport industrial area has been identified as the source of several toxic chemicals releases, including sulfuric acid, nitric acid, and glycol ethers, which can cause respiratory conditions and cancers.

Neighborhoods near the Lee’s Lane Landfill and LG&E Cane Run Power Plant have experienced high concentrations of volatile organic compounds in the air, such as methane gases, and contamination of the groundwater with chromium, arsenic, and lead many times the federal limit. The landfill poses risks of future exposure to leaking pollution because it has been inundated with flood-waters twice, damaged by ATVs and dirt bikes, and has a very limited clay cap. LG&E has been subjected to regulatory fines and lawsuits for exposing Mill Creek area residents to coal ash, which causes a variety of serious health problems ranging from shortness of breath to liver damage and cancer, and sulfuric acid mist, which can lead to asthma and chronic obstructive pulmonary disease. Flooding risk and risk of toxic exposure intersect for Mill

348 LOUISVILLE METRO STRATEGIC TOXIC AIR REDUCTION PROGRAM, STRATEGIC TOXIC AIR REDUCTION REGULATION 5.30 STAKEHOLDER GROUP REPORT AND PLAN OF ACTION 92 (2007).
350 Id. Lynch et al., supra note 343, at 3, 4, 13, 14, 21, 25; Van Velzer, supra note 349.
351 Peterson, supra note 342; Cmar & Junquera, supra note 342; LOUISVILLE METRO AIR POLLUTION CONTROL DIST., MULTIPOLLUTANT STAKEHOLDER GROUP FINAL REPORT (2020); Van Velzer, supra note 6; James Bruggers, Map Shows ‘Worst-Case’ Flooding from Contaminated Ash Pond in Louisville, LOUISVILLE COURIER J. (June 19, 2017), https://www
Creek watershed residents: a worst-case flooding scenario at the LG&E Mill Creek Power Plant would inundate the Valley Village neighborhood with several feet of toxic water from the plant’s coal ash pond, as well as backing upstream in Mill Creek for half a mile.352

Mill Creek watershed communities also suffer from inequities in green and blue infrastructure. Overall, Southwest Louisville has disproportionately less tree canopy coverage and worse heat than other areas of Louisville.353 It is a place of disproportionately extreme heat vulnerability.354 A study of park equity and needs in Louisville shows that parks in Southwest Louisville receive less funding, have areas of relatively high need for investments in local parks based on equity considerations, and have many neighborhoods with disproportionately poor access to parks (i.e., not within a ten-minute walk to a public park).355 The Jacobs neighborhood, for example, has: 1) a 22% tree density compared to Louisville’s average of 37%; 2) 2.38 public park acres per 1000 residents compared to Louisville’s average of 21.32 acres; and 3) 43% coverage with impervious surface compared to Louisville’s 22%.356 While working on Mill Creek watershed planning activities in summer and fall 2022, we observed first hand that a number of parks in the watershed, as well as the Louisville Loop bike and walking path along the levee, had poorer conditions than their counterparts in wealthier and predominantly white areas. Even within the watershed the conditions vary: Sun Valley Park (with its community center and golf course) was very well maintained, whereas Sylvania Park was overgrown, littered, and graffiti-tagged and its community center was permanently closed.
Many of Mill Creek watershed neighborhoods are disproportionately and unjustly vulnerable to shocks and changes because of the many cross-system inequities that shape these communities and the watershed itself. These inequities include not only degraded ecological and hydrological conditions and functions but also toxic environmental harms, inadequate green and blue infrastructure, health inequities, housing insecurities, economic inequality, and racial segregation, among others. The Mill Creek watershed could be seen as yet another neglected and degraded urban watershed home to neglected, marginalized, and even oppressed communities, as is so common in the United States.\textsuperscript{357} However, the Mill Creek watershed is also the object of an innovative planning effort that is attempting to seek environmental justice and resilience justice among the watershed and its neighborhoods.

\textbf{B. Mill Creek Watershed Planning}

In 2022, MSD began a three-year watershed planning process for the Mill Creek watershed under § 319(h) of the Clean Water Act, as administered by the Kentucky Division of Water (“KDOW”), a unit with the Commonwealth of Kentucky Energy and Environment Cabinet.\textsuperscript{358} Led by MSD, the planning process was to be guided by a group of planning partners, including KDOW, Metro Parks and its Natural Areas Division, the Kentucky Waterways Alliance (“KWA”), the Kentucky Center for African American Heritage, The Nature Conservancy, and the RJ Project.\textsuperscript{359} The consistently participating partners, though, have been MSD, KDOW, Metro Parks, KWA, and the RJ Project.

The goals of the planning process were identified in MSD’s § 319(h) grant proposal to KDOW:

\begin{itemize}
  \item \textbf{Goal 1:} Improve water quality in Mill Creek by developing a Kentucky Division of Water (DOW) and Environmental Protection Agency (EPA) approved watershed plan that meets EPA A-I criteria.
  \item \textbf{Objective 1:} Compile available background water quality information about the Mill Creek watershed.
\end{itemize}

\textsuperscript{357} See, e.g., Arnold et al., Anacostia, supra note 39, at 31, 40–41, 43–44.
\textsuperscript{358} WATERSHED PLANNING GUIDEBOOK FOR KENTUCKY COMMUNITIES, supra note 126.
Objective 2: Determine current conditions of Mill Creek watershed through interpretation of collected water quality data and visual assessment.

Objective 3: Compile available background information about the Mill Creek water resources knowledge and culture and environmental justice disparities within the watershed for community outreach and engagement planning.

Objective 4: Develop a Best Management Practices (BMPs) Implementation Plan for the Mill Creek watershed.

Objective 5: Develop measurable milestones and evaluation criteria for the long-term success of the watershed planning and implementation efforts.

Goal 2: Create greater opportunity for community members to become involved in watershed-improvement efforts and solutions.

Objective 1: Work with the Partners Committee and the Watershed Steering Committee.

Objective 2: Establish a Watershed Outreach Committee for the Mill Creek.

Objective 3: Provide outreach to the local community on non-point source pollution and related environmental issues in their watershed.\(^ {360}\)

The Mill Creek watershed planning process will be continuing through 2025.

Two other planning processes for Mill Creek have occurred concurrently with the Mill Creek watershed planning process. First, the Kentucky Department of Fish and Wildlife Resources has been developing a plan to restore many of the natural hydrological and ecological features of Mill Creek in the lower Mill Creek subwatershed from Sylvania Park to the confluence of Mill Creek with the Ohio River.\(^ {361}\) The project will restore or improve fish and wildlife habitats in and along Mill Creek, stream flows, wetlands, and riparian (i.e., streamside) lands and vegetation.\(^ {362}\) This five-phase, two-decade restoration project is being

\(^{360}\) Id. at 6–8.

\(^{361}\) Aubach, supra note 3; Mill Creek Restoration, supra note 6; Sustainable Streams LLC & Ky. Dep’t of Fish & Wildlife Res., Presentation on Proposed Mill Creek Wetland and Stream Restoration Project (no date) (on file with author).

\(^{362}\) See sources cited supra note 361.
partly funded by $1 million provided by LG&E to The Nature Conservancy to settle 2014 litigation with the Sierra Club over coal ash contamination from the LG&E Mill Creek power plant, although the restoration costs are likely to be at least $20 million and contingent on other funding sources. This restoration project has also led to a relatively rapid Mill Creek Greenway planning process, led by Metro Parks with assistance from planning and community-engagement consultants. The Mill Creek Greenway will be a 1000-acre trail-centric park along the nearly 14 miles of restored stream in the lower Mill Creek subwatershed. The Mill Creek Greenway plan envisions: miles of paved trails and public access hubs that connect to local neighborhoods; areas of extensive reforestation, native plants, wetlands, meadows, and restored stream corridor; and many public use amenities, including an outdoors classroom, community gardens, playgrounds and recreational spaces, community green spaces, fishing sites, and pedestrian rest stops. The plan was developed during an intensive ten-month period of extensive community engagement and an iterative visioning process. The restoration and greenway projects involved planning processes that were separate and distinct from the watershed planning process led by MSD, but all three planning processes have been coordinated with and support one another. The RJ Project has been involved in all three.

Planning in the Mill Creek watershed has occurred contemporaneously with other planning efforts that affect the watershed’s neighborhoods, including Plan for Shively, a neighborhood plan for the Algonquin, Park DuValle, and Hallmark neighborhoods (a small portion of which is within the Mill Creek watershed), and a new comprehensive plan for affordable housing. These planning efforts follow several other planning

363 Id.
365 See sources cited supra note 364.
366 Id.
367 Id.
370 LOUISVILLE METRO G OY’T, My LOUISVILLE HOME: A COMPREHENSIVE HOUSING
efforts in recent years, including Louisville’s development and adoption of a new comprehensive plan\textsuperscript{371} and climate adaptation plan,\textsuperscript{372} as well as the creation of several other plans in Southwest Louisville, including Cane Run Road Neighborhood Plan (2016), Dixie Highway Corridor Master Plan (2013), Dixie Highway Town Center (Lower Hunters Trace) (2018), Dixie Highway Town Centers (Shively/Crums Lane) (2019), Jacobs Neighborhood Plan (2015), South Dixie Highway Master Plan (2018), Rubber-town Corridor Economic Development Strategy (2010).\textsuperscript{373}

C. Integrating Environmental Justice, Resilience Justice, and Inclusive Community Engagement into Mill Creek Watershed Planning

As MSD began preparing for Mill Creek watershed planning, it realized it had an equity and inclusion problem. The watershed is characterized by many low-income neighborhoods of color and environmental injustices. Moreover, there are widespread feelings of alienation from Louisville Metro and MSD among the watershed’s residents, and no watershed-focused community groups in the area. When MSD developed Kentucky’s first urban watershed plan in the Middle Fork of Beargrass Creek watershed, it relied substantially on the Beargrass Creek Alliance for community engagement.\textsuperscript{374} Meanwhile, the Louisville Metro Office of Planning has been working on regulatory revisions to an overlay district plan for the Floyds Fork watershed in far eastern and southeastern Louisville, where the Floyds Fork Environmental Association and the Louisville Keep Your Fork organizations are active.\textsuperscript{375} Those watersheds


\textsuperscript{372} LOUISVILLE METRO OFF. OF PLAN., supra note 109.


\textsuperscript{374} See LOUISVILLE MSD, supra note 67, at 12, 15.

are home to a number of relatively wealthy and mostly white neighborhoods. Even when the Mill Creek Greenway planning process began after the watershed planning process had begun, it is focused on a portion of the watershed that has substantially fewer low-income residents and residents of color than upper portions of the watershed and areas not immediately adjacent to the stream itself.376

MSD invited the RJ Project to join the planning process as a partner with the express role of helping the planning partners to incorporate environmental justice, resilience justice, and inclusive community engagement into the Mill Creek watershed planning process and plan.377

Since April 2022, we have participated in monthly online meetings of the Mill Creek watershed planning partners, engaged in the planning process, and had additional meetings about the Mill Creek watershed with MSD, Metro Parks, and KDOW officials from time to time.

We set three specific goals to achieve in the Mill Creek watershed plan:

1) **transform** the inequitable conditions of the watershed—too few trees and parks, degraded stream quality, too much pollution—in ways that make its communities less vulnerable to shocks like climate change and environmental disasters (i.e., improve community resilience and equity);

2) **empower** community residents, especially low-income people of color, through inclusive processes of policy making and implementation that engage the voices and perspectives of historically marginalized people;

3) **prevent** green gentrification and displacement of vulnerable community residents through proactive policies.

---

376 PARKS ALL. OF LOUISVILLE & LOUISVILLE METRO PARKS & RECREATION DEP’T, supra note 355.

377 The RJ Project team participating in the Mill Creek watershed planning process has included a) its director, Craig Anthony (Tony) Arnold; b) Rebecca Wells-Gonzalez, an instructor in communication and PhD student in urban and public affairs at the University of Louisville; c) approximately three University of Louisville law and/or graduate student Resilience Justice Fellowships per year, and d) University of Louisville graduate students in law and several other disciplines in the Fall 2022 Water Resources and Spring 2023 Land & Ecosystem Conservation courses.
One of the earliest tasks we performed in the planning process was to prepare a draft working document, “Mill Creek Watershed Planning Environmental Justice and Resilience Justice Frameworks,” to share with the planner partners group. This document identified several key concepts, sixteen equitable planning principles, forty methods of inclusive planning processes, examples of community engagement and inclusive planning methods, and a three-part strategy of research and analysis. Much of the content of Part III of this Article builds on the content of our Mill Creek Watershed Planning Environmental Justice and Resilience Justice Frameworks document, and we have cited in this Article many of the sixty-four sources listed in the planning document’s bibliography. The purpose of that document was to influence MSD and the planning partners group to frame both the process and the watershed plan with a pervasively equity-focused approach, as well as to have a set of tools for an equitable and inclusive Mill Creek watershed planning process.

Next, we extensively researched and analyzed the environmental and community conditions in the Mill Creek watershed from an equity perspective and drafted the Mill Creek Watershed and Community Environmental Justice Audit. We shared the audit with planning partners for internal use in planning processes in July 2022, but we continue to update the information and revise the document, which is over 100 pages in length. Section IV.A of this Article summarizes much of the most important content of the EJ Audit. The goal of this audit has been to understand the multifaceted equity issues within the Mill Creek watershed and focus our planning partners on the unjust conditions and systemic vulnerabilities that residents of the Mill Creek watershed face.

The EJ Audit has been a systematic and fact-driven tool for shifting the framing of discussions about Mill Creek watershed issues to a combined environmental-justice/resilience-justice frame. Previously, Southwest Louisville wasn’t mentioned much as a frontline environmental justice community; most of the attention to environmental injustices has focused on West Louisville, the nine low-income and predominantly Black neighborhoods that are north of the Mill Creek watershed and adjoin the northern part of the Rubbertown industrial district.378 Very few decision makers were thinking of Southwest Louisville as a place with significant unmet needs for parks, trees, and native vegetation or as an area that could be vulnerable to gentrification and displacement, both of which have been highlighted by the EJ Audit. The audit has

378 Arnold, supra note 334.
helped give a clearer picture of the diverse set of neighborhoods that compose the Mill Creek watershed community, many of which are relatively marginalized. In addition, the first draft of the audit helped to make MSD aware that some of its publicly available information and data were outdated and inaccurate.

The centerpiece of the RJ Project’s work on the Mill Creek watershed planning process has been the Mill Creek Community Study, a study using in-depth interviews of community members to discover in their own words the conditions and issues that they perceive to affect their community and the Mill Creek watershed the most. The study consisted of in-depth, semi-structured interviews that sought to obtain community members’ views and needs about their environmental and community conditions in their own words through thirty-one questions organized around five major topics: 1) Community; 2) Fairness, Participation, Inclusion, and Trust; 3) Watershed; 4) Changes; and 5) Personal Characteristics. All of the questions were open-ended questions, except for four questions that asked participants to select among several options regarding their housing status, employment status, race and ethnicity, and annual household income. It was estimated that a typical interview would average about forty-five minutes. Interviews were conducted online and in person and were recorded and transcribed. The identities of the participants are confidential.

The study was open to everyone who is at least eighteen years old and thinks that they might live, work, or play in the Mill Creek watershed. Prospective participants were provided a map and list of neighborhoods in order to self-evaluate their connection to the Mill Creek watershed but were expressly told they could participate even if they did not know for certain about their connection or if they did not know anything about Mill Creek. The study aimed to include any adult who might live, work, or play in the Mill Creek watershed and to especially invite members of diverse and marginalized groups, especially people of color, low- and moderate-income people, renters and other non-homeowners, immigrants and refugees, the under-employed, and others who are also under-represented in local planning. As a qualitative-research study gathering broad input for public policymaking, there was no effort to engage in random sampling or representative sampling. There was no hypothesis being tested.

RJ Project researchers prepared a study protocol, interview instrument, informed consent document (unsigned preamble), recruitment documents (flyer, email messages, letters, and website language), and study application and submitted these documents to the University of
Louisville Institutional Review Board for approval, which was received. Researchers actively sought to invite members of the Mill Creek watershed to participate in the study by being interviewed. The recruitment of interview participants aimed at being as inclusive as possible and also intentionally engaged with groups and organizations that consist of or work with people who are under-represented in watershed planning and local governance. Letters, email messages, and/or flyers were sent to approximately 100 community groups, local religious organizations, non-profits, and individuals. Researchers recruited interview participants at seven community events described later in this Part and interviewed twenty-one members of the Mill Creek watershed community, of which two-thirds are from under-represented or marginalized groups: a) people who do not own their own home; b) people who are not employed full time; c) people of color; or d) people with household incomes below 150% of the area median. The researchers then coded the text of all the interview transcripts for themes and patterns in Dedoose, a qualitative social science research software, and synthesized the coded results of the study into a report.

The Mill Creek Community Study has been highly successful in several respects. First, the study has gathered the perspectives, insights, concerns, and needs of community members in their own words in response to open-ended questions. We have learned some important things about what community members care about that would not have been anticipated or queried by a close-ended survey designed by government officials or academic researchers. Inclusive community engagement and equitable empowerment of marginalized peoples and communities require listening to community members’ voices—to their expressions of themselves in their own words.

Second, community members, especially marginalized community members, want someone involved in local planning to listen to them. Several interviewees told us without prompting how much they enjoyed and appreciated the interview process, particularly the open-ended nature of the questions and having someone hear what they wanted to

---

379 Institutional Review Board Study No. 22.0567, University of Louisville.
380 Black or African American; Hispanic or Latine; Asian, Native Hawaiian, or Pacific Islander; American Indian or Alaska Native; Middle Eastern, North African, or South-west Asian; or multiracial.
say in their own words. We have heard this from participants in past semi-structured interview studies in other communities. However, the fact that we were university researchers, not the notoriously distrusted MSD officials, seemed to help interview participants open up to us.

Third, two-thirds of the interview participants have characteristics that make them marginalized or under-included in local governance, such as watershed planning. These interview participants are relatively evenly distributed among people of color, low-income people, under-employed people, and people with multiple characteristics. Thus, the Mill Creek Community Study is a means by which under-represented voices and perspectives are being included in the Mill Creek watershed planning process.

Fourth, the study exceeded our target of at least twenty interviews, even though our twenty-one interview participants form a relatively small and unrepresentative sample of the entire Mill Creek watershed population. We believe that the time commitment to engage in a forty-five-minute online or in-person interview at a mutually convenient time with researchers was a barrier to a larger number of participants: approximately 100 people expressed an interest in setting up an interview upon learning about the Mill Creek study, but only about 20% of them actually scheduled and then followed through with the interview. The point of semi-structured interviews, though, is to develop and explore qualitative insights into community members’ perspectives, insights, and needs, not obtain statistically significant quantitative results that confirm predictive hypotheses or find patterns based on narrow, predefined categories of input. Semi-structured interviews produce a thickly descriptive thematic understanding based on grassroots voices. Moreover, the interview results produced clear, strong patterns of insights that cut across a wide range of participants, which emerged as we coded and synthesized the interview transcripts and thus established the relative validity of numerous conclusions that can be drawn from the Mill Creek Community Study.

The results of the study reveal major equity concerns that need to be addressed in the Mill Creek watershed planning process and in other planning processes. The strongest, most pervasive theme to emerge

---

362 Very few interview participants were white, employed, moderate-income homeowners. However, RJ Project researchers were disappointed that very few renters chose to participate in the interviews. To protect the anonymity of the interview participants, we have committed not to break down the numbers or percentages of interview participants by characteristics at any more granular level than we have communicated in this Article.
from the interviews is that Mill Creek community members overwhelmingly distrust Louisville Metro government, including MSD, and perceive that officials have unfairly underinvested resources in and attention to the Mill Creek communities’ needs and well-being.

A second major theme is that none of the twenty-one interview participants were aware of what the Mill Creek watershed was before the Mill Creek Community Study, and only slightly more than half were even aware of Mill Creek itself as a stream. Those who were more aware of the stream tended to have higher levels of involvement in community groups, longer residency in the watershed, and perhaps even had a house bordering the stream. No one actually used Mill Creek, though, and many complained about lack of access.

Nonetheless, the interview participants overwhelmingly perceived serious water problems in their community, particularly stagnant water, sediment buildup, water pollution, aquatic habitat conditions, and the overall general health of their environment. The most commonly articulated concern was over flooding that affects their property and its value, including damage to homes and land. The sources include flooding from Mill Creek itself, drainage from both developed and undeveloped lands, debris blocking drainage points, and periods of especially high amounts of rain. Many felt that water management in the Mill Creek watershed is vastly unequal and that MSD and Louisville Metro government have abandoned their community. Some residents said they didn’t know who to call about specific flooding problems, and others said MSD was mostly unresponsive when the residents did call. They perceived that Louisville Metro and MSD invest more resources in addressing water problems and flooding in other parts of the metropolitan area.

Interview participants in the Mill Creek Community Study also identified substantial needs for more and better green and blue infrastructure, which is generally perceived to be less and worse than in other parts of Louisville. There was an across-the-board strong interest in green spaces in the Mill Creek watershed. The interview participants noted that they used some of the parks in Southwest Louisville to varying degrees. However, they also acknowledged that they often go to and use other parks throughout the Louisville area because those parks have amenities not found in the Mill Creek watershed, such as soccer fields and pickleball courts, or nicer conditions. Many interview participants

383 The most commonly mentioned park facilities that are used include Waverly Park, the Greenwood Boat Dock in Riverview Park, the Louisville Loop, and Iroquois, Shively, Sun Valley, and Sylvania Parks.
expressed a desire for more walking trails and biking trails, more trees and native plants, a pergola or other outdoors communal gathering space, improved park safety, and the revitalization of drainage ditches that are unattractive and unused voids in some neighborhoods. They complained about trash and litter, lack of safety in local parks, lack of accessibility to the parks, the use of chemicals on grasses and trees, and non-native vegetation that fails to retain stormwater runoff.

Other environmental and land use problems and injustice were major concerns to the interviewees. They overwhelmingly expressed concerns about the effects of substantial industry, poor land uses, and hazardous pollution on their physical health and neighborhoods and the watershed’s ecosystems. Residents of neighborhoods near industrial facilities or Dixie Highway reported experiencing higher levels of air pollutants and associated respiratory and cardiovascular health problems. They also complained that insufficient tree canopy and green spaces near industrial facilities and busy highways do not allow for the absorption of pollutants. Many interview participants expressed concern about a high volume of litter throughout the Mill Creek watershed, as well as their neighbors’ irresponsibility in causing it. The “litter divide”—between those who do not litter and those who do—seems to be a source of weakened social capital in the community (i.e., lesser degree of trust of and cooperation with neighbors).

An overarching theme among the interview responses was the observation that despite some sense of community and belonging among area residents, there is a substantial unmet need for more effective and inclusive involvement of residents in their community and the policies that affect it. There is undoubtedly a “Southwest Louisville” community identity, built in part on a relatively united feeling that Louisville Metro government and the rest of the Louisville population neglect the people and neighborhoods in the Mill Creek watershed area.

However, the interview participants’ sense of community belonging and engagement varied widely. Those who seem to have more community identity are involved in community groups but state that the circle of people whom they trust is relatively small, more likely to consist of family members or nearby neighbors. Family ties and length of residency in the Mill Creek watershed area are key parts of feelings of community identity. Some report not being involved in community issues or groups at all. Many of these disengaged residents state they are unaware of the current issues in their community and of opportunities to get involved. They simultaneously express skepticism about whether engagement will make a difference because they distrust Louisville Metro
government and feel the voices of Southwest Louisville residents aren’t heard. Many have had past negative experiences interacting with local government agencies. Interviewees’ general unawareness of three major planning efforts that could change their community—the watershed, stream restoration, and greenway planning processes—is an indicator of inadequate outreach and engagement efforts, as well as Southwest Louisville’s lack of bridging organizations that link neighborhood residents with one another and with governments around watershed issues specifically or community environmental issues generally. The interview process helped to make its participants aware of some of their community’s watershed issues and the associated planning processes, and most of them expressed an interest in becoming more involved in the issues and participating in planning meetings and workshops. This interest, though, was accompanied by concerns about whether their participation would be valued and effective and about their lack of information about how to participate.

The other major overarching theme among interview responses was that the Mill Creek watershed as a community lacks opportunity, investment, resilience, and the conditions needed to thrive. Those who remain in the area do so because of longevity and close connections to family and nearby neighbors, despite the bleak future that they see for the community. But many young people are leaving to find better opportunities elsewhere, even just in the metropolitan area, and those who remain feel trapped in a community with few opportunities and overall disinvestment. The community is highly vulnerable to decline. The interview participants identified a number of conditions and policy changes that would be needed to build community resilience and enable it to thrive. Many have been identified with respect to specific concerns that interview participants discussed: more green spaces and recreation areas, safer and user-accessible trails and sidewalks, new spaces for community residents to gather and build connections, elimination of industrial and other sources of hazardous pollutants in the neighborhood, pollution cleanup (stream, litter, etc.), and more inclusive community engagement opportunities. The interview participants named other needs too, including affordable and accessible childcare, improved education, community development, and opportunities to influence how their community will change over time. One resident said people in the community fear change because they have no opportunity or capacity to influence how the community changes in order to benefit themselves.

The last major draft work product that the RJ Project has produced in the Mill Creek watershed planning process is called “Public
Policy Analyses & Proposed Reforms.” This document assesses a wide range of local public policies and laws for their equitable or inequitable impacts on community resilience, using the Resilience Justice Assessment Framework. The policies fall into eight categories: 1) water and MSD policies; 2) parks and natural areas policies; 3) trees and heat policies; 4) climate change policies; 5) brownfields and environmental policies; 6) public health policies; 7) zoning and land use policies; and 8) housing policies. These public policies were selected for their effects on watershed conditions, acknowledging that watershed conditions aren’t limited to stream pollution, stormwater runoff, and flooding but include a range of environmental, social, economic, political, and institutional conditions that affect the human communities (i.e., neighborhoods) who inhabit the Mill Creek watershed.

Several key themes emerged from our analyses, organized around the seven categories of the Resilience Justice Assessment Framework.

1) **Community Resilience:** A relatively new Louisville Metro climate adaptation plan, Prepare Louisville, expressly addresses equitable community resilience through its climate resilience strategies that include equitable neighborhoods, healthy residents, natural capital, resilient infrastructure, and community readiness. There is a Louisville Metro Office of Resilience and Community Services that focuses on economic and social vulnerabilities. Some of the features of local parks, tree-canopy, and health-equity policies have begun to advance community resilience in vulnerable and marginalized neighborhoods generally. However, community-resilience-building strategies remain primarily aspirational or in their early stages. Very few plans have substantial analysis of future climate-change impacts or climate-resilience strategies. Local MSD, land use, environmental, and housing policies are not framed in terms of equitable community resilience, nor do they articulate specific community resilience-building strategies. In addition, MSD has been reluctant to base its flood planning on the latest climate models used by scientists, instead adhering to what are admittedly outdated federal flood maps and predictions. We did not find much to address community resilience in Mill Creek watershed neighborhoods, although the recent Mill Creek Greenway and Plan for Shively planning processes appear promising. We could not discern any cross-policy alignment or coordination around equitable community resilience goals and strategies.
2) **Inclusive Community Engagement:** The default approach to community participation in policy making in Louisville involves top-down methods of government education of the public, opportunities for public reaction to proposed government-drafted plans and policies, or community workshops that are organized and run by government officials. There are notable more bottom-up exceptions from time to time. Community-based organizations help to engage residents of low-income neighborhoods of color, including in Southwest Louisville, but some of these organizations have institutional interests in bolstering their own power and resources through less-than-inclusive collaboration, whereas other organizations play more of an adversarial role against government officials. There are signs that deep-seated distrust of the government, systemic racism, structural inequality, and the entrenched interests of government and business and civic elites are barriers to inclusive engagement of residents of marginalized neighborhoods and the development of co-governance structures. Other barriers include the substantial number of neighborhoods in Louisville, including many low-income neighborhoods of color in various parts of the metropolitan area, the number and scope of issues affecting marginalized neighborhoods, and the vast number and variety of plans, policies, and programs needing community engagement.

3) **Environmental Conditions:** While there have been recent policy initiatives to improve parks, trees, flooding, and health services in Southwest Louisville, it is unclear whether there will be the government resources and political support to turn aspirations to specific implementation actions that in turn produce measurably and meaningfully better environmental conditions for the residents of the Mill Creek watershed community. The Mill Creek restoration and greenway projects serve as examples of new planning efforts that will take many years and tens of millions of yet-to-be-committed dollars to come to fruition yet will disproportionately benefit residents of the lower portion of the Mill Creek watershed, where there are fewer low-income residents and residents of color than in the upper portion. Funding for environmental improvement projects in marginalized communities often comes from legal settlements to remedy past or ongoing environmental harms, such as pollution releases that violate environmental regulations, contamination of brownfields sites, development of wetlands, flood disasters, or MSD's consent-decree
for violations of the Clean Water Act. Thus, we do not see many net environmental improvements but instead mostly partial mitigation of existing environmental harms. Louisville’s air toxics regulatory program has improved the air quality in the Rubbertown area during the past two decades, but the residents of West and Southwest Louisville still live among a disproportionate amount of health-harming air pollution; permit violations happen regularly, and a complicated system of permits, exceptions, and variances allow industries in both Rubbertown and Riverport to emit toxics into the air. LG&E’s coal ash ponds at its power plants and the potentially deteriorating Lee’s Lane Landfill Superfund site pose ongoing and mostly unaddressed environmental risks to Mill Creek watershed neighborhoods. There has been no environmental justice reform of local zoning and land use regulations, which allow industrial land uses concentrated among the marginalized neighborhoods of the Mill Creek watershed and other low-income areas of color in Louisville.

4) Economic, Social, and Political Conditions: Since our initial analyses of policies, Louisville Metro has adopted new affordable housing strategies and an anti-displacement ordinance, but it remains to be seen how robustly these policies will be implemented and whether they will address conditions and needs in the Mill Creek watershed’s most marginalized and vulnerable neighborhoods. Like many cities, Louisville’s policies to address the needs of unhoused populations and renters who cannot afford rents on their income can be considered failures: inadequate to address the scope and root causes of these needs. A recent reform to Louisville Metro zoning regulations to eliminate barriers to multifamily and affordable housing was modest and of the sort that has had limited effect in other cities. Many policies and plans do not look systematically at the relationships among environmental, economic, social, and political conditions, dynamics, and vulnerabilities in low-income neighborhoods of color, although Louisville’s 2020 climate adaptation plan, Prepare Louisville, makes a good start. There does not appear to be any systematic approach to addressing the vulnerabilities of some Mill Creek neighborhoods’ residents from lack of access to a grocery store, internet service, and transportation. There is no overall plan or strategy for investment in Southwest Louisville in ways that are community-based, avoid gentrification and displacement, and help the community to thrive in the ever-changing future.
5) **Inequalities:** Driven by grassroots community groups and racial and social justice activism, Louisville Metro government has increasingly acknowledged the vast racial and class inequities in environmental, land use, housing, economic, and social conditions in Louisville, as well as resources, power, and opportunity. There have been acknowledgments of some of the causes of these inequities, such as redlining practices and racist planning and zoning policies, as well as some of the major inequitable patterns, such as environmental injustices, health inequities, and the unequal distribution of parks and trees across the metropolitan area. However, it appears that acknowledgements of injustices and aspirational goals to address them have been met with only slow and piecemeal actions. Often, Louisville Metro government does not meet its equity outcomes targets or engage in deep, serious, systematic, and very public assessments of the equity failures of its plans and policies, although there are some notable exceptions. The best policies and plans for remedying racial, social, and environmental inequities in Louisville are the ones that have arisen from the voices and engagement of residents of low-income communities of color and had substantial and lasting involvement of community-based groups.

6) **Feedback Loops:** Louisville Metro officials and agencies, aided by community groups, non-profit organizations, and academic researchers, gather a lot of data about community conditions and inequities that can inform whether their plans are achieving intended goals and whether their policies and programs are effective and equitable. There are some significant data gaps, but a larger problem is the failure to use the feedback provided by ongoing monitoring and data to actually change public policies. For example, Louisville Metro officials have known for decades about how the patterns of industrial zoning in Southwest, West, and South Louisville result in disproportionately more exposure to air pollution and worse health outcomes in these communities, but these feedbacks have not led to systematic revisions to Louisville's zoning patterns or code. Another major weakness is the lack of any formalized system of feedback loops in most plans, policies, or programs. For example, Louisville’s climate adaptation plan does not have a feedback-loop section or process for revising the plan based on monitoring and lessons learned. Most importantly, there are few effective means by which residents of marginalized communities are included in any feedback-loop and
policy-revision processes. Forms, websites, and hotlines for the public to register complaints or report conditions form a relatively low-level baseline for community-engaged feedbacks. Likewise, community groups might use other means, such as speaking at Metro Council hearings or contacting local officials, to share feedback about whether policies are working well or not, but there’s no assurance the government will evaluate and act on that input. For some policies, the involvement of neighborhood leaders and community groups on boards and task forces can help provide community-based feedback and review of data gathered by government officials, but this is ad hoc. The relative weakness of inclusive community-engaged feedback loops is the general lack of systematic co-governance structures for many plans, policies, and programs.

7) **Adverse Impacts:** Many of the equity weaknesses in Louisville’s policies, described in the previous six assessment elements, mean the adverse impacts of these policies on low-income neighborhoods of color in the Mill Creek watershed are not being rigorously assessed and either avoided or mitigated. Although the Metro Council recently adopted an anti-displacement ordinance applicable to local government investments in vulnerable neighborhoods and the Parks Alliance of Louisville park-equity organization has recommended specific anti-displacement strategies be used in connection with its proposed remedies for park inequities citywide, most Louisville plans and policies lack meaningful anti-displacement strategies and tools. Moreover, local governance has adverse impacts on marginalized communities in the Mill Creek watershed due to the “silo” effect of having so many different plans, policies, and programs that are developed and implemented by so many different Louisville Metro agencies and departments. Inequitable vulnerabilities result, for example, from green and blue infrastructure policies that are not integrated or aligned with housing policies and vice versa or from stormwater, flood, and stream-quality policies that are not integrated or aligned with policies to address air pollution, brownfields, industrial zoning, and land-development patterns, and vice versa. Equitable community resilience—resilience justice—is a unifying theme that is missing from many of these policies.

Finally, throughout the Mill Creek watershed planning process, the RJ Project has participated in numerous activities aimed at inclusively
engaging Mill Creek watershed residents to address their communities’ needs, in addition to the interviews of community residents as part of the Mill Creek Community Study. These engagement activities have reached thousands of people, most of whom would have been unlikely to connect with an MSD-driven watershed planning process without activities pro-actively aimed at inclusion. The RJ Project set up and staffed tables to share information about the Mill Creek watershed planning process and the Mill Creek Community Study at four major community events: an environmental justice festival in West Louisville in August 2022, the Southwest Community Festival in October 2022, the Mill Creek Greenway Planning Community Workshop in November 2022, and the Plan for Shively Public Workshop in November 2022. RJ Project faculty, students, and friends have participated in five stream and trash community cleanup events hosted by MSD, as well as three public outreach events at the Southwest Regional Library. The RJ Project, Metro Parks, and the community-engagement consultants on the Mill Creek Greenway project collaborated extensively with one another to facilitate cross-participation of a diverse range of community members in both watershed and greenway planning processes.

The RJ Project has developed and taught an educational unit about the Mill Creek watershed to sophomores at Holy Cross Catholic High School, which is located in the Mill Creek watershed, in fall 2022 and spring 2024. Most of the approximately seventy-five Holy Cross sophomores whom we teach each year live in the Mill Creek watershed, are students from low-income households, and/or are students of color. The curriculum includes classroom learning, field trip education, and student presentations about Mill Creek watershed issues and teaches core concepts about watershed structure and function, environmental justice, resilience justice, and social and environmental responsibility. Members of the RJ Project have also made presentations and facilitated discussions about environmental and resilience justice issues in the Mill Creek watershed to disadvantaged or under-represented youth in the MSD and Metro Parks SummerWorks internship program (field trip based) and in Butler Traditional High School in Shively (classroom based).

The RJ Project participated with the Louisville Tenants Union in successfully advocating for the Louisville Metro Council’s unanimous passage of the Anti-Displacement Ordinance, a metro-wide ordinance aimed at preventing gentrified housing displacement that is the first of its kind in the nation. Furthermore, the RJ Project has engaged in many activities aimed at improving awareness of Mill Creek watershed equity issues and connecting local officials and the public with the Mill Creek
watershed community. These activities include a Sierra Club public event, an MSD workshop for engineers in the region, an MSD training event for its staff, a Kentuckiana Regional Planning & Development Agency quarterly meeting, and a meeting with the National Wildlife Federation Mississippi River Partners. Environmental justice, resilience justice, and watershed planning issues in the Mill Creek watershed are a central focal point of environmental justice education at the University of Louisville, including for all first-year law students in Property I and for students in law, urban planning, sustainability, urban and public affairs, education, Pan-African studies, and Latin American and Latino studies through electives. Many of these classes feature field trips in the Mill Creek watershed. Scholarly presentations and this Article have expanded awareness of the equity issues in the Mill Creek watershed nationally and internationally.

Whether the Mill Creek watershed plan remedies environmental injustices and builds equitable community resilience in the watershed’s marginalized neighborhoods remains to be seen. It is also too early to tell whether the planning processes are or will be sufficiently inclusive and empowering of these neighborhoods’ residents. What we do know, though, is the Mill Creek watershed planning process is an example of a growing trend in the United States to make watershed planning more equitable by integrating the approaches of environmental justice and/or resilience justice into watershed plans and their planning processes. Kentucky has never had a watershed planning process that has framed the issues or engaged marginalized low-income communities of color in the ways that are occurring in the Mill Creek watershed.

CHALLENGES AND CONCLUSION

In Louisville’s Mill Creek watershed, like the watersheds of the Chesapeake Bay, the Bronx and Santa Ana Rivers, and the Ohio River and Green/Duwamish Basins, equitable principles, processes, and tools are being integrated into watershed planning. Environmental justice is an organizing frame for much of this equity evolution in watershed planning in the United States, but resilience justice concepts and methods are increasingly being used. Climate change is one of many disruptors to watersheds and their human communities, and it is one of many focal points for unjust vulnerabilities of low-income communities of color that cut across environmental, social, economic, political, and institutional systems. Low-income communities of color are pushing back against systemic forces of racial and class marginalization and oppression. They
seek watersheds that are healthy and equitable, communities that are resilient and thriving, and governance systems that are inclusive and empowering. The means for change are available: equity principles, inclusive processes, analytical tools, resilience-justice strategies, and most importantly the voices and perspectives of the marginalized and oppressed themselves.

It remains to be seen, though, whether current and evolving efforts at equitable watershed planning will transform watersheds, marginalized communities, and governance systems. In our work in the Mill Creek watershed, we see many obstacles to an equity transformation in watershed planning. The Mill Creek watershed planners have committed themselves to an equity-centric approach, but their first inclination is to use a government- and engineering-centric approach to framing, discussing, and acting on watershed planning issues. The watershed planners also view many of the issues that are most important to Mill Creek watershed residents as beyond the scope of their agency’s authority, responsibility, expertise, and budget. The silo approach that divides government power and planning across agencies and departments is difficult to overcome, in part because it perpetuates inequities and favors those with power and resources.

Many of the most significant environmental and resilience injustices in the Mill Creek watershed are entrenched and extremely difficult to change, such as how to de-industrialize land uses in two areas that are major economic engines in the Louisville region or how to invest in a neglected part of the city without stimulating gentrifying displacement of its most vulnerable residents. Climate change always poses complex and difficult problems for planners because equity strategies and promising projects, such as the Mill Creek Greenway, might fail if the unprecedented effects of climate change are worse than forecasted.

Another obstacle is the relatively low level of community-member engagement with watershed governance issues in the Mill Creek watershed. In general, the time and cost of participation in governance is a barrier for people who lack the time, financial resources, knowledge base, or other capacities to attend meetings and join groups, especially when the Mill Creek watershed area has so many governance issues that need attention. When people are concerned about basic needs, such as housing, food, health, safety, and jobs, watershed conditions might not be considered a high priority for engagement in planning and governance. The social, political, and market forces of racism and class inequality create barriers to community engagement and governance participation among residents of low-income neighborhoods of color. Mill Creek watershed
residents’ widespread distrust of local government and feelings that local officials and the city as a whole have neglected and marginalized their community are also barriers to involvement. The same is true with residents’ reported past experiences of getting no response when they express their needs and concerns to local officials, especially MSD. Even though there is a general community identity associated with Southwest Louisville, residents’ social ties seem to be more family- or neighborhood-specific, and widespread unawareness of the Mill Creek watershed impedes the formation and activism of a grassroots watershed-based community group.

In a fundamental sense, the entities and institutions with power over the Mill Creek watershed and its communities—government agencies and officials, associations of professionals, business organizations, networks of wealthy and influential civic leaders, major non-profit organizations, groups of investors, and others—will be reluctant to give up their power or even share it. Interest convergence theory predicts that power sharing, resource sharing, and equity reforms will occur only to the extent that they benefit those who already have power and resources.\textsuperscript{384} Equitable watershed planning in Mill Creek may result only in vague aspirational goals without concrete actions, equity strategies that are never funded or implemented or that get undermined by adverse interests, and idealistic projects that fail to achieve substantial and meaningful transformation of Mill Creek’s marginalized and oppressed communities. Symbolic policies often substitute for real empowerment and systemic change. And while the marginalized and oppressed may organize, engage in activism, and struggle for environmental and resilience justice, there is a temptation to settle for modest and incremental reforms.\textsuperscript{385}

However, Sze argues the revolutionary struggle of the environmental justice movement is built not only on critical perspectives on the systemic and structural obstacles to justice but also on radical hope, a

\textsuperscript{384} Derrick A. Bell, Jr., Brown v. Board of Education and the Interest-Convergence Dilemma, 93 HARV. L. REV. 518, 523 (1980) (“the interest of blacks in achieving racial equality will be accommodated only when it converges with the interests of whites”); Patience A. Crowder, Interest Convergence as Transaction, 75 U. PITT. L. REV. 693, 707–09 (2014) (applying interest convergence theory to regional community economic development and arguing for transactional alignment of interests).

creative vision for the future, and joy when real justice-advancing changes are won.\textsuperscript{386} The features of equitable watershed planning occurring throughout the United States, including in Louisville's Mill Creek watershed, have transformative potential. They are, by nature, both a) reformist in their use of existing planning institutions and tools to advance environmental and resilience justice and b) disruptive in their grassroots challenges to the thinking, power arrangements, and institutional systems that have dominated the governance of watersheds and their communities. Watershed planning is becoming more equitable through “revolutionary evolution”: “revolutionary in principles and scope, yet evolutionary in processes.”\textsuperscript{387}

On one hand, the meanings of and struggles for justice in watersheds must come from the grassroots voices of the marginalized and oppressed, such as the residents of the Mill Creek watershed. On the other hand, climate change is an overwhelming, destructive, and unjust disruptor of watersheds, marginalized and oppressed communities, and planning and governance institutions. Resilience justice, as a set of conceptual frameworks and systemic planning tools, can help marginalized communities and watershed planners to build equitable resilience in watersheds and the human communities who inhabit them.

\textsuperscript{386} Supra note 16, at 14–24.
\textsuperscript{387} Arnold, supra note 235, at 184.
APPENDIX

*Resilience Justice Project Researchers*

The following student researchers, many of whom were co-investigators on grant projects or did community-engaged research with the Resilience Justice Project for academic credit, contributed to this Article and are listed below:

Frank Bencomo-Suarez, JD, Senior Resilience Justice Fellow, 2022–2023, Resilience Justice Fellow, 2021–2022, Fall 2022 Water Resources class, Spring 2023 Land & Ecosystem Conservation class, Spring 2023 Independent Study

Rebecca Wells-Gonzalez, MA, Lecturer in Communication, PhD student in Urban and Public Affairs, Co-Instructor of Fall 2022 Water Resources class

Colin Shumate, JD candidate, Resilience Justice Fellow, 2022–2023 and, Fall 2022 Water Resources class, Spring 2023 Land & Ecosystem Conservation class, Spring 2023 Independent Study

Trinity Brown, JD candidate, Resilience Justice Fellow, 2022–2023, Fall 2022 Water Resources class

Irie Ewers, candidate for the JD and graduate certificate in Latin American and Latino Studies, Senior Resilience Justice Fellow, 2023–2024

Lauren Neal, JD, Resilience Justice Fellow, 2021–2022

Rachel Utz, JD, Resilience Justice Fellow, 2021–2022

Alexandra Rose Chase, JD, Senior Graduate Research Assistant, 2013–2015

Jennifer-Grace Ewa, JD, MUP, Senior Graduate Research Assistant, 2013–2014

Carcyle Barrett, MPA, JD candidate and PhD student in Educational Leadership and Policy, Resilience Justice Fellow, 2023–2024
Colin Sheehan, JD candidate, Resilience Justice Fellow, 2023–2024

Caitlin Grimes, JD, Fall 2022 Water Resources class, Spring 2023 Land & Ecosystem Conservation class, Spring 2023 Independent Study

Helen McArthur, JD, Fall 2022 Water Resources class, Spring 2023 Independent Study

Cameron Lyons, JD, Spring 2023 Land & Ecosystem Conservation class, Spring 2023 Independent Study

Abigail Kenyon, JD, Spring 2023 Land & Ecosystem Conservation class, Spring 2023 Independent Study

Catherine Gomez, MUP candidate, Spring 2023 Land & Ecosystem Conservation class, Summer 2023 Resilience Justice Fellow

Kaycie Polk, JD, Fall 2022 Water Resources class, Spring 2023 Land & Ecosystem Conservation class

Victoria Hafner, JD candidate, Fall 2022 Water Resources class

Peter LeBlanc, JD candidate, Fall 2022 Water Resources class

Evan Mitchell, JD, Fall 2022 Water Resources class

Samantha Eaton, JD, Fall 2022 Water Resources class

Christopher Gregory, JD, Fall 2022 Water Resources class

Abigail Proffitt, JD, Fall 2022 Water Resources class

Halley Stewart, JD candidate, Fall 2022 Water Resources class

Elijah Miller, MSc Sustainability candidate, Spring 2023 Land & Ecosystem Conservation class

Ella Swigler, MSc Sustainability candidate, Spring 2023 Land & Ecosystem Conservation class
Leon Bates, PhD candidate in Pan-African Studies, Spring 2023 Land & Ecosystem Conservation class

Gloria Chebichi, MUP candidate, Spring 2023 Land & Ecosystem Conservation class

Max Cosby, JD, Spring 2023 Land & Ecosystem Conservation class

Kaitlin Hite Dever, MUP candidate, Spring 2023 Land & Ecosystem Conservation class

Olivia Edwardson, JD, Spring 2023 Land & Ecosystem Conservation class

Lane McKenzie, JD, Spring 2023 Land & Ecosystem Conservation class

Stenley Mondestin, PhD candidate in Urban & Public Affairs, Spring 2023 Land & Ecosystem Conservation class

Angela Rothbauer, JD, Spring 2023 Land & Ecosystem Conservation class

Stuart White, JD candidate, Spring 2023 Land & Ecosystem Conservation class

Briana Bonham, JD, Fall 2022 Water Resources class

Jackson Doughty, JD candidate, Fall 2022 Water Resources class

Vincent Varano, JD, Fall 2022 Water Resources class

Christopher Portman, MUP candidate, Spring 2023 Land & Ecosystem Conservation class

Research Funding and Acknowledgements

This research was funded in part by EPA Clean Water Act § 319(h) Non-point Source Pollution Control Grant to Kentucky Division of Water and Louisville-Jefferson County Metropolitan Sewer District for the Jefferson County Mill Creek Watershed Plan; U.S. Geological Survey § 104(b)
Student Research Enhancement Grant, Grant/Cooperative Agreement G11AP20081 through the Kentucky Water Resources Research Institute, subaward UKFR#3048108119-14-152; a Surdna Foundation grant for “A Thriving Los Angeles: A Collaborative Framework for Infrastructure Planning and Investment”; and research grants from the University of Louisville Brandeis School of Law. A portion of this research was conducted as a Visiting Scholar at UCLA in fall 2016.

We thank the following for collaboration and/or comments: The City Project and the late Robert Garcia; Mill Creek Watershed participants, particularly the Louisville-Jefferson County Metropolitan Sewer District, Louisville Metro Parks and Recreation Department & Natural Areas Division, Kentucky Division of Water and Department of Fish & Wildlife, Kentucky Waterways Alliance, Human Nature, Holy Cross Catholic High School, City of Shively, Southwest Community Festival, Parks Alliance of Louisville, and numerous community groups; and participants of the Universities Council on Water Resources/National Institute for Water Resources 2016 Conference; National Environmental Justice Conference, 2018; Summer Works-in-Progress Symposium of University of Colorado Law School, the Bren School at U.C. Santa Barbara, and UCLA Law School, 2019; National Wildlife Federation Mississippi River Partners, 2022; Kentuckiana Regional Planning & Development Agency Quarterly Meeting, 2022; Sierra Club, Greater Louisville Chapter, 2023; University of Exeter Environmental Justice Café, 2023; Online Workshop for Environmental Scholarship, 2023; Loyola Chicago Law School Environmental and Natural Resources Scholars Workshop, 2023; and the William & Mary Environmental Law and Policy Review Symposium “Water Law in a Changing Climate”, 2024.