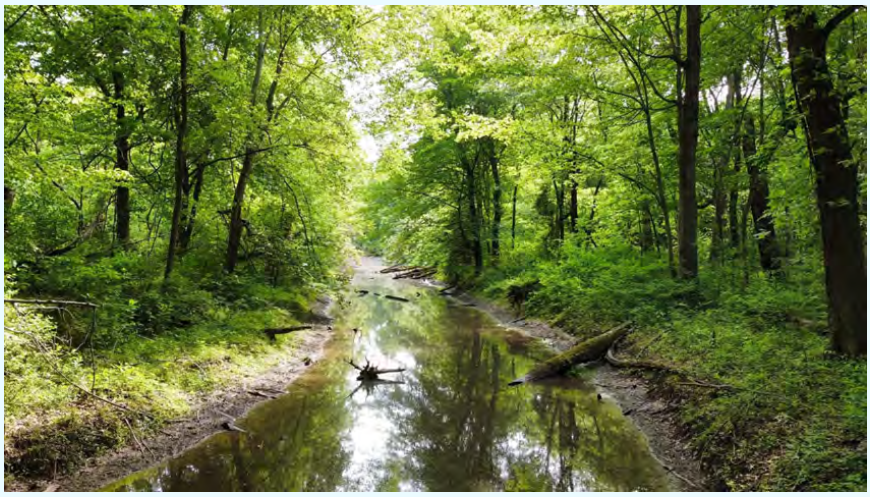
MILL CREEK WATERSHED & COMMUNITY REPORT

UNIVERSITY OF LOUISVILLE RESILIENCE JUSTICE PROJECT

Dr. Craig Anthony (Tony) Arnold. Director



JULY 2024

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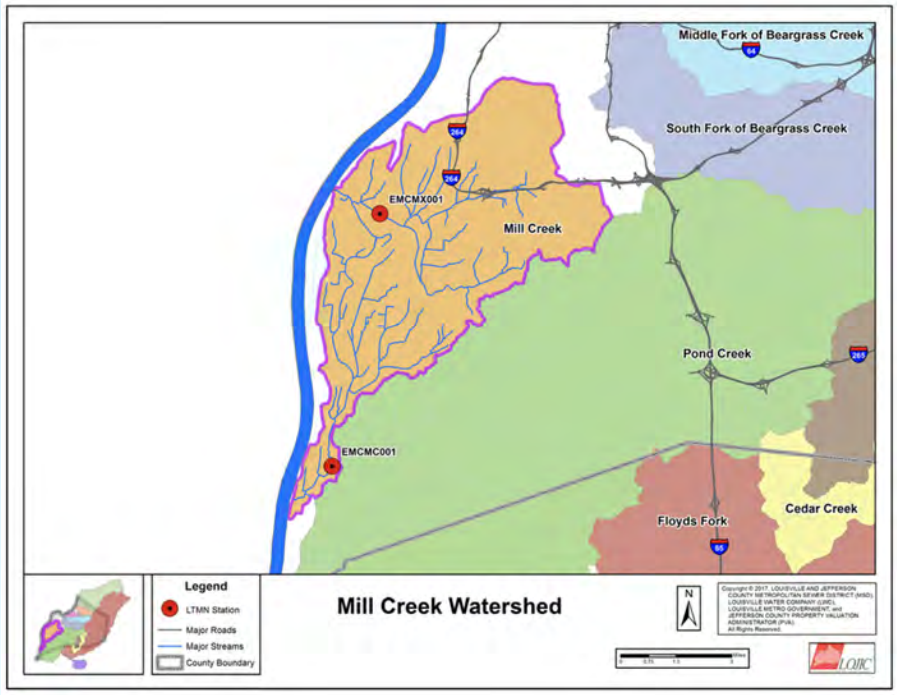
MILL CREEK WATERSHED & COMMUNITY REPORT

UNIVERSITY OF LOUISVILLE RESILIENCE JUSTICE PROJECT

DR. CRAIG ANTHONY (TONY) ARNOLD. DIRECTOR *

INTRODUCTION

The area of Southwest Louisville that drains into Mill Creek – an area called the Mill Creek watershed – is a place of environmental injustices and harms, as well as social injustices and harms. Its neighborhoods are "environmental justice fenceline and frontline communities," which are neighborhoods next to sources of pollution and human communities that have more severe and immediate effects of environmental harms, including climate change, than other communities.[1] These conditions hurt the health and safety of the people who live in the Mill Creek watershed. But they also mean that the communities and neighborhoods that make up the Mill Creek watershed have less capacity to thrive in an ever-changing and disruptive world. And they mean that the people who live in the Mill Creek watershed encounter barriers to changing their communities and environments for the better and influencing public policy.



Map of the Mill Creek Watershed & 2022 University of Louisville Resilience Justice Project team on a bridge over Mill Creek while studying watershed & community conditions. Sources: Louisville-Jefferson County Metropolitan Sewer District & LOJIC; Frank Bencomo-Suarez.

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* 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, student researchers, and acknowledgements are listed in Appendix A.

1 ENVIRONMENTAL JUSTICE HEALTH ALLIANCE FOR CHEMICAL POLICY REFORM, COMING CLEAN, & CAMPAIGN FOR HEALTHIER SOLUTIONS, LIFE AT THE FENCELINE: UNDERSTANDING CUMULATIVE HEALTH HAZARDS IN ENVIRONMENTAL JUSTICE COMMUNITIES (2018), https://www.ej4all.org/assets/media/docu-ments/Life%20at%20the%20Fenceline%20-%20English%20-%20Public.pdf (last visited June 16, 2024); The Climate Reality Project, Frontline and Fenceline Communities, https://www.climaterealityproject.org/frontline-fenceline-communities (last visited June 16, 2024). See also Peter J Fos, Peggy A Honoré, Russel L Honoré, & Kirstin Patterson, Health Status in Fence-Line Communities: The Impact of Air Pollution, 2(3) INT'L J. FAM. MED. PRIM. CARE. 1040 (2021) Natalie R. Sampson, Amy J. Schulz, Edith A. Parker, & Barbara A. Israel, Improving Public Participation to Achieve Environmental Justice: Applying Lessons from Freight's Frontline Communities, 7(2), ENV'T J. 45 (2014).

Mill Creek watershed communities and neighborhoods have unequal – and therefore unfair – vulnerability to harmful change. They are more vulnerable to disasters such as flooding or extreme heat, pollution and other environmental contamination, climate change, insecurities in housing, food, and energy, economic shocks, and social and political unrest and change.

Louisville Metro's efforts to plan for a healthier, cleaner, well-managed, and thriving Mill Creek watershed will be effective only if the community's environmental and social injustices, vulnerabilities, and community members' concerns are addressed. There is growing evidence nationwide that government officials and watershed planners must pay attention to equity (or fairness) – particularly environmental justice, community resilience, and inclusion of residents in policy making and implementation – if they want watershed plans to be successful.[2]

This report is the result of a two-year study undertaken by the University of Louisville Resilience Justice Project ("RJ Project")[3] to:

a) document the conditions and inequalities affecting Southwest Louisville communities in the Mill Creek watershed.
b) seek out and understand the perspectives and concerns of community members in their own words; and
c) evaluate Louisville Metro public policies and planning processes for how well they build community resilience and justice by addressing the unequal environmental and social conditions affecting Southwest Louisville.

The RJ Project did this study as part of the Mill Creek watershed planning process led by the Louisville-Jefferson County Metropolitan Sewer District ("MSD"), with federal and state funding and a variety of government and community partners. The RJ Project conducted this study independently of MSD and other planning partners, and this report doesn't necessarily reflect the views of MSD or any planning partners. The independent nature of this study was designed to ensure the confidentiality and anonymity of interview participants, as well as rigorous equity analysis that's not influenced by any agency's or organization's interests. MSD and the other planning partners have embraced and supported this study, though, and the study would not have been

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2 Craig Anthony (Tony) Arnold & RJ Project Researchers, Environmental Justice, Resilience Justice, and Watershed Planning, 48 Wm. & Mary Env't L. & Pol'y Rev. __ (forthcoming 2024).

3 The University of Louisville Resilience Justice Project is a transdisciplinary community-engaged research initiative of the University of Louisville Brandeis School of Law. The RJ Project is one of the world's leaders in the study of equitable community resilience and the unjust vulnerabilities experienced by marginalized and oppressed communities, especially low-income neighborhoods of color. The RJ Project uses a resilience justice conceptual framework to identify and seek governance reforms that empower communities and transform unjust systems. It is directed by Dr. Tony Arnold and engages students in its work, including through Resilience Justice Fellowships.

possible without collaboration between the RJ Project, MSD, and other planning partners. Even more importantly, the study would not have been possible without the support and engagement of the Mill Creek watershed's community members and various community groups in Southwest Louisville.

The centerpiece of the study are the results of in-depth interviews with community members, a part of the study called the Mill Creek Community Study, and these interview results are described in Part 4 of this report. Placing these results in Part 4 of the report is because the views of community members are best understood after first understanding the watershed/community conditions (Part 2) and the planning processes that seek to include grassroots community perspectives (Part 3).

The report is organized in 6 parts:

1. Overview, which summarizes key facts.
2. Mill Creek Watershed & Community Conditions, which summarizes the results of an Environmental Justice Audit of the Mill Creek watershed.
3. Mill Creek Watershed Planning, which describes efforts to incorporate environmental justice, resilience justice, and inclusive community engagement into planning for the Mill Creek watershed.
4. Mill Creek Community Study, which presents the results of in-depth interviews of community members, including their perspectives, concerns, needs, and goals.
5. Public Policy Analyses & Proposed Reforms, which uses a Resilience Justice Assessment Framework to analyze selected local public policies for equity (justice) and community resilience and to identify key policy changes that would improve community resilience and equity in Southwest Louisville.
6. Conclusion, which discusses the potential for future monitoring of environmental and resilience injustices in the Mill Creek watershed and how effective the Mill Creek watershed plan, its implementation, and related public policies are in achieving more a more equitable and resilient Mill Creek watershed community.

In addition, the report has 5 appendices:

A. Resilience Justice Project Researchers, Funding, and Acknowledgements.

B. Environmental Justice Audit Tool.

C. Equitable Watershed Planning Principles and Processes.

D. In-Depth Semi-Structured Interview Study Methodology.

E. Resilience Justice Planning and Policy Assessment Framework.

The report is a relatively thorough and detailed presentation of the study's results. It is accompanied by a separate two-page flyer that summarizes key facts and findings. The report is written for use in the Mill Creek Watershed Plan and other planning and policy documents, as well as for community members, community groups, and the general public. The flyer is a short and less-technical summary aimed at community members and the public.

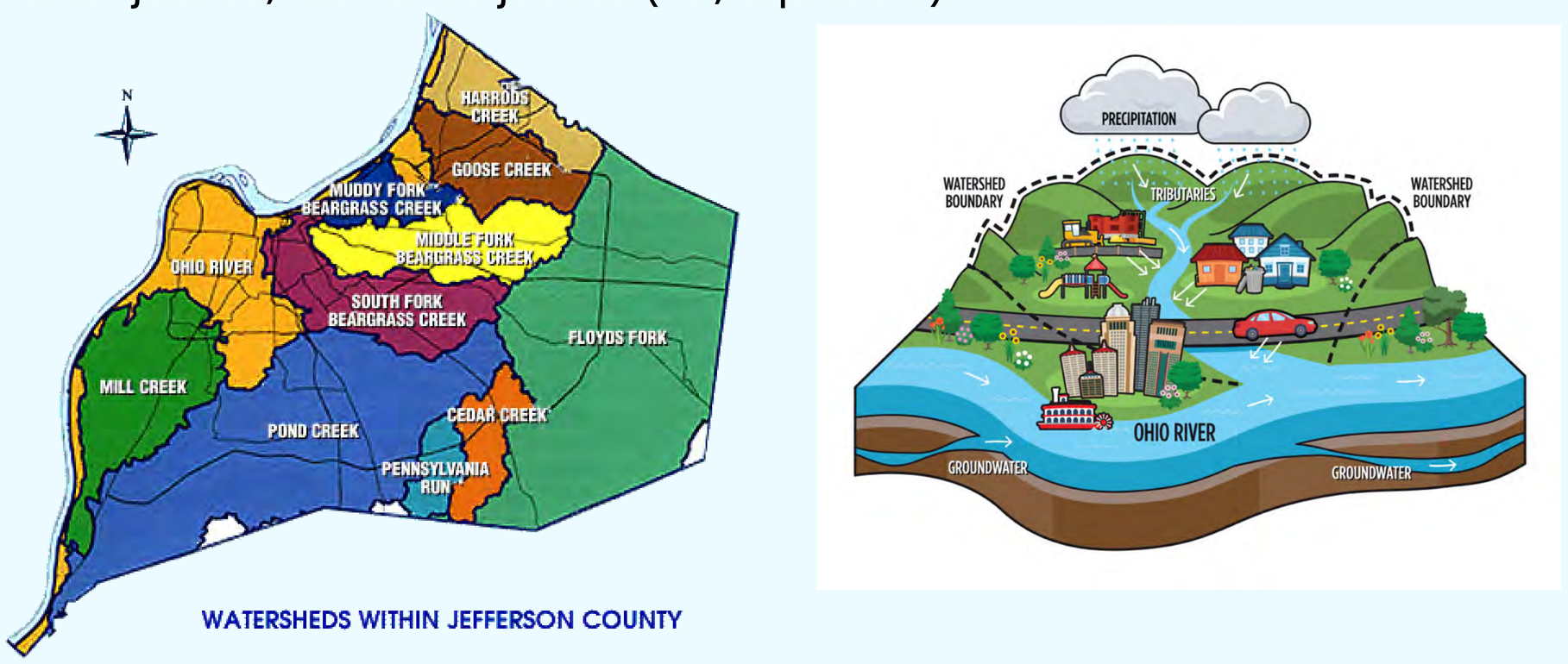
The Mill Creek watershed in Southwest Louisville is home to the LG&E Mill Creek Power Plant (pictured), the LG&E Cane Run Power Plant, the Rubbertown Industrial District (pictured), & the Riverport Industrial District. Sources: The Nature Conservancy/Randy Olsen; the University of Louisville.

01. Overview

In 2022, MSD began a watershed planning process in the Mill Creek watershed of southwestern Louisville, Kentucky, especially 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. Watersheds are 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.[4]

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 ("KDOW") to support local watershed planning.[5] MSD asked governmental, environmental, and community entities to join the effort as planning partners. The planning process has occurred at roughly the same time as 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.[6]

Planning for the Mill Creek watershed has been distinctive – different than previous watershed planning in Kentucky or in many parts of the U.S. – in its up-front attention to environmental and social equity. MSD asked the RJ Project to join the effort as a partner to incorporate environmental justice, resilience justice (i.e., equitable).



A map of the watersheds within Louisville Metro, showing the location of the Mill Creek watershed in Southwest Louisville, and a diagram depicting how watersheds function. Source: MSD.

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4 See Tony Arnold, *Environmental Justice and Mill Creek Watershed Planning*, Univ. of Louisville Resilience Just. Project, https://louisville.edu/ciehs/cores/cec/environ-mental-health-blog/environmental-justice-and-mill-creek-watershed-planning (last visited May 6, 2024)

5 Section 319(h) *Grant Program Funding*, Ky. Energy & Env't Cabinet, https://eec.ky.gov/environmental-protection/water/protection/pages/section-319(h)-grant-program-funding.aspx (last visited May 6, 2024); Lucas Aulbach, *Louisville's Mill Creek Could Be Among 'Largest Urban Stream Restoration Projects' in the US*, Louisville Courier J. (Jan. 12, 2022), https://www.courier-journal.com/story/news/lo-cal/2022/01/12/louisville-parks-water-officials-explain-mill-creek-park-restoration-plan/6432620001.

6 Id.; *Mill Creek Greenway*, Wilderness Louisville, Inc., https://www.wildernesslouis-ville.org/initiatives/mill-creek-greenway (last visited May 6, 2024); Carla Hardy, J. Matthew Monroe & Neil Gillies, Mill Creek of the South Branch of the Potomac Watershed Based Plan: Grant & Pendleton Counties, West Virginia 11, 28–35 (2007).

community resilience), and inclusive community engagement into the Mill Creek watershed plan and planning processes.[7]

Environmental justice is:

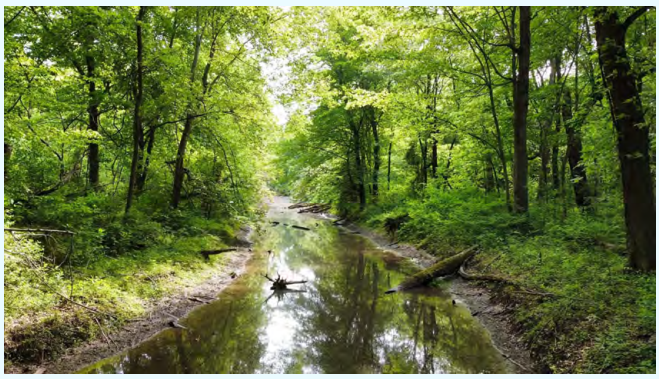
> the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.[8]

According to Julie Sze, environmental justice issues emanate from society's toxic intersection of "race, indigeneity, poverty, and environmental inequality."[9] In general, environmental justice concerns racially and socially unequal environmental conditions and unfair environmental policies.

In contrast, resilience justice concerns 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.[10] Inequitable vulnerabilities refer to how changes and disruptions are likely to harm some communities more than other communities, and inequitable resilience refers to how some communities have less capacity to adapt to a changing and disruptive world.

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.[11] The following is a definition of resilience justice:

> Resilience justice is about the unequal vulnerabilities and adaptive capacities of marginalized and oppressed communities, particularly low-income neighborhoods of color, to systemic shocks, disturbances, and changing conditions. The



Mill Creek. Source: Tony Arnold.

A map of the Mill Creek watershed. Source: MSD & LOJIC.

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7 See Tony Arnold, *Environmental Justice and Mill Creek Watershed Planning*, Univ. of Louisville Resilience Just. Project, https://louisville.edu/ciehs/cores/cec/environ-mental-health-blog/environmental-justice-and-mill-creek-watershed-planning (last visited May 6, 2024).

8 *Environmental Justice*, EPA, https://www.epa.gov/environmentaljustice (last visited May 6, 2024).

9 Julie Sze, Environmental Justice in a Moment of Danger 5 (2020).

10 Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Urban Water Planning*, 52 Seton Hall L. Rev. 1399, 1417–20 (2022).

11 *Id*.

> 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.[12]

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 un-housed, immigrant and refugee communities, and others. It "emerges from the grassroots experiences, voices, and collective action of communities, especially the most vulnerable and marginalized communities in society."[13] 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.[14] Therefore, resilience justice is about inclusion (not merely participation), community empowerment, and cogovernance.[15]

Resilience Justice & Traditional Environmental Justice	Resilience Justice & Expanded Environmental Justice	Resilience Justice
• Environmental conditions • Environmental policies & governance	• Climate change • Disasters • Water • Green & blue infrastructure • Land use conditions & policies	• Social conditions • Economic conditions • Political conditions • Housing • Gentrification & displacement • Health equity • Food deserts • Community empowerment & self-governance

A graphic showing the evolution of environmental justice concerns and issues towards increasing concern for resilience justice and broader issues about equitable community resilience and vulnerability. Source: Tony Arnold & the University of Louisville Resilience Justice Project.

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12 *Id.* at 1417.

13 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, 227 (2023).

14 See Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Community-Based Green and Blue Infrastructure*, 45 Wm. & Mary Env't L. & Pol'y Rev. 665, 698–09 (2021). 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 multi-system, 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.*

15 Craig Anthony (Tony) Arnold & RJ Project Researchers, *Environmental Justice, Resilience Justice, and Watershed Planning*, 48 Wm. & Mary Env't L. & Pol'y Rev. 553 (2024).

Inclusive community engagement aims to involve all affected persons, groups, and communities in policy making and implementation and gives special attention and effort to proactive outreach to those who have historically been underrepresented or disempowered in planning and governance processes.[16]

These features aim to make watershed conditions, policies, and governance systems equitable (or fair), particularly for low-income communities of color. Mill Creek watershed planning needs specific attention to equity. Mill Creek is a degraded, channelized, and 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.[17]

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.[18]

Neighborhoods in the Mill Creek watershed are located among and next to industrial facilities, such as these houses in Riverside Gardens that adjoin the Bakelite facility (formerly Hexion), which produces formaldehyde and phenolic resin and emits methanol, formaldehyde, ammonia, and particulate matter, among other pollutants. Source: Frank Bencomo-Suarez.

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16 Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Urban Water Planning*, 52 Seton Hall L. Rev. 1399, 1433, 1455–57 (2022); Kathryn S. Quick & Martha S. Feldman, *Distinguishing Participation and Inclusion*, 31 J. Plan. Educ. & Rsch. 272, 272 (2011).

17 Tony Arnold, *Environmental Justice and Mill Creek Watershed Planning*, Univ. of Louisville Resilience Just. Project, https://louisville.edu/ciehs/cores/cec/environ-mental-health-blog/environmental-justice-and-mill-creek-watershed-planning (last visited May 6, 2024); *Mill Creek Restoration*, The Nature Conservancy (Oct. 20, 2018), https://www.nature.org/en-us/about-us/where-we-work/united-states/kentucky/stories-in-kentucky/mill-creek-in-kentucky; Ryan Van Velzer, *Unequal: Who Are Louisville's Top Polluters?*, Louisville Pub. Media (Apr. 18, 2019), https://www.lpm.org/news/2019-04-18/unequal-who-are-louisvilles-top-polluters.

18 *See, e.g.*, Richard Smardon, Sharon Moran, & April Karen Baptiste, Revitalizing Urban Waterways: Streams of Environmental Justice (2018); Julian Agyeman & Dale Bryan, *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); Mahbubur Meenar, Richard Fromuth & Manahel Soro, *Planning for Watershed-Wide Flood-Mitigation and Stormwater Management Using an Environmental Justice Framework*, 20 Env't Prac. 55, 57 (2018); Qizhong Guo, Strategies for a Resilient, Sustainable, and

In general, 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. Nationally, low-income communities of color are disproportionately more likely to live in flood-prone areas, near degraded streams, or in environments with polluted waters.[19] They are more likely to have unsafe drinking water or lack sufficient access to water due to scarcity, quality, and/or cost.[20] Low-income people of color often live among or near industrial and other intensive land uses and sources of toxic pollution,[21] and they have fewer or worse parks, trees, and green places that contribute to health and adaptability to climate change and

The inclusive engagement of young people in Southwest Louisville is essential to equitable planning for the Mill Creek watershed and its communities. The RJ Project regularly teaches a collaborative, engaged unit on the Mill Creek watershed and environmental and resilience justice as part of the STREAM program at Holy Cross Catholic High School. Holy Cross is located in the Mill Creek watershed, and most of its students live in the area. Source: Tony Arnold.

Equitable Mississippi River Basin, 2 River 336, 336 (2023). See also *Equity and Environmental Justice in the Nonpoint Source Program*, EPA, https://www.epa.gov/nps/eq-uity-resources (Nov. 13, 2023); *CWA §319 Grant Guidance Update*, EPA, https://www.epa.gov/nps/cwa-ss319-grant-guidance-update (Jan. 30, 2024).

19 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, 2018, at 1, 2; Leila M. Harris, Scott McKenzie, Lucy Rodina, Sameer H. Shah & Nicole Wilson, *Water Justice*, in The Routledge Handbook of Environmental Justice 338, 343 (Ryan Holifield, Jayajit Chakraborty, Gordon Walker eds., 2018); Neil Debbage, *Multiscalar Spatial Analysis of Urban Flood Risk and Environmental Justice in the Charlanta Megaregion*, USA, Anthropocene, Dec. 2019, at 1, 2. See generally Dustin T. Hill, Mary B. Collins, & Elizabeth S. Vidon, *The Environment and Environmental Justice: Linking the Biophysical and the Social Using Watershed Boundaries*, 95 Applied Geography 54 (2018) (studying the racial and class dimensions of exposure to water pollution at watershed scales); Richard Smardon, Sharon Moran, & April Karen Baptiste, Revitalizing Urban Waterways: Streams of Environmental Justice 1 (2018); Mahbubur Meenar, Richard Fromuth & Manahel Soro, *Planning for Watershed-Wide Flood-Mitigation and Stormwater Management Using an Environmental Justice Framework*, 20 Env't Prac. 55, 55–56 (2018).

20 Leila M. Harris, Scott McKenzie, Lucy Rodina, Sameer H. Shah & Nicole Wilson, *Water Justice*, in The Routledge Handbook of Environmental Justice 338, 340–43 (Ryan Holifield, Jayajit Chakraborty, Gordon Walker eds., 2018); Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Urban Water Planning*, 52 Seton Hall L. Rev. 1399, 1400–03 (2022); see also Julie Sze, Environmental Justice in a Moment of Danger 25–50 (2020) (exploring environmental justice examples of water injustices experienced by the Standing Rock Sioux Tribe, low-income Black residents of Flint, Michigan, and low-income Latino residents of California's Central Valley).

21 Craig Anthony (Tony) Arnold, Fair and Healthy Land Use: Environmental Justice and Planning 2–7, 16–22 (2007); Dorceta E. Taylor, Toxic Communities: Environmental Racism, Industrial Pollution, and Residential Mobility 6–32 (2014).

disasters.[22] They and their neighborhood communities have less capacity to adapt to water-related stresses and crises due to fewer resources and less sociopolitical power.[23]

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."[24] 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.[25] Climate change disproportionately makes the environmental and water crises of low-income communities of color worse.[26]

Dr. Tony Arnold, Director of the University of Louisville Resilience Justice Project, discusses environmental and resilience justice issues in the Mill Creek watershed on field trips in 2022 at the Louisville Loop and the Mill Creek Power Plant, while Resilience Justice Fellow Carcyle Barrett discusses what it's like living in the Mill Creek watershed near Rubbertown during a field trip in 2023 at Riverside Gardens Park. Sources: Frank Bencomo-Suarez; Tony Arnold.

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22 Jason Byrne, *Urban Parks, Gardens and Greenspace*, in The Routledge Handbook of Environmental Justice 437–38 (Ryan Holifield, Jayajit Chakraborty, Gordon Walker eds., 2018); Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Community-Based Green and Blue Infrastructure*, 45 Wm. & Mary Env't L. & Pol'y Rev. 665, 665–69 (2021).

23 Robert R.M. Verchick, *Disaster Justice: The Geography of Human Capability*, 23 Duke Env't L. & Pol'y F. 23, 41–44 (2012); 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, 2018, at at 2.

24 *Id*. at 2.

25 *See generally* Julie Sze, Environmental Justice in a Moment of Danger (2020). *See also* Deidre Zoll, *We Can't Address What We Don't Acknowledge: Confronting Racism in Adaptation Plans*, in Justice in Climate Action Planning 3, 3–6 (Brian Petersen & Hélène B. Ducros eds., 2022).

26 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, 2018, at 2; Deidre Zoll, *We Can't Address What We Don't Acknowledge: Confronting Racism in Adaptation Plans*, in Justice in Climate Action Planning 3, 6 (Brian Petersen & Hélène B. Ducros eds., 2022).

02. Mill Creek Watershed and Community Conditions

This part of this report summarizes key watershed and community conditions in the Mill Creek watershed. The RJ Project extensively researched and analyzed these conditions from an equity perspective, using the Environmental Justice Audit Tool. The Environmental Justice Audit Tool is summarized in Appendix B. The goal of this EJ 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.[27]

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. Previously Southwest Louisville was rarely discussed 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 EJ Audit has helped give a clearer picture of the diverse set of neighborhoods that compose the Mill Creek watershed community, many of which are relatively marginalized.

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.[28] This relatively small urban-suburban watershed is located entirely within the jurisdiction of the Louisville Metro government.[29] The only separately incorporated municipality located in the Mill Creek watershed is the City of Shively.[30]

The Mill Creek watershed[31] is the heart of the area known as Southwest Louisville. It's not only an area of land and water but also a place of human communities.

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27 This part of this report summarizes important facts about the Mill Creek watershed and community conditions from a much longer interim working draft of the EJ Audit, which went into extensive detail.

28 *Following the Flow of Water: Exploring the Watersheds of Jefferson County*, Louisville MSD (June 3, 2022), https://storymaps.arcgis.com/sto-ries/c2827d5295c74876bf0079e764c5f389.

29 *Id*.

30 City of Shively, https://shivelyky.gov (last visited May 6, 2024).

31 For purposes of describing and analyzing the non-aquatic conditions and issues

Popular parks in Southwest Louisville include Riverview, Watterson Lake, Iroquois, and Sun Valley. Sources: Louisville Metro Parks; Tony Arnold.

Southwest Louisville landmarks include the Wade-Braden house at the forefront of the civil rights and fair housing movements in Louisville, now dedicated as the Wade-Braden Peace Park; the Southwest Louisville Regional Free Public Library; and Mike Linnig's Restaurant. Sources: City of Shively; State Representative Nima Kulkarni; Louisville Free Public Library; Frank Bencomo-Suarez.

Although there are several different ways of labeling and classifying neighborhoods in the area, the following neighborhoods in the Kentucky State Data Center's Neighborhood Profiles are at least partly within the Mill Creek watershed: Cloverleaf, Hazelwood, Iroquois, Jacobs, PRP-Northwest Rockford, PRP Southeast, PRP Southwest-Black Pond, PRP-Northeast Hunters Trace, PRP West Central, Riverport-Greenwood, Riverside Gardens-Lake Dreamland, Rubbertown, Shively North-Farnsley, Shiveley Northeast-7th Street Road, Shively South-Dixie-Watterson, Southwest Dixie-Valley Village, St. Andrews, St. Dennis, Valley Station, Valley Station Northeast-Stone Street, Valley Station Northwest-Johnsontown, Valley Station Southwest-Bethany, and Waverly Hills.[32] Although the Mill Creek watershed has still has some rural or quasi-rural features, more than three-quarters of the land in the watershed is considered urban or suburban.[33] Some of the landmarks that have been important to Southwest Louisville's history and community identity[34] include the Waverly Hills Sanatorium, Riverside Farnsley-Moreman Landing, Wade Braden House and Park, Stitzel-Weller Distillery, Bud's Tavern, and Mike Linnig's Restaurant. Some of the major parks that help to form the Mill Creek watershed's landscape include Iroquois Park, Riverside Gardens Park, Watterson Lake Park, Sun Valley Park (and Community Center and Golf Course), Sylvania Park, and a portion of the Louisville Loop along the Levee. The area has been a place of tension over racial justice and opportunity, with burnings of Black residences in the 1980s and Ku Klux Klan leafletting in 2020, but also civil rights activism (such as the famous buying of a Shively home by Black buyers Andrew and Charlotte Wade from white civil-rights activists Anne and Carl Braden in 1954) and increasing diversification of Southwest Louisville.

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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.

32 *Neighborhood Data Profiles*, Metro United Way & Ky. State Data Ctr. (June 2022), https://metrounitedway.org/neighborhood-data-profiles/?gclid=CjwKCAiA-vOsBhAAEiwAIWR0TRJX7Oh1WiV4kxxVuyUx3QRtHEiwW9MGchJAQ7hHFp3LA9 y3KnyjcRoCHu8QAvD_BwE (last visited May 6, 2024)

33 The Nature Conservancy, *Stories in Kentucky Mill Creek Restoration*, 2, (2018); Louisville MSD, State of the Streams: 2021 Water Quality Synthesis Report 68–71.

34 Key facts about the history and community identity of Southwest Louisville are synthesized from The Encyclopedia of Louisville (2001), many historical and news sources in the University of Louisville Ekstrom Library Archives, and numerous websites about Southwest Louisville and its history, culture, and infrastructure.

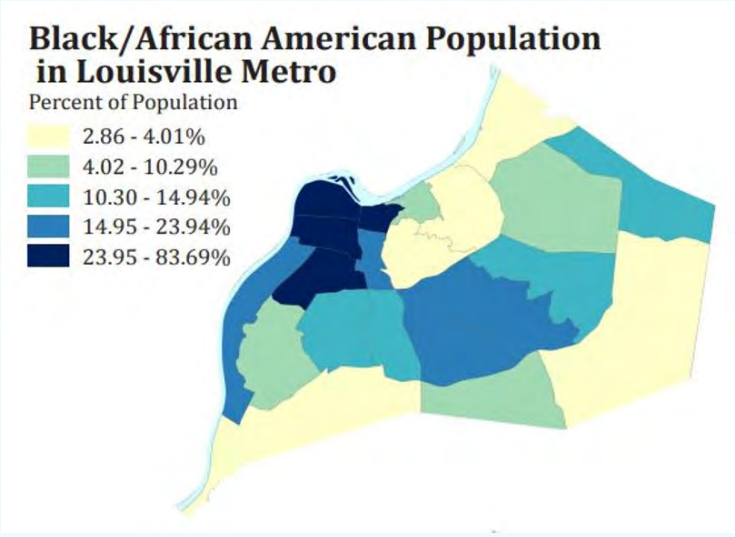
Activities that bring together diverse members of the Mill Creek watershed community include the Southwest Community Festival, Riverview Independence Festival, activities at the Southwest Regional Library, and many events in Shively.

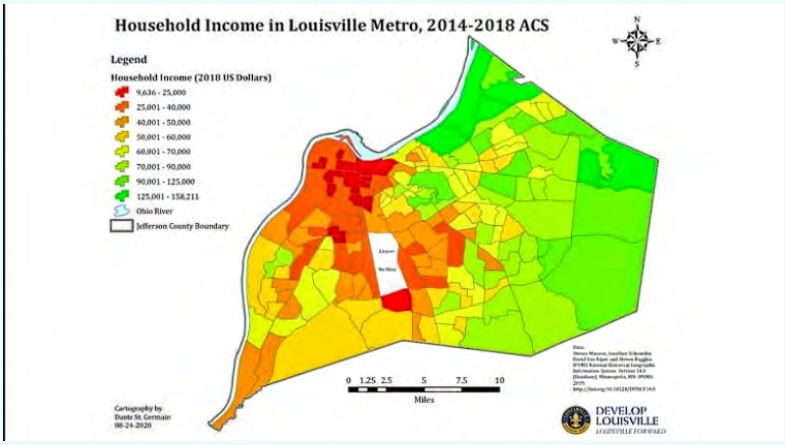
Many of the neighborhoods in the Mill Creek watershed are relatively marginalized due to poverty, racial and ethnic segregation, housing conditions, and other characteristics. Seven neighborhoods have significantly higher percentages of residents of color, households receiving SNAP benefits, individuals below poverty, and households in poverty than the overall percentages for Louisville Metro. Notably, there are 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.[35]

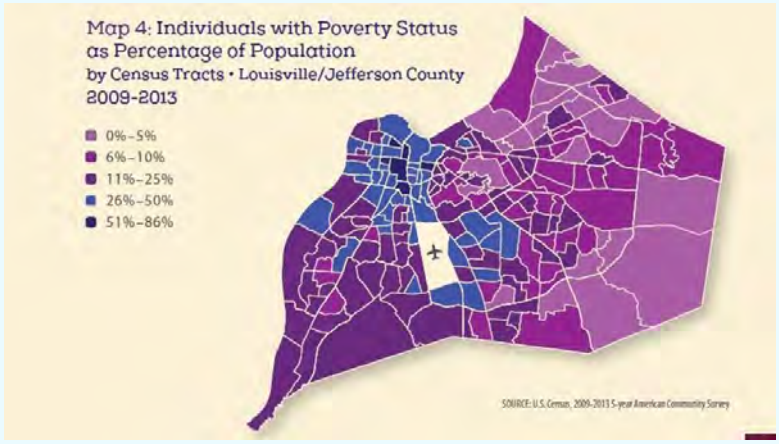
Another three neighborhoods have high concentrations of residents of color, but they have lesser percentages of residents at or below poverty than the Louisville median.[36] Four neighborhoods are predominantly white and characterized by at least two above average indicia of relative economic distress.[37] In contrast, nine neighborhoods are predominantly white with economic indicia that are mostly at or better than the Louisville median.[38] 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.[39] The following table summarizes these conditions:

Demographic characteristics	Low-income & high-minority	Low-income & low-minority	High-income & high-minority	High-income & low-minority
Number of neighborhoods	7	4	3	9

35 *See, Neighborhood Data Profiles*, Metro United Way & Ky. State Data Ctr. (June 2022), https://metrounitedway.org/neighborhood-data-profiles/?gclid=CjwKCAiA-vOsBhAAEiwAIWR0TRJX7Oh1WiV4kxxVuyUx3QRtHEiwW9MGchJAQ7hHFp3LA9 y3KnyjcRoCHu8QAvD_BwE (last visited May 6, 2024) (providing data for the Hallmark, Hazelwood, Iroquois, Jacobs, Rubbertown, Shiveley Northeast-7th Street Road, & Shively South-Dixie-Watterson neighborhoods).
36 *See id.* (providing data for Cloverleaf, Shively North-Farnsley & St. Dennis).
37 *See id.* (providing data for PRP-Northeast Hunters Trace, PRP West Central, Riverside Gardens-Lake Dreamland & Southwest Dixie-Valley Village).
38 *See id.* (providing data for PRP-Northwest Rockford, PRP Southeast, PRP Southwest-Black Pond, Riverport-Greenwood, St. Andrews, Valley Station Northeast-Stone Street, Valley Station Northwest-Johnsontown, Valley Station Southwest-Bethany & Waverly Hills).
39 *See id.* (providing data for Cloverleaf, Hallmark, Hazelwood, Iroquois, Jacobs, Rub-bertown, Shively North-Farnsley, Shiveley Northeast-7th Street Road, Shively South-Dixie-Watterson & St. Dennis).







Maps of Black/African American resident populations, poverty status, and household income in Louisville Metro. Some areas of the Mill Creek watershed have higher proportions of low-income households and/or households of color than the Louisville median. Sources: Louisville Metro Center for Health Equity; Metropolitan Housing Coalition; Develop Louisville/Louisville Forward.

Southwest Louisville's Mill Creek watershed has a wide variety of neighborhoods and housing types. Sources: Frank Bencomo-Suarez & Tony Arnold.

Furthermore, out of the 23 total neighborhoods in the Mill Creek watershed:

- 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.[40]

For example, the Hazelwood neighborhood has 23% unemployment, 29% of households without a vehicle, 24% of households without inter-net, 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.[41]

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.[42]

Overall, substantial parts of Southwest Louisville have high displacement vulnerability and housing precarity risk (a composite of multiple risk factors), according to one study.[43] A different study identified several areas of Southwest Louisville as at moderate risk of displacement.[44] It's also noteworthy that Southwest Louisville has relatively

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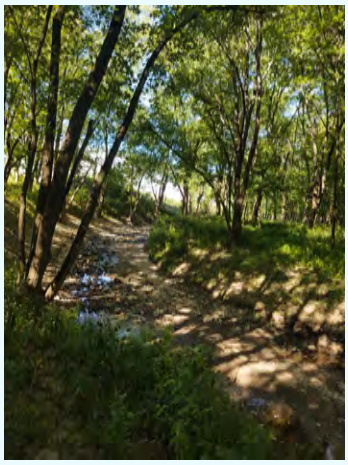
40 *See id.*
41 *See id.* (providing data for Hazelwood).
42 *See id.* (providing data for Jacobs).
43 See interactive map at *Housing Precarity Risk Model*, Urb. Displacement Project (July 2021), https://www.urbandisplacement.org/maps/housing-precarity-risk-model (last visited May 6, 2024).
44 Louisville Metro Off. of Hous. & Cmty. Dev. & Louisville Affordable Hous. Tr. Fund, Louisville Housing Needs Assessment 85 (2019).

high percentages of manufactured and mobile homes, households eligible for utility disconnections, and eviction rates.[45]

The socioeconomic inequities of the neighborhoods in the Mill Creek watershed are accompanied by environmental inequities and vulnerabilities. The Mill Creek watershed is degraded. Its degraded ecological functions can be traced back to the early nineteenth century when swamps in Southwest Louisville were drained to convert the land to agricultural land uses and eventually urban, suburban, and industrial land uses.[46] Ditches and cutoffs were created to drain water from natural areas of collection to humanly preferred destinations (often the Ohio River).[47] 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.[48]

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.[49] The Upper Mill Creek subwatershed is nineteen square miles and contains the tributary streams of Cane Run, Boxwood Ditch, Lynnview Ditch, and Big Run.[50] The Lower Mill Creek subwatershed is fifteen square miles, containing stream tributaries Black Pond Creek and Valley Creek.[51] Notably, many of the watershed's neighborhoods with the highest rates of poverty and residents of color



Mill Creek is an altered and degraded stream. Sources: Tony Arnold; The Nature Conservancy/Catherine Fitzgerald.

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45 Metropolitan Housing Coalition, The State of Housing in a Changing Climate: Building Resilient Homes, Households, and Communities 10, 34, 37 (2023); Alexandra Kanik, *Behind The Data: How We Found Louisville's Highest Eviction Rates*, Lou. Pub. Media, July 5, 2018, https://www.lpm.org/investigate/2018-07-05/behind-the-data-how-we-found-louisvilles-highest-eviction-rates.

46 Edward W. Robinson, History of Local Drainage Improvement Efforts, Jefferson County, Kentucky 3, 7, 11–12 (1985), https://louis-ville.edu/cepm/westlou/louisville-wide/drainage-improvements-history-of-1985.

47 Id. at 10.

48 Id.; Louisville Metro Emergency Servs., 2023 Louisville Metro Hazard Mitigation Plan, at 5-160, https://louisvillemsd.org/sites/default/files/file_reposi-tory/Floodplain%20Management/Louisville%20Five%20Year%20Mitiga-tion%20PlanV7.pdf; *Following the Flow of Water: Exploring the Watersheds of Jefferson County*, Louisville MSD (June 3, 2022), https://storymaps.arcgis.com/sto-ries/c2827d5295c74876bf0079e764c5f389.

49 Louisville Metro Emergency Servs., 2023 Louisville Metro Hazard Mitigation Plan, at 5-160.

50 *Id.*

51 *Id.*

are in the Upper Mill Creek subwatershed, the portion that has been diverted from the stream's natural flow.[52]

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 storm-water runoff. Many of the watershed conditions are considered fair to poor: significant pollution from nutrients, sediment, and bacteria; degraded habitat for species; loss of natural wetlands; and deterioration of riparian buffers (lands alongside the streams).[53] 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.[54]

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.[55] MSD facilities in the Mill Creek watershed area include the Derek R. Guthrie Water Quality Treatment Center, and Upper Mill Creek and Lower Mill Creek pump stations, among others. In addition, Louisville Metro owns about 1,700 acres of land along Mill Creek for flood mitigation and preservation, collectively known as Community Improvement District (CID) parcels, but these lands have undergone erosion and deterioration of function.[56]

Moreover, 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

Water pollution and flooding are problems in the Mill Creek watershed. Sources: Tony Arnold; WDRB.

52 *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 (last visited May 6, 2024); Tony Arnold, *Environmental Justice and Mill Creek Watershed Planning*, UNIV. OF LOUISVILLE CTR. FOR INTEGRATIVE ENV'T HEALTH SCIS., https://louisville.edu/ciehs/cores/cec/environmental-health-blog/environmental-justice-and-mill-creek-watershed-planning (last visited May 6, 2024).

53 LOUISVILLE MSD, STATE OF THE STREAMS: 2021 WATER QUALITY SYNTHESIS REPORT 68– 71.

54 *Mill Creek Restoration*, THE NATURE CONSERVANCY (Oct. 20, 2018), https://www.na-ture.org/en-us/about-us/where-we-work/united-states/kentucky/stories-in-ken-tucky/mill-creek-in-kentucky.

55 STORMWATER MANAGEMENT MASTER PLAN § 9.32 (2010) (Mill Creek section, at 6); LOUISVILLE METRO EMERGENCY SERVS., 2023 LOUISVILLE METRO HAZARD MITIGATION PLAN, at 5-160; MSD, Current Projects, https://louisvillemsd.org/currentprojects (last visited June 21, 2024) ("Learn more about how MSD is ensuring safe, clean waterways in your community by using the interactive map below.")

56 Louisville Metro Parks & Recreation, *Mill Creek Greenway Conceptual Master Plan Overview* (2023).

Water pollution and flooding are problems in the Mill Creek watershed. Sources: Tony Arnold; WDRB.

Housing and neighborhoods located immediately next to pollution-generating industries in Rubbertown and Riverport. Source: Frank Bencomo-Suarez.

communities in the Mill Creek watershed would be overwhelmed by catastrophic flooding.[57] Two of Kentucky's dams with the highest risk of failure are located in the Mill Creek watershed, as are two moderate-risk dams.[58]

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 and fenceline 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).[59] Rubbertown played a crucial role in supplying the U.S. with synthetic rubber during World War II from its riverfront location but has expanded into a large and continually polluting industrial area.[60] Riverport is an international shipping port as well as an industrial area.[61]

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 River.[62] The Lee's Lane Landfill, a Superfund site where toxic wastes

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57 **Connor Giffin,** *Outdated: Can Louisville's Levee System Handle the Next "Great Flood"?*, **Louisville Courier J., Mar. 26, 2023.** *See generally* **Edward W. Robinson, History of Local Drainage Improvement Efforts, Jefferson County, Kentucky (1985),** https://louisville.edu/cepm/westlou/louisville-wide/drainage-improvements-his-tory-of-1985.

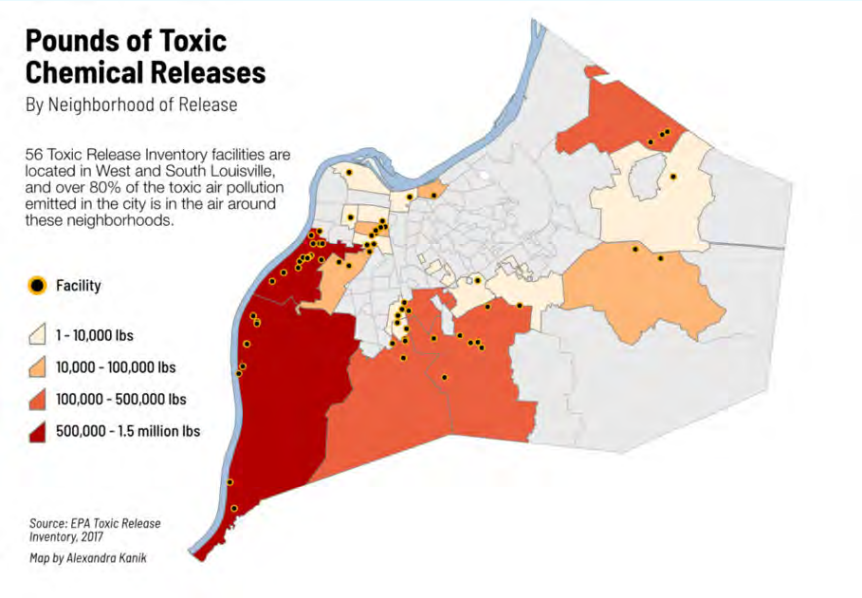
58 **Louisville Metro Emergency Servs., 2023 Louisville Metro Hazard Mitigation Plan, at 5-68 to -71.**

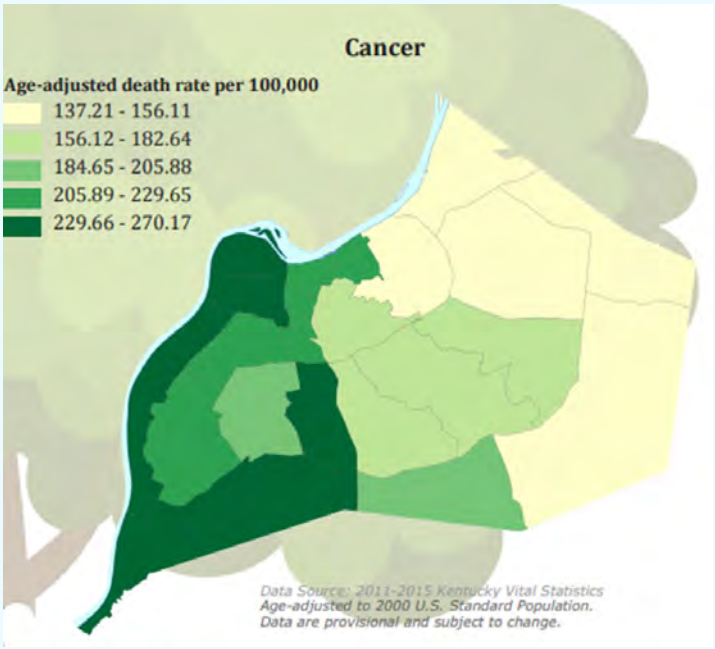
59 *Id.* **at 5-160;** *Rubbertown*, **Louisville Metro Air Pollution Control Dist.,** https://louisvilleky.gov/government/air-pollution-control-district/rubbertown **(last visited May 6, 2024);** *It Starts Here. Riverport*, **Louisville Riverport Auth.,** https://www.louisvilleriverportauthority.com **(last visited May 6, 2024).**

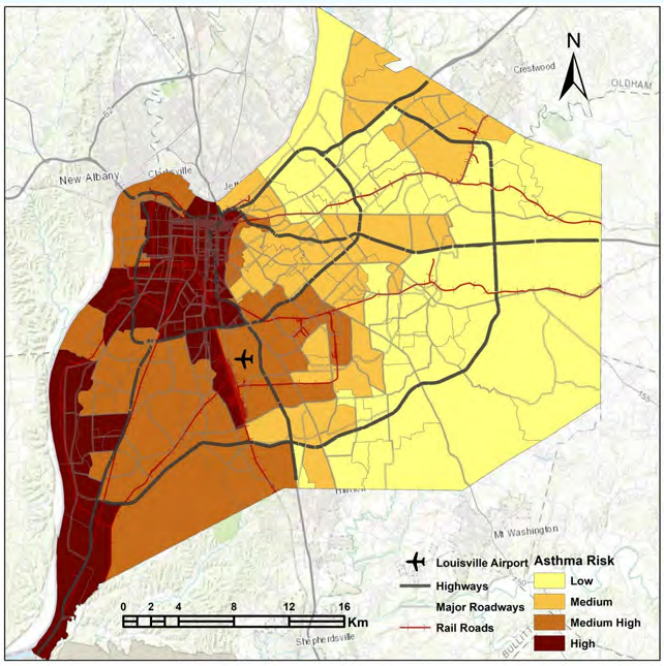
60 **The Encyclopedia of Louisville 772 (2001).**

61 *Foreign Trade Zone #29*, **Louisville Riverport Auth.,** https://www.louisvilleriver-portauthority.com/advantages/foreign-trade-zone-29 **(last visited May 6, 2024).**

62 **Louisville Metro Emergency Servs., 2023 Louisville Metro Hazard Mitigation Plan, at 5-160.** *See also* **Erica Peterson,** *Riverside Gardens: A Former Resort Community Besieged by Pollution*, **Ctr. for Health Journalism (Jan. 18, 2013),** https://center-forhealthjournalism.org/our-work/reporting/riverside-gardens-former-resort-community-besieged-pollution; **Ryan Van Velzer,** *Unequal: Who Are Louisville's Top Polluters?*, **Louisville Pub. Media (Apr. 18, 2019),** https://www.lpm.org/news/2019-04-18/unequal-who-are-louisvilles-top-polluters; **Erica Peterson,** *What You Need to Know About LG&E's New Cane Run Natural Gas Plant*, **Louisville Pub. Media (July 6, 2015),** https://www.lpm.org/news/2015-07-06/what-you-need-to-know-about-lg-amp-es-new-cane-run-natural-gas-plant; **Thomas Cmar & Ricky Junquera,** *Agreement Reached over Water Discharge Dispute at LG&E's Mill Creek Power Plant*, **Earthjust. (Sept. 23, 2016),** https://earthjustice.org/press/2016/agreement-reached-over-water-discharge-







Maps of distribution of toxic chemical releases, cancer rates, and asthma rates. Sources: Louisville Public Media; Louisville Metro Center for Health Equity; AIR Louisville.

were removed and remaining wastes buried on the 112-acre site, is located among Mill Creek watershed neighborhoods.[63]

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.[64] 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 (TRI) 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 toxics.[65] Southwest Louisville has disproportionately more pounds of toxic chemical releases, higher cancer death rate, higher inpatient admissions for asthma, and lower life expectancy than other areas of Louisville.[66]

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

LG&E power plants (such as the Mill Creek Power Plant depicted here) and the Lee's Lane Landfill Superfund site are located in Southwest Louisville. Sources: Frank Bencomo-Suarez; University of Louisville.

dispute-at-lge-s-mill-creek-power-plant; *LG&E Demolishes Retired Cane Run Generating Station*, LG&E & KU (June 8, 2019), https://lge-ku.com/newsroom/press-re-leases/2019/06/08/lge-demolishes-retired-cane-run-generating-station; Ryan Van Velzer, *Louisville Ranks 3rd in U.S. for Most Premature Deaths from Coal-Fired Power*, Louisville Pub. Media (Mar. 3, 2023), https://www.lpm.org/news/2023-03-03/louisville-ranks-3rd-in-u-s-for-most-premature-deaths-from-coal-fired-power-pollution.

63 *See generally* Jordan Lynch, Stacey Konkle, Jamar Wheeler, Katlyn McGraw, Haley Metcalf & Lauren Heberle, *What Is the Status of the Lee's Lane Landfill Superfund Site?* (Univ. of Louisville Fac. Scholarship, Working Paper, 2020), https://ir.library.lou-isville.edu/cgi/viewcontent.cgi?article=1749&context=faculty.

64 Elizabeth Hornbeck, *Dixie Highway (Part I in the Series "My Louisville")*, Stationary Nomad (June 23, 2013), https://itinerantprofessor.blogspot.com/2013/06/dixie-highway-part-i-in-series-my.html; *About the New Dixie Highway Project*, Louisville Metro Gov't, https://louisvilleky.gov/government/new-dixie-highway/about-project (last visited May 6, 2024); Louisville MSD, Municipal Separate Storm Sewer System (MS4) Annual Report, at 5-38 (2021).

65 Louisville Metro Emergency Servs., 2023 Louisville Metro Hazard Mitigation Plan, at 5-187 to -190.

66 Louisville Metro Ctr. for Health Equity, Louisville Metro Health Equity Report 2017, at 37–38, 53, 131, 137; Ryan Van Velzer & Alexandra Kanik, *Unequal: Despite Progress, Louisville's Toxic Air Still Mostly Affects Poor, Black Residents*, Louisville Pub. Media (Apr. 15, 2019), https://www.lpm.org/news/2019-04-15/unequal-despite-progress-louisvilles-toxic-air-still-mostly-affects-poor-black-residents.

formaldehyde from a Hexion chemical facility in 2019.[67] 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.[68]

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.[69] 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.[70] 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.[71] Flooding risk and risk of toxic exposure intersect

Dixie Highway and industrial truck traffic through neighborhoods are sources of health harms and safety threats to local residents. Sources: Louisville Metro government; Tony Arnold.

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67 Ryan Van Velzer, *Data Shows Improvements in Air Quality in Louisville's Rub-bertown*, Louisville Pub. Media (Apr. 28, 2023), https://www.lpm.org/news/2023-04-28/data-shows-improvements-in-air-quality-in-louisvilles-rubbertown; Matt Men-carini, *A Year After $258K Fine, Louisville Plant Faces $100K Fine for 50 Incidents over 17 Months*, Louisville Courier J. (Oct. 15, 2019), https://www.courier-jour-nal.com/story/news/local/science/environment/2019/10/15/rubbertown-chemical-plant-faces-second-six-figure-fine-since-2018/3985019002.

68 Louisville Metro Strategic Toxic Air Reduction Program, Strategic Toxic Air Reduction Regulation 5.30 Stakeholder Group Report and Plan of Action 92 (2007).

69 Jordan Lynch, Stacey Konkle, Jamar Wheeler, Katlyn McGraw, Haley Metcalf & Lauren Heberle, *What Is the Status of the Lee's Lane Landfill Superfund Site?* (Univ. of Louisville Fac. Scholarship, Working Paper, 2020), https://ir.library.louis-ville.edu/cgi/viewcontent.cgi?article=1749&context=faculty, at 3–4, 13–14, 21, 25; Ryan Van Velzer, *Louisville Hazardous Waste Site Still Leaking Pollution into Ohio River*, Louisville Pub. Media (Apr. 26, 2019), https://www.lpm.org/news/2019-04-26/louis-ville-hazardous-waste-site-still-leaking-pollution-into-ohio-river .

70 Id.; Jordan Lynch, Stacey Konkle, Jamar Wheeler, Katlyn McGraw, Haley Metcalf & Lauren Heberle, *What Is the Status of the Lee's Lane Landfill Superfund Site?* (Univ. of Louisville Fac. Scholarship, Working Paper, 2020), https://ir.library.louis-ville.edu/cgi/viewcontent.cgi?article=1749&context=faculty, at 3, 4, 13, 14, 21, 25; Ryan Van Velzer, *Louisville Hazardous Waste Site Still Leaking Pollution into Ohio River*, Louisville Pub. Media (Apr. 26, 2019), https://www.lpm.org/news/2019-04-26/louis-ville-hazardous-waste-site-still-leaking-pollution-into-ohio-river.

71 Erica Peterson, *Riverside Gardens: A Former Resort Community Besieged by Pollution*, Ctr. for Health Journalism (Jan. 18, 2013), https://centerforhealthjournal-ism.org/our-work/reporting/riverside-gardens-former-resort-community-besieged-pollution; Thomas Cmar & Ricky Junquera, *Agreement Reached over Water Discharge Dispute at LG&E's Mill Creek Power Plant*, Earthjust. (Sept. 23, 2016), https://earthjustice.org/press/2016/agreement-reached-over-water-discharge-dispute-at-lge-s-mill-creek-power-plant; Louisville Metro Air Pollution Control Dist.,

for Mill 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.[72]

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.[73] It is a place of disproportionate vulnerability to extreme heat.[74]

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).[75] 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%.[76]

Multipollutant Stakeholder Group Final Report (2020); Ryan Van Velzer, *Unequal: Who Are Louisville's Top Polluters?*, Louisville Pub. Media (Apr. 18, 2019), https://www.lpm.org/news/2019-04-18/unequal-who-are-louisvilles-top-polluters; James Bruggers, *Map Shows 'Worst-Case' Flooding from Contaminated Ash Pond in Louisville*, Louisville Courier J. (June 19, 2017), https://www.courier-jour-nal.com/story/tech/science/watchdog-earth/2017/06/19/map-shows-worst-case-flooding-contaminated-mill-creek-power-plant-ash-pond-louisville/408006001; Ryan Van Velzer & Alexandra Kanik, *Unequal: Despite Progress, Louisville's Toxic Air Still Mostly Affects Poor, Black Residents*, Louisville Pub. Media (Apr. 15, 2019), https://www.lpm.org/news/2019-04-15/unequal-despite-progress-louisvilles-toxic-air-still-mostly-affects-poor-black-residents; Rick Howlett, *LG&E, Sierra Club Settle Mill Creek Dispute*, Louisville Pub. Media (Sep. 27, 2016), https://www.lpm.org/news/2016-09-27/lg-amp-e-sierra-club-settle-mill-creek-dispute.

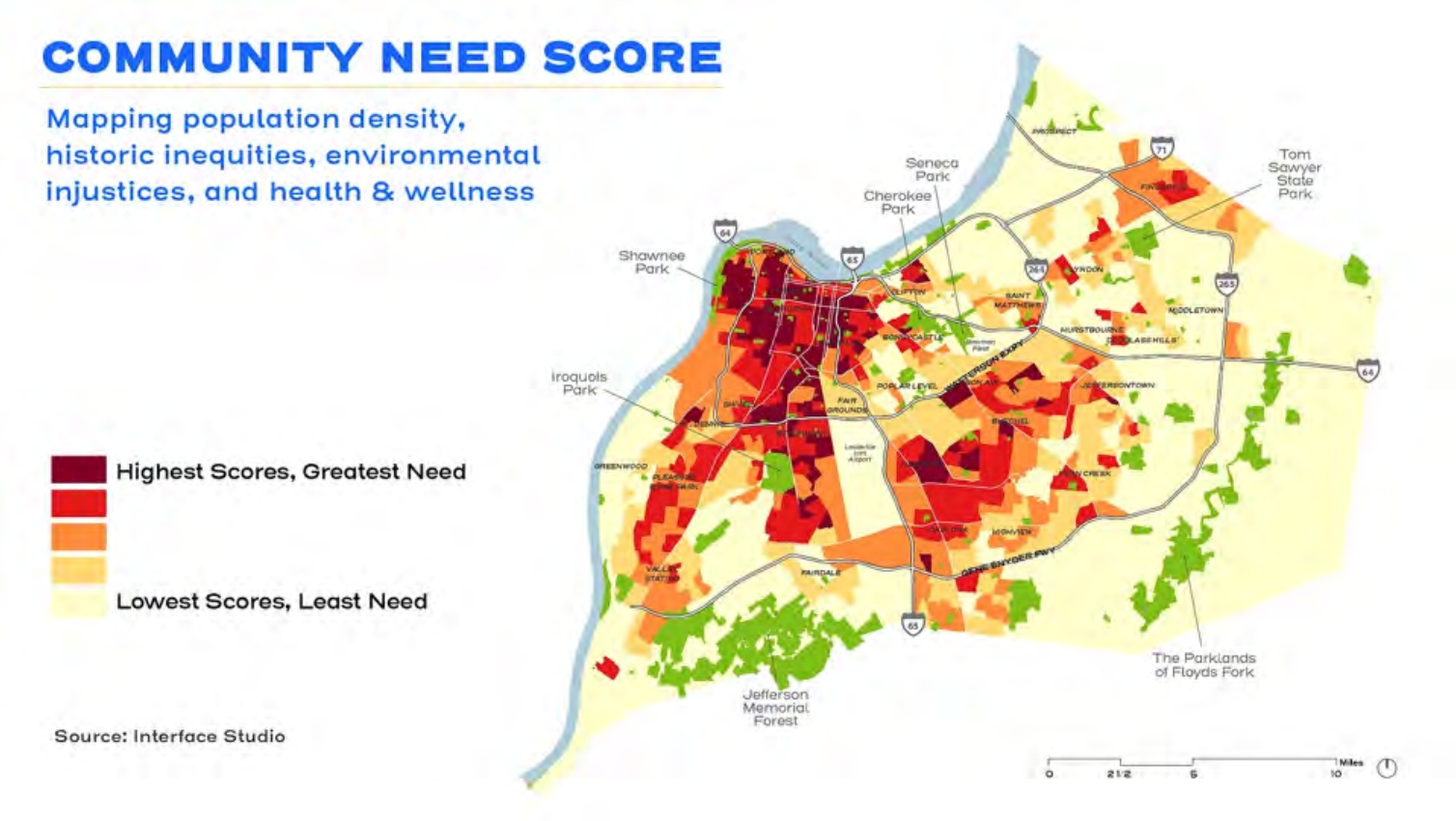
72 James Bruggers, *Map Shows 'Worst-Case' Flooding from Contaminated Ash Pond in Louisville*, Louisville Courier J. (June 19, 2017), https://www.courier-jour-nal.com/story/tech/science/watchdog-earth/2017/06/19/map-shows-worst-case-flooding-contaminated-mill-creek-power-plant-ash-pond-louisville/408006001.

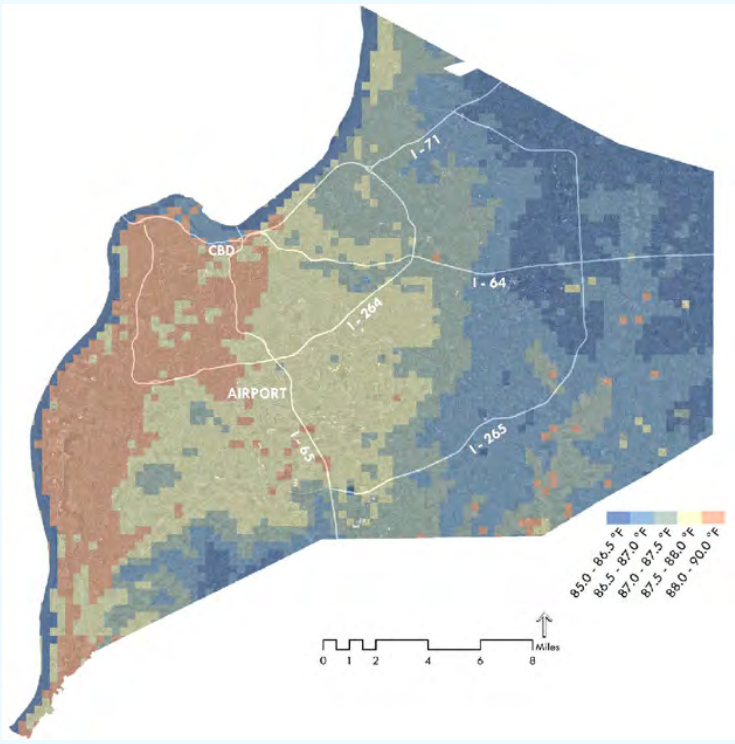
73 Isabella Sofia Wolfsdorf, Shade Equity in Louisville, KY: Considering Environmental Justice in an Analysis of Urban Tree Canopy Inequality and Demographics 16 fig.1 (2022) (B.A. thesis, University of Vermont) (on file with Univ. of Vt.), https://scholar-works.uvm.edu/envstheses/72.

74 Louisville Metro Emergency Servs., 2023 Louisville Metro Hazard Mitigation Plan, at 5-115 fig.5-16.

75 Parks All. of Louisville & Louisville Metro Parks & Recreation Dep't, Parks for All: An Equity Initiative Led by Parks Alliance of Louisville; Final Rep. 19 fig.11, 75 fig.49, 78 fig.52 (2023) https://www.parksalliancelou.org/parks-for-all.

76 Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Community-Based Green and Blue Infrastructure*, 45 Wm. & Mary Env't L. & Pol'y Rev. 665, 682 (2021).





Maps of distribution of park need, tree canopy, and urban heat. Sources: Parks Alliance of Louisville & Interface Studio; Louisville Urban Heat Management Study.

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.

According to the Climate Vulnerability Index (CVI), a national mapping tool that measures and maps relative climate vulnerability of communities, the Mill Creek watershed area is disproportionately vulnerable to the effects of climate change, in comparison to other areas of Louisville Metro and other neighborhoods nationally.[77] All of the areas within the Mill Creek watershed are among the 20% most climate-vulnerable communities in the nation, with many areas being among the 10% most climate-vulnerable and at least three areas being among the 1% most climate-vulnerable communities in the U.S.[78] 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).[79]

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

Poor conditions, including trash, graffiti, and deteriorating structures, in Sylvania and Riverside Gardens Parks, 2022. Source: Tony Arnold.

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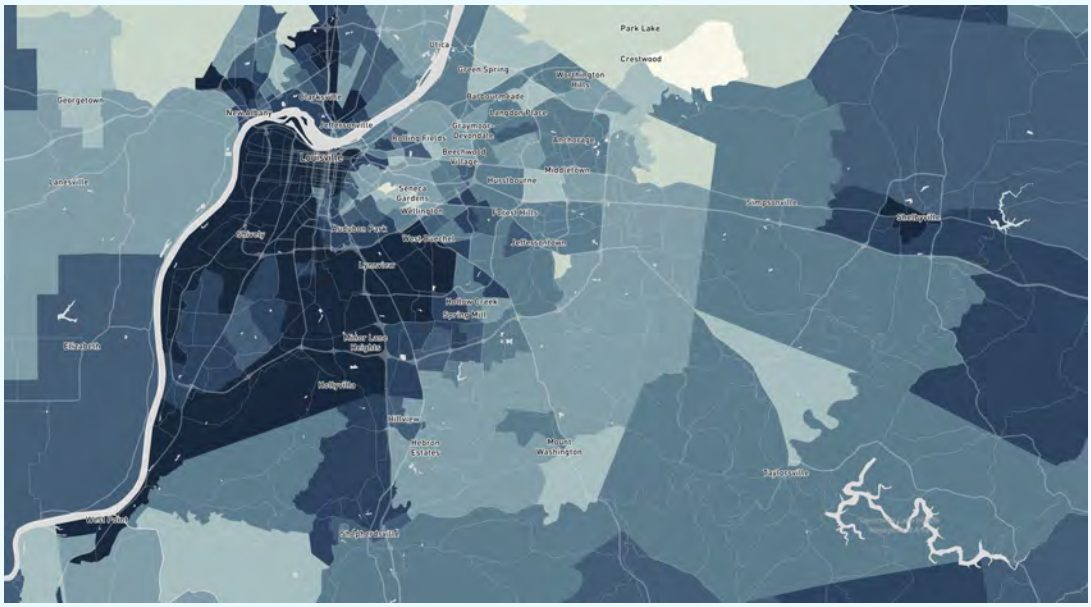
77 *U.S. Climate Vulnerability Index*, Env't Def. Fund, Tex. A&M Univ. & Darkhorse Analytics, https://climatevulnerabilityindex.org (last visited May 6, 2024).

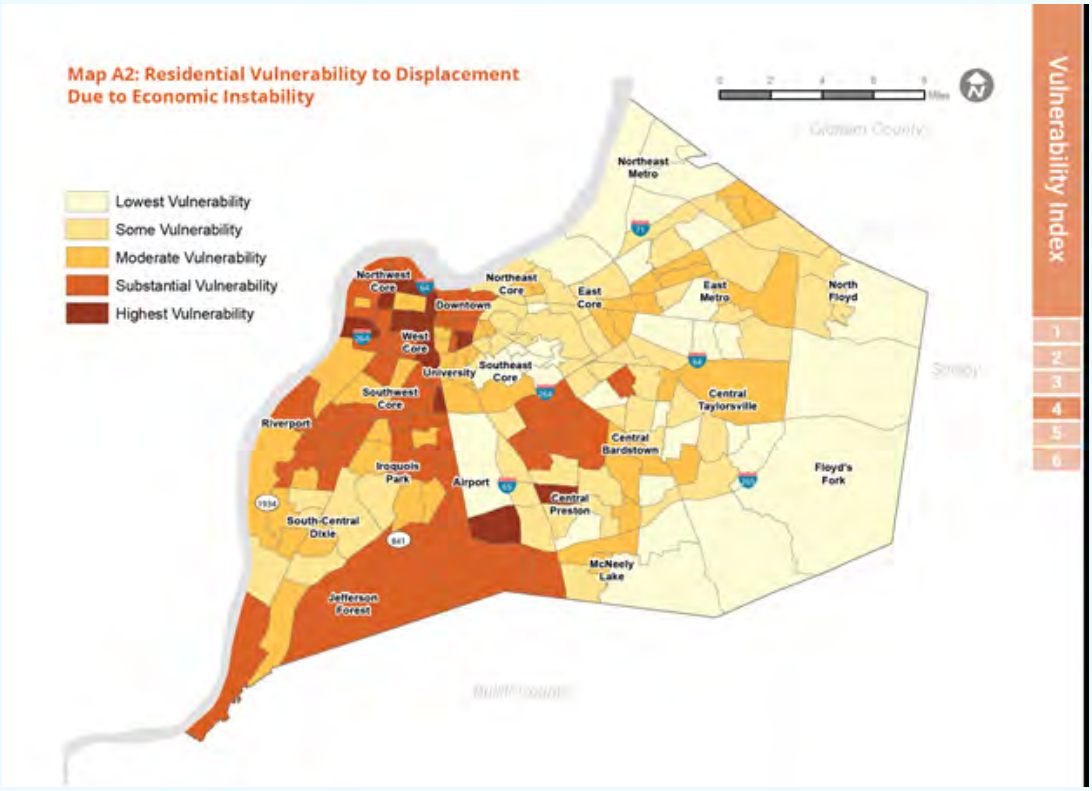
78 *Id.*

79 *U.S. Climate Vulnerability Index: Methodology*, Env't Def. Fund, Tex. A&M Univ. & Darkhorse Analytics, https://climatevulnerabilityindex.org/methodology (last visited May 6, 2024). The CVI builds on the Centers for Disease Control's (CDC's) Social Vulnerability Index (SVI), but adds variables related to climate change (i.e., not only the vulnerability generally to disasters and health crises that SVI maps) and is based on extensive peer-reviewed studies and consultations with experts.

States.[80] 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.



Map of climate vulnerability. Source: Climate Vulnerability Index (Texas A&M University, Environmental Defense Fund, & Darkhorse Analytics).



Map of displacement risk. Source: Louisville Metro Government Office of Housing & Community Development & Louisville Affordable Housing Trust Fund.

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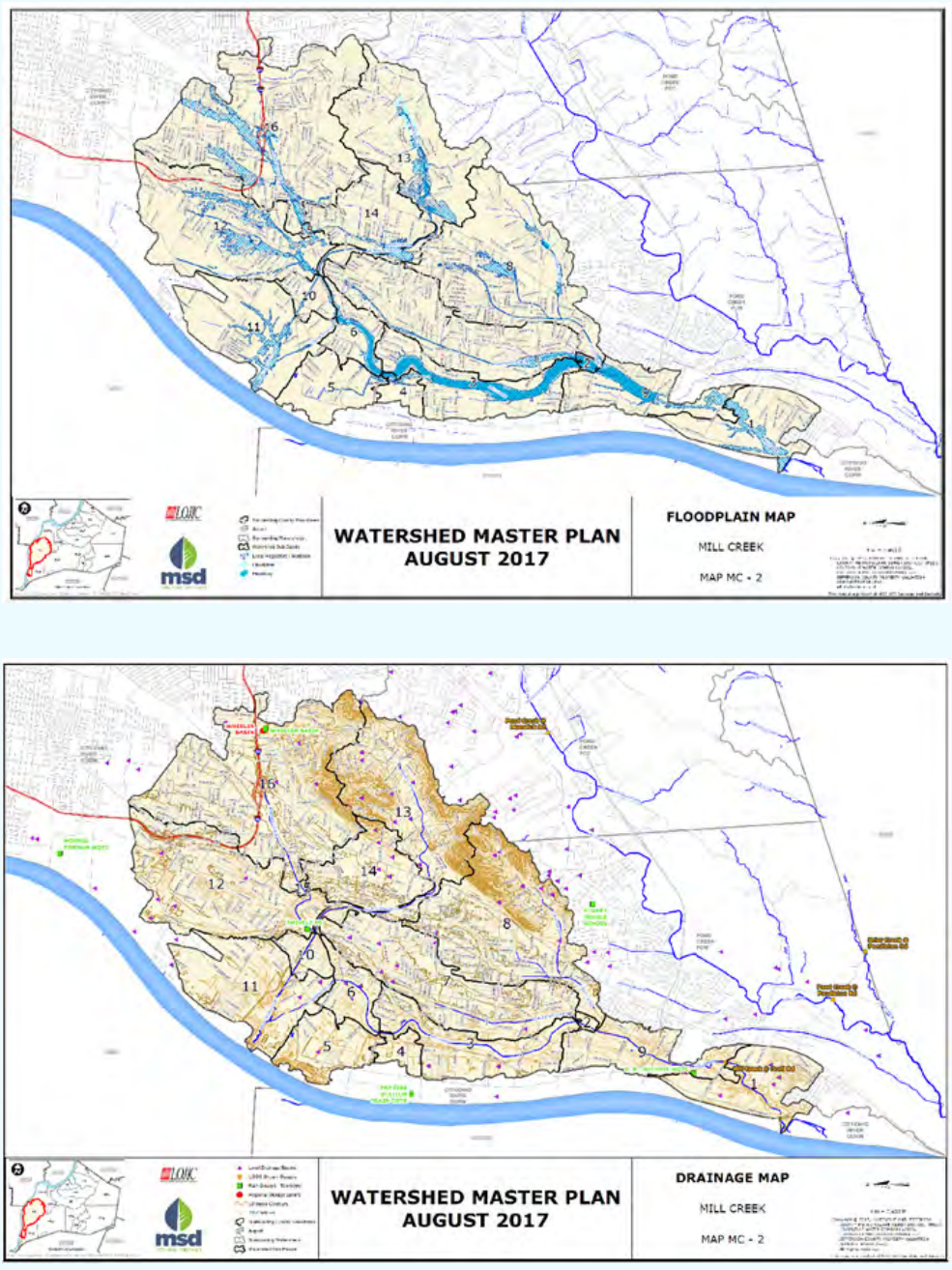
80 *See, e.g.*, Craig Anthony (Tony) Arnold, Olivia Odom Green, Daniel DeCaro, Alexandra Chase & Jennifer-Grace Ewa, *The Social-Ecological Resilience of an Urban-Suburban Eastern Watershed: The Anacostia River Basin*, 51 IDAHO L. REV. 29, 31, 40–41, 43– 44 (2019).

03. 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 KDOW.[81] Led by MSD, the planning process has been 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.[82]



The Mill Creek watershed planning process requires attention to drainage catchments and floodplains in the watershed, as depicted on these two maps. Source: MSD.

81 Ky. Waterways All. & Ky. Div. of Water, Watershed Planning Guidebook for Kentucky Communities (2010) (describing KDOW and its role in watershed planning in Kentucky).
82 Ky. Nonpoint Source Pollution Mgmt. Program, Louisville Jefferson County's Mill Creek Watershed Plan: FFY 2021 Project Application 13–14 (on file with author).

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

> 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.
>
> > Objective 1: Compile available background water quality information about the Mill Creek watershed.
> >
> > 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 nonpoint source pollution and related environmental issues in their watershed.[83]

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

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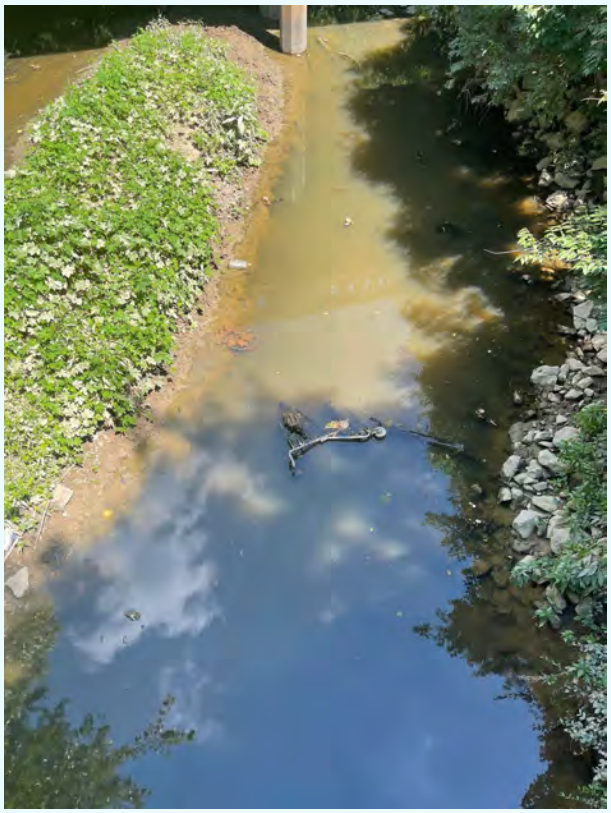
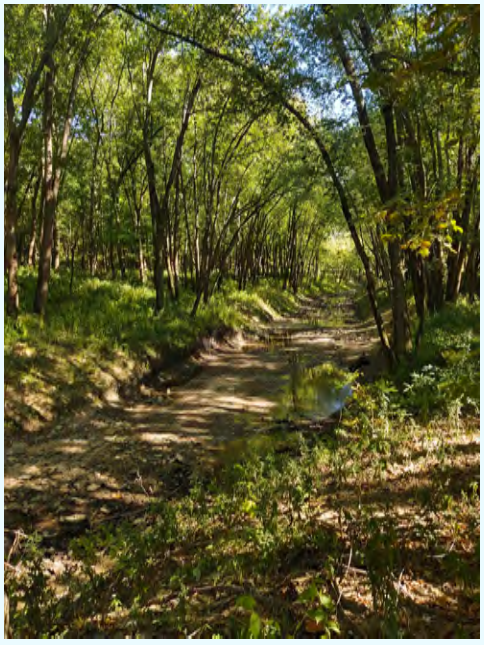
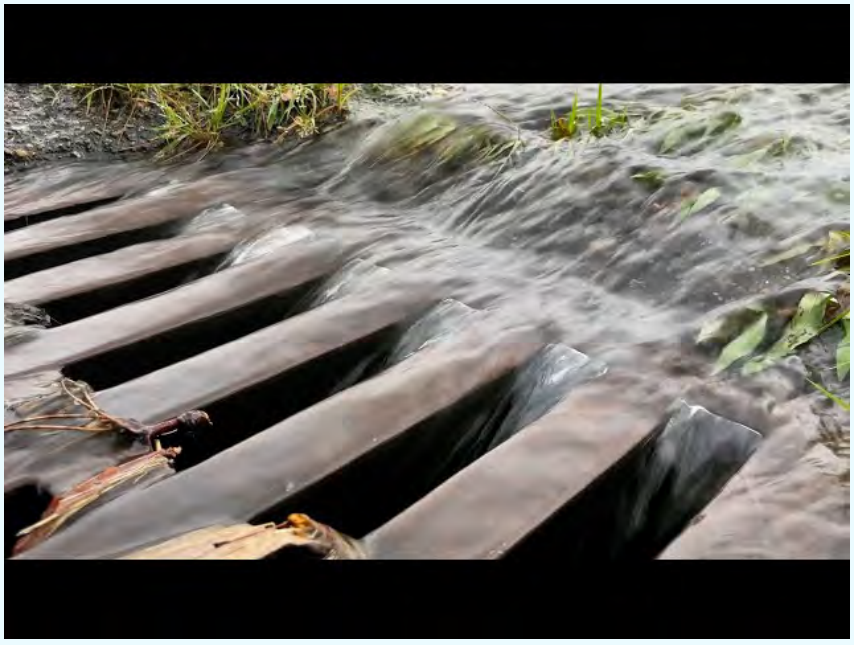
83 *Id.* at 6–8.







Issues for the Mill Creek watershed plan include degraded stream conditions and pollution, the disconnection of the upper watershed (drained by the Mill Creek Cutoff) from the lower watershed (drained by the main stream channel), and stormwater runoff. Sources: Tony Arnold & MSD.

Two other planning processes for Mill Creek have occurred at approximately the same time as 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 subwater-shed from Sylvania Park to the confluence of Mill Creek with the Ohio River.[84] 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.[85] This five-phase, two-decade restoration project is being 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.[86]

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.[87] 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.[88] The Mill Creek Greenway plan envisions: miles of paved trails and public access hubs that connect to local neighborhoods; areas of extensive

The Mill Creek Greenway project logo and map are recognizable parts of a plan to restore the lower portion of Mill Creek and create a park greenway along the creek. Sources: Louisville Metro Parks & Human Nature.

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84 Lucas Aulbach, *Louisville's Mill Creek Could Be Among 'Largest Urban Stream Restoration Projects' in the US*, Louisville Courier J. (Jan. 12, 2022), https://www.courier-journal.com/story/news/local/2022/01/12/louisville-parks-water-officials-explain-mill-creek-park-restoration-plan/6432620001; *Mill Creek Restoration*, The Nature Conservancy (Oct. 20, 2018), https://www.nature.org/en-us/about-us/where-we-work/united-states/kentucky/stories-in-kentucky/mill-creek-in-kentucky; 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).

85 *See* sources cited in immediately preceding footnote.

86 *Id.*

87 Louisville Metro Parks & Recreation Dep't, Mill Creek Greenway Master Plan (2023); *Mill Creek Greenway*, Wilderness Louisville, Inc., https://www.wildernesslou-isville.org/initiatives/mill-creek-greenway (last visited May 6, 2024); Lucas Aulbach, *Louisville's Mill Creek Could Be Among 'Largest Urban Stream Restoration Projects' in the US*, Louisville Courier J. (Jan. 12, 2022), https://www.courier-jour-nal.com/story/news/local/2022/01/12/louisville-parks-water-officials-explain-mill-creek-park-restoration-plan/6432620001.

88 *See* sources cited in immediately preceding footnote.

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.[89] The plan was developed during an intensive ten-month period of extensive community engagement and an iterative visioning process.[90]

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.

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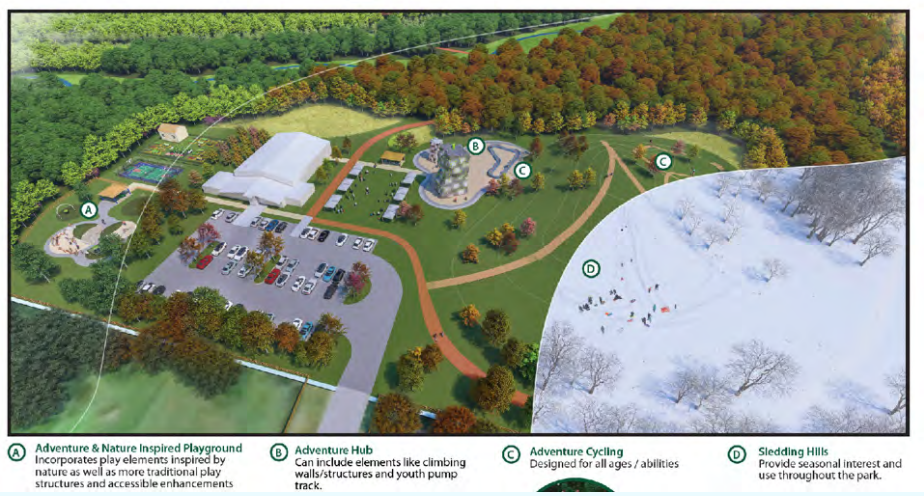
89 *Id.*
90 *Id.*

A restored Mill Creek visualized. Sources: Louisville Metro Parks & Human Nature.




Fishing opportunities at pools downstream of existing road bridges and at existing lakes.

Drawings of proposed recreational and ecological areas along the Mill Creek Greenway. Sources: Louisville Metro Parks & Human Nature.

Some of the other planning efforts that have occurred or are occurring in Southwest Louisville include planning for Dixie Highway, parks in Southwest Louisville, community gardens (such as the 7th Street Community Garden on MSD property), and flood management and hazard mitigation (aided by the Lower Mill Creek Pump Station). Sources: Louisville Metro government; Louisville Metro Parks; MSD; & Tony Arnold.

Planning in the Mill Creek watershed has occurred at roughly the same time as other planning efforts that affect the watershed's neighborhoods, including Plan for Shively,[91] a neighborhood plan for the Algonquin, Park DuValle, and Hallmark neighborhoods (a small portion of which is within the Mill Creek watershed),[92] and a new comprehensive plan for affordable housing.[93] These planning efforts follow several other planning efforts in recent years, including Louisville's development and adoption of a new comprehensive plan[94] and a climate adaptation plan,[95] 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),

The Mill Creek watershed planning process has been led by Colette Easter of MSD, featured here speaking to a group at Catfish Haven. Source: Tony Arnold.

The Summer 2022 RJ Project team at Mill Creek. Source: Tony Arnold.

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91 SHIVELY BULL., Feb. 2023, at 1, 7, https://shivelyky.gov/wp-content/up-loads/2023/02/Shively-News-Feb-2023.pdf; *Plan for Shively*, https://tswdesign.myso-cialpinpoint.com/plan-for-shively (last visited May 6, 2024).

92 *It's a Beautiful Day to Make a Plan*, ALGONQUIN, PARK DUVALLE, & HALLMARK NEIGHBORHOOD PLAN, https://aphplan.com (last visited May 6, 2024).

93 LOUISVILLE METRO GOV'T, MY LOUISVILLE HOME: A COMPREHENSIVE HOUSING STRATEGY FOR A CONNECTED, HEALTHY, AUTHENTIC, SUSTAINABLE, EQUITABLE AND SAFE CITY (2023), https://louisvilleky.gov/housing/document/my-louisville-home-final-draft.

94 LOUISVILLE METRO OFF. OF PLAN., COMPREHENSIVE PLAN: PLAN 2040 (2019), https://louisvilleky.gov/government/planning-design/comprehensive-plan.

95 LOUISVILLE METRO OFF. OF PLAN., PREPARE LOUISVILLE: BUILDING A RESILIENT COMMUNITY FOR ALL 20 (2020), https://louisvilleky.gov/advanced-planning-and-sustain-ability/document/prepare-louisville083122.

South Dixie Highway Master Plan (2018), Rubbertown Corridor Economic Development Strategy (2010).[96]

As MSD began preparing for Mill Creek watershed planning, it realized it had an equity and inclusion challenge and opportunity. 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.[97] 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.[98] Those watersheds 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, the Greenway plan 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 watershed areas further away from the stream itself, both of which have higher concentrations of residents of color and low-income residents.[99]

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.[100] Since April 2022, we have participated in monthly online

Watershed planning and governance can become more equitable when it incorporates climate, environmental, and resilience justice considerations. Source: Tony Arnold & RJ Project.

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96 *Completed/Adopted Neighborhood Plans and Studies*, Louisville Metro Off. of Plan., https://louisvilleky.gov/government/advanced-planning/completedadopted-neighborhood-plans-and-studies (last visited May 6, 2024).

97 *See* Louisville MSD, Middle Fork Beargrass Creek Watershed-Based Plan 12, 15 (2022), https://eec.ky.gov/Environmental-Protection/Water/Outreach/BasinCoordi-nation/WBPSalt/MFBeargrassCreekWBP.pdf.

98 *Floyd's Fork DRO*, Louisville Metro Off. of Plan., https://louisvilleky.gov/govern-ment/planning-design/floyds-fork-dro (Mar. 7, 2024); Floyd's Fork Env't Ass'n & Louisville Keep Your Fork, Floyd's Fork, http://www.floydsfork.net (last visited May 6, 2024).

99 Louisville Metro Parks & Recreation Dep't, Mill Creek Greenway Master Plan (2023).

100 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

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.

The RJ Project set three specific goals to achieve in the Mill Creek watershed plan:

1) transform the inequitable conditions of the wa-tershed—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.

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 draft working document identified key concepts, equitable planning principles, methods of inclusive planning processes, examples of community engagement and inclusive planning methods, and a strategy of research and analysis. The purpose of this 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. A revised list of 19 equitable watershed planning principles and 23 equitable watershed planning processes appears in Appendix C of this report, along with citations to many of the sources from which this planning framework was derived.

In addition, 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



The Southwest Community Festival has been a way for planners and the RJ Project to connect with and engage residents of the Mill Creek watershed. Source: Southwest Community Festival.

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.

residents as part of the Mill Creek Community Study, which is discussed in the next section, Part 4. 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 proactively 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 a forthcoming scholarly article[101] have expanded awareness of the equity issues in the Mill Creek watershed nationally and internationally.

The UofL RJ Project has collaborated with Holy Cross High School, the MSD & Louisville Metro Parks Summer Works programs, the Louisville Tenants Union and Louisville Metro Council, and the Southwest Dream Team to inclusively engage a wide range of people who live, work, and play in the Mill Creek watershed in issues affecting their communities. Sources: Tony Arnold, Jessica Bellamy, Southwest Dream Team.

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101 Craig Anthony (Tony) Arnold & RJ Project Researchers, *Environmental Justice, Resilience Justice, and Watershed Planning*, 48 Wm. & Mary Env't L. & Pol'y Rev. 553 (2024).

04. Mill Creek Community Study

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 underemployed, 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.[102] Researchers actively sought to invite members of the Mill Creek watershed to participate in the study by being interviewed.

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102 Institutional Review Board Study No. 22.0567, University of Louisville.

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, nonprofits, 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;[103] or d) people with household incomes below 150% of the area median.[104] 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 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.

The Mill Creek Community Study is based on inclusively seeking diverse voices of community members who live, work, or play in the Mill Creek watershed. Images of community residents are not depicted in this section of this report in order to protect the confidential identities of interview participants. Source: Stock image.

103 Black or African American; Hispanic or Latine; Asian, Native Hawaiian, or Pacific Islander; American Indian or Alaska Native; Middle Eastern, North African, or Southwest Asian; or multi-racial.

104 Households that are considered very-low-, low-, or moderate-income. *See, e.g.*, *Am I Eligible for Assistance?*, ENERGY STAR, https://www.energystar.gov/products/as-sist_lmi/eligible_assistance (last visited May 6, 2024).

These interview participants are relatively evenly distributed among people of color, low-income people, under-employed people, and people with multiple characteristics.[105] Thus, the Mill Creek Community Study is a means by which underrepresented 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 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

University of Louisville students working with the Resilience Justice Project conducted and analyzed the interviews in the Mill Creek Community Study. Here they are featured at a training meeting at Mike Linnig's. Source: Frank Bencomo-Suarez.

105 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 report.

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.[106] 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 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.

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106 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.

Other environmental and land use problems and injustices were major concernsto the interviewees. They overwhelminglyexpressed 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 of the time of the interviews, 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 University of Louisville Resilience Justice Project recruited potential interview participants at many different community events within the Mill Creek watershed, including at the Southwest Community Festival and the Southwest Regional Library. Source: Tony Arnold.

05. Public Policy Analyses & Proposed Reforms

Whether or not the Mill Creek Watershed Plan will improve environmental justice, community resilience, and responsiveness to community members' concerns depends not only on the content and implementation of the plan itself, but also on many other Louisville Metro policies, plans, and programs. Many of these are beyond the control of MSD and the watershed planning partners. However, equitable watershed planning and resilience justice initiatives require working across the silos of policy areas and agency jurisdictions. And they require leadership from officials who can and should insist on an integrated and transformative approach to addressing environmental and social injustices, particularly the Louisville Metro Mayor, the Louisville Metro Council, the Kentucky Governor, and the Kentucky General Assembly. Nonpoint source pollution isn't a discrete, independent feature of the Mill Creek watershed. From the perspectives and experiences of the people who live, work, and play in the Mill Creek watershed – as well as from the systems-based and research-based perspective of resilience justice – nonpoint source pollution in the Mill Creek watershed is integrally interconnected with so many other conditions, vulnerabilities, and policy areas.

Thus, the last major set of analyses that the RJ Project has produced in the Mill Creek watershed planning process is called "Public Policy Analyses & Proposed Reforms." In these analyses, we have assessed 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.

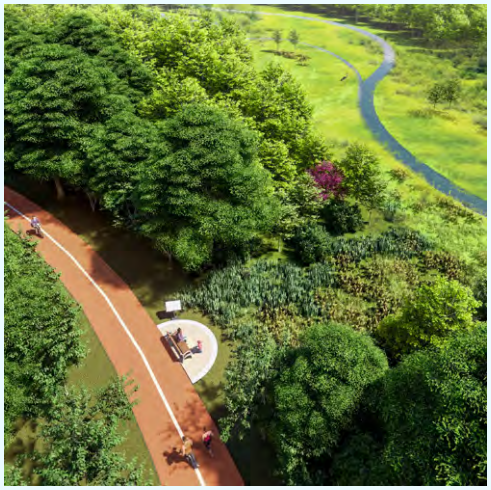
Many dozens of public policy documents from the websites of Louisville Metro agencies and entities were read and assessed using the Resilience Justice Assessment Framework in October and November

The policy areas that must be addressed equitably for Southwest Louisville community resilience and for an effective Mill Creek watershed plan include: water.
Sources: open domain.

2022.[107] A detailed set of proposed changes to each policy was beyond the scope of this study. Instead, we sought to identify the themes and patterns from a resilience-justice perspective that pervade Louisville Metro policies and will likely affect – facilitate or deter – the equity goals and strategies of the Mill Creek Watershed Plan and related plans for the Mill Creek restoration and greenway projects.

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



The policy areas that must be addressed equitably for Southwest Louisville community resilience and for an effective Mill Creek watershed plan include: parks.

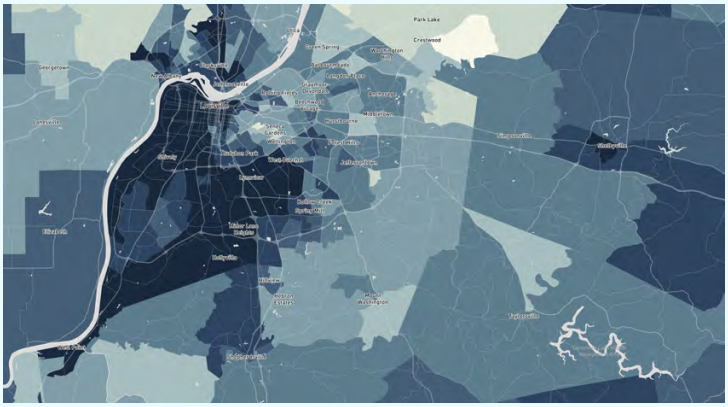
Sources: Louisville Metro Parks.

107 Louisville Metro policies are ever changing and evolving. We had to do our assessments at a relatively static point in time in Fall 2022, although we were able to partially update our analyses in December 2023. We recognize that some of our assessments may be incomplete or dated as time moves forward. Nonetheless, even in June 2024, the major themes we identified still seem to mostly characterize Louisville Metro policies.

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.[108] 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



The policy areas that must be addressed equitably for Southwest Louisville community resilience and for an effective Mill Creek watershed plan include: climate change. This map shows unequal climate vulnerability in Louisville.

Sources: Climate Vulnerability Index.

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108 Co-governance is a structure of policymaking and policy implementation in which power is shared by governmental entities and local grassroots communities. Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Community-Based Green and Blue Infrastructure*, 45 WM. & MARY ENV'T L. & POL'Y REV. 665, 694– 95 (2021).

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

The policy areas that must be addressed equitably for Southwest Louisville community resilience and for an effective Mill Creek watershed plan include: enviornmental conditions.

Sources: LG&E.

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 acknowledgements 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, nonprofit organizations, and academic researchers, gather a lot of data

The policy areas that must be addressed equitably for Southwest Louisville community resilience and for an effective Mill Creek watershed plan include: health.

Sources: University of Louisville..

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

The policy areas that must be addressed equitably for Southwest Louisville community resilience and for an effective Mill Creek watershed plan include: land use.

Sources: Tony Arnold.

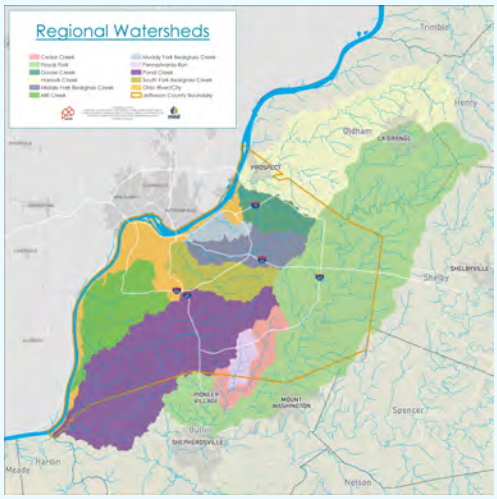
applicable to local government investments in vulnerable neighborhoods and the Parks Alliance of Louisville park-equity organization has recommended specific anti-displacement strategies be used in connection with its proposed remedies for park inequities city-wide, most Louisville plans and policies 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, brown-fields, industrial zoning, and land-development patterns, and vice versa. Equitable community resilience—resili-ence justice—is a unifying theme that is missing from many of these policies.

The policy areas that must be addressed equitably for Southwest Louisville community resilience and for an effective Mill Creek watershed plan include: g) housing

Sources: Riverport Family Scholar House.

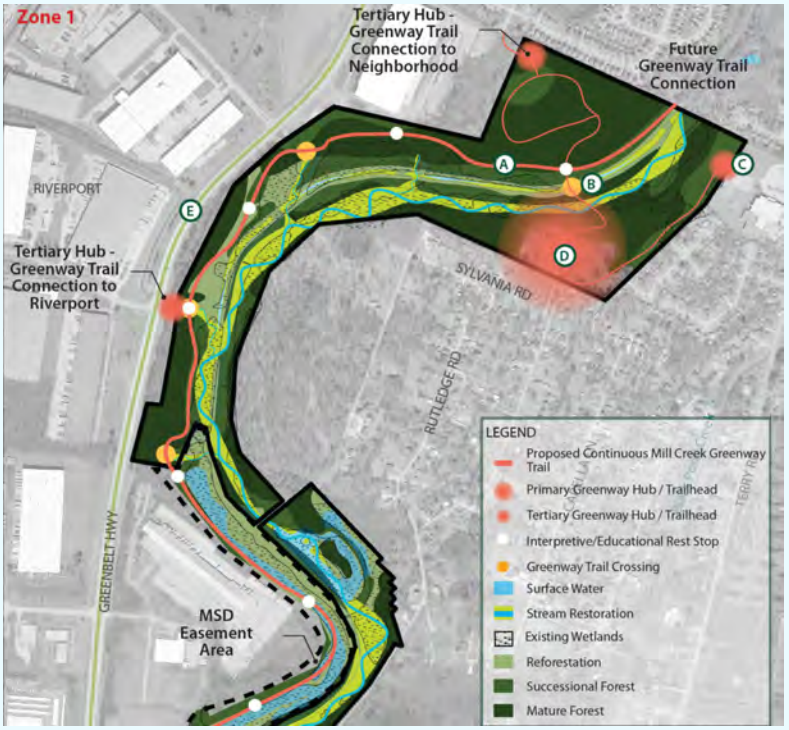
06. Conclusion

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.



This map of the watersheds in the Louisville Metro region reminds planners and residents that the conditions and problems of the Mill Creek watershed (bright green) are interconnected with environmental and community policies throughout the Metro area. Source: MSD

On one hand, the Mill Creek watershed planning process is a major step forward to including environmental justice and resilience justice in watershed planning in Kentucky, just as watershed planning throughout the United States is undergoing an equity evolution.



Restoration of the degraded, polluted Mill Creek and creation of the Mill Creek Greenway for a stream-focused set of park, recreational, and ecological resources for the community are high priorities for Mill Creek watershed residents. Sources: Tony Arnold & Louisville Metro Parks/Human Nature.

The need for environmental justice and resilience justice perspectives is strong. 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. This isn't something that MSD can unilaterally solve; there are legal and resource constraints, including the scope of nonpoint-source watershed planning under the CWA. This will take leadership by the Mayor, Metro Council, KDOW, and EPA, as well as institutional change.

Residents of Mill Creek neighborhoods care about litter, flooding stormwater runoff, and life in the watershed, and they want plans and policies that equitably improve the conditions and functions of the watershed. Sources: Tony Arnold; WDRB.

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 fore-casted.

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.

Southwest Louisville community members want solutions to their communities' environmental injustices, including pollution, industrial development, burdensome land uses, and traffic. Sources: Frank Bencomo-Suarez; Tony Arnold; Louisville Metro government.

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. Improved responsiveness doesn't change perceptions or distrust overnight. 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 nonprofit 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

Community education, organizing, cooperation, and activism will be essential to seeking and securing a future for the Mill Creek watershed communities that is both equitable and resilient. This includes addressing environmental injustices, climate change vulnerabilities, housing and food insecurity, economic and job investments, and gentrification/displacement. Community members express their voices to shape plans and policies, collaborate with one another and government agencies, and hold government officials accountable. Sources: Tony Arnold; Cindi Fowler.

resources.[109] 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.[110]

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 creative vision for the future, and joy when real justice-advancing changes are won.[111] The features of equitable watershed planning occurring 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."[112]

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,

Source: MSD.

109 Derrick A. Bell, Jr., Brown v. Board of Education *and the Interest-Convergence Dilemma*, 93 HARV. L. REV. 518, 523 (1980) ("[t]he 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).

110 Robert Benford has argued the environmental justice movement tends to evolve toward stagnation and the setting for reformist tinkering instead of adhering to a revolutionary and disruptive agenda of challenging existing institutions. *The Half-Life of the Environmental Justice Frame: Innovation, Diffusion, and Stagnation*, *in* POWER, JUSTICE, AND THE ENVIRONMENT: A CRITICAL APPRAISAL OF THE ENVIRONMENTAL JUSTICE MOVEMENT 37, 45–52 (David Naguib Pellow & Robert J. Brulle eds., 2005).

111 JULIE SZE, ENVIRONMENTAL JUSTICE IN A MOMENT OF DANGER 14–24 (2020).

112 Craig Anthony (Tony) Arnold, *Adaptive Law*, *in* RESEARCH HANDBOOK ON CLIMATE DISASTER LAW: BARRIERS AND OPPORTUNITIES 169, 184 (Rosemary Lyster & Robert R.M. Verchick eds., 2018).

can help marginalized communities and watershed planners to build equitable resilience in watersheds and the human communities who inhabit them.

One of the critically important needs for any equitable watershed planning process is community-engaged feedback loops that include monitoring and assessment of – and learning from – the data most relevant to equity. These data include the environmental conditions and injustices, social conditions and injustices, indicia of unequal community resilience and vulnerability, and perspectives and concerns of community members, all of which are described in this report. It's important to know whether environmental and social equity and community resilience are improving in Mill Creek watershed neighborhoods over time. This information is essential to MSD and other Louisville Metro agencies and officials, KDOW, EPA, community-based organizations (including justice-advocacy groups), and the community residents themselves. Community members must be inclusively involved in providing, gathering, monitoring, and evaluating the data, especially those community members who have historically been marginalized from governance processes. Plans and policies need to be changed when the data show they aren't working or when there are new threats to the community, such as gentrification and displacement or worsening climate-change impacts (e.g., unprecedented flooding, heat, etc.).

MSD's planning for non-structural best management practices (BMPs) to address nonpoint source pollution in the Mill Creek watershed could a transformative catalyst of community empowerment and engagement, especially if combined with grassroots community organizing and advocacy. As members of the Mill Creek watershed community become involved in addressing their environmental conditions, they can provide feedback on how well the watershed plan and other policies are performing with respect to justice and community resilience, and vice-versa.

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.[113] Social capital includes community "cooperation, trust, social networks, information sharing, and collective problem-solving."[114]

The future health of the Mill Creek watershed and equitable resilience of its communities depend on good environmental stewardship by watershed community members. This includes preventing pollution from entering runoff and streams and engaging in cleanups, such as those held at Sylvania Park and Watterson Lake Park. Source: MSD.

The RJ Project especially looks forward to continuing to collaborate with community residents, organizations, and leaders in the Mill Creek watershed to support and facilitate grassroots community empowerment, activism, and advocacy. The RJ Project is deeply committed to a thriving Southwest Louisville that is resilient, not vulnerable, and environmentally and socially equitable, not harmed, burdened, and marginalized by unjust conditions and systems. A plan for a healthier, cleaner, well-managed, and thriving Mill Creek watershed will fail without the inclusive voices, activism, collaboration, and power of the watershed's people.

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113 *See* Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Community-Based Green and Blue Infrastructure*, 45 Wm. & Mary Env't L. & Pol'y Rev. 665, 692–93 (2021).

114 *Id.* Some key works on the role of social capital in the equitable resilience (or vulnerabilities) of low-income communities of color include Mark Pelling, *Participation, Social Capital and Vulnerability to Urban Flooding in Guyana*, 10 J. Int'l Dev. 469, 470 (1998); Manuel Pastor, *Building Social Capital to Protect Natural Capital: The Quest for Environmental Justice* (Univ. Mass. Amherst Pol. Econ. Rsch. Inst., Working Paper No. 11, 2001); and Sheila R. Foster, *The City as an Ecological Space: Social Capital and Urban Land Use*, 82 Notre Dame L. Rev. 527, 580 (2013).

The UofL RJ Project collaborates with Southwest Louisville community members of all ages/generations, as well as government planners, because we care about a thriving, resilient, equitable future for the Mill Creek watershed and its communities. Sources: Tony Arnold; Southwest Community Festival.

Appendix A
Resilience Justice Project Researchers, Funding, and Acknowledgements

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 report and are listed below:

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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

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APPENDIX B
ENVIRONMENTAL JUSTICE AUDIT TOOL

The Environmental Justice Audit Tool 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.[115] This planning tool was developed in *Fair and Healthy Land Use: Environmental Justice and Planning*. [116] 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.[117]

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

[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

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115 CRAIG ANTHONY (TONY) ARNOLD, FAIR AND HEALTHY LAND USE: ENVIRONMENTAL JUSTICE AND PLANNING 46 (2007).
116 *Id.*
117 *Id.*

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/ma-rinas, 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 [118]

[118] *Id.* at 47.

APPENDIX C
EQUITABLE WATERSHED PLANNING PRINCIPLES AND PROCESSES

Principles

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

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
3. 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.

4. Inclusive community engagement should give special attention and effort to proactive outreach to those who have historically been underrepresented or disempowered in planning and governance processes.
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[119]:

    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;

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[119] 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.

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 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 up-front 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, nonprofits, 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.

These Equitable Watershed Planning Principles and Processes are synthesized from many sources, including:

- Advancing Equity Planning Now (Norman Krumholz & Kathryn Wertheim Hexter eds., 2018);
- *Principles of Environmental Justice*, EJnet, https://www.ejnet.org/ej/princi-ples.html (Apr. 6, 1996) (Principles of Environmental Justice adopted by the First National People of Color Environmental Leadership Summit in 1991);
- Resilience, Environmental Justice, and the City (Beth Schaefer Caniglia, Manuel Vallee, Beatrice Frank eds., 2017);
- Julian Agyeman & Dale Bryan, *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);
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APPENDIX D
IN-DEPTH SEMI-STRUCTURED INTERVIEW STUDY METHODOLOGY

An essential analytical tool for equitable watershed planning is the use of in-depth, semi-structured interviews of community members. Semistructured 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.[120] 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.[121]

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.[122] In semi-structured interviews,

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120 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.").

121 *See, e.g.*, JULIE SZE, ENVIRONMENTAL JUSTICE IN A MOMENT OF DANGER 810, 838 n.3 (2020); OLIVIA LOPEZ & ELEANOR D. PIEREL, JUSTICE40 AND WATER EQUITY IN FLORIDA: A CASE STUDY OF CLIMATE RISK AND WATER INFRASTRUCTURE INVESTMENT IN FRONTLINE COASTAL COMMUNITIES 6 (2023), https://oceanconservancy.org/wp-content/up-loads/2023/11/j40-report-v2-1-1.pdf; 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, 2018, 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).

122 *Types of Interviews in Research and Methods*, QUESTIONPRO, https://www.ques-tionpro.com/blog/types-of-interviews (last visited May 6, 2024). *See generally* MICHAEL QUINN PATTON, QUALITATIVE RESEARCH & EVALUATION METHODS 339–427 (3d ed. 2002); KARIN OLSON, ESSENTIALS OF QUALITATIVE INTERVIEWING (2011); ANNE GALLETTA, MASTERING THE SEMI-STRUCTURED INTERVIEW AND BEYOND: FROM RESEARCH DESIGN TO ANALYSIS AND PUBLICATION (2013).

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).[123] 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.[124] The goal of the semi-structured interview is to 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.[125]

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.[126] 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.[127] 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.[128]

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

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123 PATTON, at 344–47; GALLETTA, at 45–72.
124 PATTON, at 344–47, 353–79; GALLETTA, at 45–118.
125 *See, e.g.*, 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, 2018, 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).

126 PATTON, at 365–66 (referring to the researcher's need to establish rapport but maintain neutrality).
127 GALLETTA, at 40–41.
128 PATTON, at 405–15.

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.[129] The transcripts will contain qualitative textual data—words—that can be analyzed for themes and patterns, as well as key insights.[130] The researchers should use a qualitative social-science research software program or platform to code the textual data from the interviews.[131] 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.[132] The soft-ware/platform enables researchers to view, sort, categorize, aggregate, and synthesize these codes from all the coded texts (e.g., transcripts).[133]

Gathering knowledge and planning input from the texts of in-depth, semi-structured interview transcripts involves qualitative research methods to generate understanding, not proof.[134] 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.[135] Researcher bias cannot be completely eliminated

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[129] *See generally* Christian Bokhove & Christopher Downey, *Automated Generation of "Good Enough" Transcripts as a First Step to Transcription of Audio-Recorded Data*, METHODOLOGICAL INNOVATIONS, May–June 2018, at 1; Susanne Wollin-Giering, Markus Hoffmann, Jonas Höfting & Carla Ventzke, *Automatic Transcription of Qualitative Interviews* (Socio. of Sci., Discussion Paper, 2023), https://www.static.tu.berlin/filead-min/www/10005401/publikationen_sos/wollin-giering_et_al_2023_automatic_transcription.pdf.

[130] PATTON, at 380; GALLETTA, at 4–5, 119–22.

[131] JOHNNY SALDAÑA, THE CODING MANUAL FOR QUALITATIVE RESEARCHERS 3, 25–34 (2d ed. 2013).

[132] *Id.* at 3–8; GALLETTA, 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.*, Deidre Zoll, *We Can't Address What We Don't Acknowledge: Confronting Racism in Adaptation Plans*, *in* JUSTICE IN CLIMATE ACTION PLANNING 3, 8–11 (Brian Petersen & Hélène B. Ducros eds., 2022) (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).

[133] SALDAÑA, at 30–34, 207–08.

[134] 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 CRESWELL, RESEARCH DESIGN: QUALITATIVE & QUANTITATIVE APPROACHES 5, 145 (1994); *see also* PATTON, at 340–41; GALLETTA, at 2.

[135] GALLETTA, at 119–45.

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.[136]

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.[137] Researchers aim to look for the patterns that emerge from the interviews as a whole, particularly about community conditions and needs, perceived injustices and vulnerabilities, the lived experiences of community residents, and perspectives on governance and their communities, among others.[138] 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.[139] 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

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136 SALDAÑA, at 39–50; PATTON, 494–95; GALLETTA, at 104–05, 119–45.

137 SALDAÑA, at 39–50; PATTON, at 494–95; GALLETTA, at 104–05, 145–72.

138 *See, e.g.*, JULIE SZE, ENVIRONMENTAL JUSTICE IN A MOMENT OF DANGER 810, 838 n.3 (2020); OLIVIA LOPEZ & ELEANOR D. PIEREL, JUSTICE40 AND WATER EQUITY IN FLORIDA: A CASE STUDY OF CLIMATE RISK AND WATER INFRASTRUCTURE INVESTMENT IN FRONTLINE COASTAL COMMUNITIES 6 (2023), https://oceanconservancy.org/wp-content/up-loads/2023/11/j40-report-v2-1-1.pdf; 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, 2018, at 2, 5–7; Suzanne Speak, *Planning for the Needs of Urban Poor in the Global South: The Value of a Feminist Approach*, 11 Plan. Theory 343, 350, 352–57 (2012); 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).

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

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.[140]

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.[141] 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.[142] 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.[143] In our experiences with in-depth semistructured 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.

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140 PATTON, at 388.
141 GALLETTA, at 2, 45.
142 *Id.* at 33–43; PATTON, at 223–46.
143 GALLETTA, at 33–43; PATTON, at 223–46.

APPENDIX E
RESILIENCE JUSTICE PLANNING AND POLICY ASSESSMENT FRAMEWORK

Rhe Resilience Justice Framework for Assessing Plans, Policies, and Laws was developed by the RJ Project to provide structured guidance for analyses of government plans, policies, programs, and laws affecting the resilience and vulnerabilities of marginalized and oppressed communities.[144] 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."[145] 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?

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

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144 Craig Anthony (Tony) Arnold & RJ Project Researchers, *Resilience Justice and Urban Water Planning*, 52 SETON HALL L. REV. 1399, 1424–25 (2022).
145 *Id.*

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?[146]

[146] *Id.* at 1424.