

Resilience Justice and Urban Water Planning

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I. INTRODUCTION

Good water planning by cities and metropolitan areas is essential to the health and well-being of urban residents, especially the most vulnerable people who depend on urban water systems.¹ Cities and metropolitan areas seek to supply their residents with clean, safe, reliable, affordable, and sufficient amounts of water.² Planning is necessary to achieve these multi-faceted and difficult goals. Government officials, urban water system managers, and community stakeholders in the United States use several different planning processes, including water supply planning, water system management and operational planning, water rate planning, and drinking water quality planning.³ A variety of legal standards, planning principles, and institutional design features influence these planning processes and their outcomes.⁴

Failures in urban water planning have disastrous consequences not only for the functioning of the city but also for the health and well-being of urban residents.⁵ With over 85 percent of the U.S. population served by municipal water systems,⁶ the extent to which these systems are resilient and equitable has national consequences. Urban water planning failures disproportionately harm the most vulnerable urban

¹ See generally TOM DANIELS & KATHERINE DANIELS, *THE ENVIRONMENTAL PLANNING HANDBOOK FOR SUSTAINABLE COMMUNITIES AND REGIONS* 67–97 (2003); Robert W. Adler, *Legal Framework for the Urban Water Environment*, in *THE WATER ENVIRONMENT OF CITIES* 171, 178 (Lawrence A. Baker ed., 2009) [hereinafter Adler, *Legal Framework*]; Catherine F. Grasham et al., *On Considering Climate Resilience in Urban Water Security: A Review of the Vulnerability of the Urban Poor in Sub-Saharan Africa*, *WIRES WATER* 1, 2, 7 (2019), <https://wires.onlinelibrary.wiley.com/doi/pdf/10.1002/wat2.1344>.

² See generally DANIELS & DANIELS, *supra* note 1, at 83–97; Adler, *Legal Framework*, *supra* note 1, at 177–78. Due to necessary limits to scope, this Article does not address rural water supply system planning, even if there is a continuum between urban and rural water systems. For analyses of rural water supply planning inequities, see, e.g., Camille Pannu, *Drinking Water and Exclusion: A Case Study from California's Central Valley*, 100 CALIF. L. REV. 223 (2012), and Camille Pannu, *Bridging the Safe Drinking Water Gap for California's Rural Poor*, 24 HASTINGS ENV'T L.J. 253 (2018).

³ See *infra* Part II.

⁴ See *infra* Part II.

⁵ See, e.g., DAVID LEWIS FELDMAN, *WATER* 1–27 (2012); Farhana Sultana, *Water Justice: Why It Matters and How to Achieve It*, 43 WATER INT'L 483, 485–86 (2018); Grasham et al., *supra* note 1, at 3–7; Nancey Green Leigh & Heonyeong Lee, *Sustainable and Resilient Urban Water Systems: The Role of Decentralization and Planning*, 11 SUSTAINABILITY, 2019, at 1. For a perspective on the severe social, ecological, and human consequences of water planning failures generally, see ROBERT GLENNON, *UNQUENCHABLE: AMERICA'S WATER CRISIS AND WHAT TO DO ABOUT IT* 77–102 (2009).

⁶ Heather Payne, *A Fix for a Thirsty World—Making Direct and Indirect Reuse Legally Possible*, 42 WM. & MARY ENV'T L. & POL'Y REV. 201, 203 (2017).

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residents, such as low-income people, people of color, children and the elderly, people with health vulnerabilities, homeless people, people living in immigrant or informal communities, and others.⁷

Two of the most notorious examples in recent years are the drinking water crisis of Flint, Michigan, and the severe water shortage crisis of Atlanta, Georgia. The drinking water in Flint, Michigan, a city in which a majority of residents are African American and 42 percent of the residents live below the poverty line, was contaminated for years with lead, bacteria, carcinogenic trihalomethanes, and Legionnaire's disease. This contamination occurred after the city water system switched its water supply to acidic, corrosive, and polluted Flint River water to save money in 2014.⁸ It has been estimated that over 6,000 children were poisoned with lead in their drinking water, a group that is especially vulnerable because of the effects of lead on growing brains and nervous systems. Secondary effects on Flint residents include post-traumatic stress disorder, distrust of the government and the water system, and billions of dollars of costs to triage and then remedy the crisis. The planning failures that led to the Flint crisis were legion. The city failed to invest in needed water infrastructure improvements for decades and then became financially insolvent. Finding cheaper sources of water became a high priority for the city's emergency manager. Officials corruptly arranged for the city to be ordered by the state to obtain water from a new water source to satisfy the interests of wealthier suburban communities looking for an alternative to water from Detroit. Due to the cost and delay of building a pipeline to this new source, the city's emergency manager decided to temporarily obtain water from the Flint River as a cost-saving measure, even though its acidity would corrode lead pipes. Refusing to believe that the city could be facing a major health crisis from its drinking water, the city's water managers, as well as federal and state regulators, failed to enforce Safe

⁷ Martha F. Davis, *Let Justice Roll Down: A Case Study of the Legal Infrastructure for Water Equality and Affordability*, 23 GEO. J. POVERTY L. & POL'Y 355, 356–57 (2016); Christine DeMyers et al., *Urban Water Insecurity: A Case Study of Homelessness in Phoenix, Arizona*, 10 ENV'T JUST. 72, 72 (2017); Grasham et al., *supra* note 1; Jerry van den Berge et al., *Water Justice and Europe's Right2Water Movement*, 38 INT'L J. WATER RES. DEV., 173, 175–77 (2022).

⁸ The facts of this Flint, Michigan, example are synthesized from the following sources: Lindsey J. Butler et al., *The Flint, Michigan, Water Crisis: A Case Study in Regulatory Failure and Environmental Injustice*, 9 ENV'T JUST. 93 (2016); Andrew J. Lawton, *The Flint Water Crisis: A National Warning of Failing Infrastructure*, 19 BENEFITS & SOC. WELFARE L. REV. 85, 88–102 (2017); JAMES SALZMAN, DRINKING WATER: A HISTORY 139–56 (2017); Sultana, *supra* note 5, at 486; Leigh & Lee, *supra* note 5, at 1; Joanne Sobeck et al., *Stress, Coping, Resilience and Trust During the Flint Water Crisis*, 46 BEHAV. MED. 202, 202–12 (2020).

Drinking Water Act standards, even manipulating data to make the water appear to be safe. When residents, scientists, and health professionals repeatedly raised concerns and brought forth evidence about the dangerously high levels of lead in the water, government officials ignored, criticized, and marginalized them. Only when the crisis became a national news story of environmental injustice and total institutional failure were changes made and remedial measures taken.

Atlanta, on the other hand, came within 90 days of running out of water supply for the nearly 5 million people in its metropolitan area during a severe drought in 2007.⁹ Water plans and management in the Atlanta metropolitan area rely almost entirely on surface waters from two river basins, with 70 percent of Atlanta's water supply coming entirely from a single reservoir, Lake Lanier. Officials had not planned well for a severe and sustained drought. They had not planned well for increased competition for and litigation over surface water supplies by other water users, including agricultural users; commercial shipping; recreational users; lakefront property owners; environmental interests in instream flows; fishing industries; and the downstream states of Alabama and Florida. Officials had not planned well for Atlanta's explosive and mostly uncontrolled growth and land development, including having few effective mechanisms in place to slow or halt new water hookups and permits during the water crisis. Officials had not adequately invested in water infrastructure improvements and water-system management reforms for several decades. Even during the drought, broken water pipes and hydrants wastefully poured water into the streets for days due to lack of personnel to fix them. The crisis forced officials to come up with water conservation plans quickly. Nonetheless, per capita usage remains high in the Atlanta area; demand-management plans are weak at best. Moreover, water bills are extremely high, an average of about \$325 per household per month (in comparison to a national average of \$140 per household per month). Low-income households, which are disproportionately households of color, bear burdens of high costs for unreliable water supplies in order for the

⁹ The facts of the Atlanta, Georgia, example are synthesized from the following sources: Craig Anthony (Tony) Arnold, *Water Privatization Trends in the United States: Human Rights, National Security, and Public Stewardship*, 33 WM. & MARY ENV'T. L. & POL'Y REV. 785, 786–88, 799–800 (2009) [hereinafter Arnold, *Privatization*]; David L. Feldman, *Preventing the Repetition: Or, What Los Angeles' Experience in Water Management Can Teach Atlanta About Urban Water Disputes*, 45 WATER RES. RSCH., 2009, at 1–13; GLENNON, *supra* note 5, at 23–35; Thomas M. Missimer et al., *Water Crisis: The Metropolitan Atlanta, Georgia, Regional Water Supply Conflict*, 16 WATER POL'Y 669 (2014); Leigh & Lee, *supra* note 5; Andrea K. Gerlak et al., *An Intersectional Approach to Water Equity in the US*, 15 WATER ALTS. 1, 3 (2022).

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water system to provide water to relentless, profitable land development for high-income residences and businesses.

Urban water crises, such as the drinking-water-quality crisis of Flint, Michigan, and the drinking-water-supply crisis of Atlanta, Georgia, highlight how urban water planning failures disproportionately harm metropolitan areas' most vulnerable communities—typically low-income communities and communities of color. Systemic injustices emerge out of cross-system effects. For example, systemic vulnerabilities in cities' water infrastructure, supplies, quality, costs, and management intersect with structural economic, political, and social inequalities, as well as forces like systemic racism, oppression, and the long-term impacts of colonialism. In both the Flint and Atlanta examples, officials and planners failed to plan for sufficient systemic resilience to surprise shocks and changes to water systems. These failures and their effects were exacerbated by the inequities of urban water systems and cities generally.

Urban water planning should be characterized by both resilience and justice. Resilience is the capacity of a system to adapt to disturbances, shocks, and changing conditions while retaining its core functions and structure.¹⁰ A resilient urban water system adapts to unprecedented conditions, whether climate change, drought, pollution, economic and financial crises, population growth, infrastructure failure, or others.¹¹ Justice is the equity of the system for all communities, groups, and people.¹² A just urban water system addresses the needs of its most vulnerable communities and people, including fairness in the distribution and cost of water resources, meaningful opportunities to shape water policies and decisions, and the power and capacities (or capabilities) of traditionally marginalized or oppressed people to thrive with dignity and to meet their needs.¹³

¹⁰ BRIAN WALKER & DAVID SALT, *RESILIENCE THINKING: SUSTAINING ECOSYSTEMS AND PEOPLE IN A CHANGING WORLD* 1 (2006).

¹¹ *See infra* Part III.

¹² *Id.*

¹³ This statement synthesizes the analytical frameworks of justice in several landmark works: JOHN M. ALEXANDER, *CAPABILITIES AND SOCIAL JUSTICE: THE POLITICAL PHILOSOPHY OF AMARTYA SEN AND MARTHA NUSSBAUM* (2008); SUSAN F. FAIRSTEIN, *THE JUST CITY* (2010); Melanie McDermott et al., *Examining Equity: A Multidimensional Framework for Assessing Equity in Payments for Ecosystem Services*, 33 *ENV'T SCI. & POL'Y* 416, 417–21 (2013); Nicole J. Wilson, *Querying Water Co-Governance: Yukon First Nations and Water Governance in the Context of Modern Land Claim Agreements*, 13 *WATER ALTS.* 93, 94–96 (2020); Craig Anthony (Tony) Arnold et al., *Resilience Justice and Community-Based Green and Blue Infrastructure*, 45 *WM. & MARY ENV'T L. & POL'Y REV.* 665, 688–94 (2021) [hereinafter Arnold et al., *Resilience Justice*].

This Article explores how resilience justice can be integrated into urban water planning. The conceptual framework of resilience justice¹⁴ links the goals of resilience and justice, and focuses the analyses and plans of urban water systems on the adaptive capacities and vulnerabilities of marginalized communities and people. Resilience justice is a new way of thinking about the linkages among systemic resilience/vulnerability and systemic injustice. It is emerging not only from scholarly work on these linkages,¹⁵ but also from the experiences and community activism of marginalized and oppressed people in the Global South and low-income communities of color in North America.¹⁶

Part II of this Article describes the practices and institutional frameworks of five types of urban water planning: water supply planning, water system management and operational planning, water rate planning, and drinking water quality planning. The themes of systemic vulnerability and inequity receive particular attention. Part III presents the basic concept and framework of resilience justice. Part IV analyzes examples of urban water planning undertaken in Fresno, California, and Sacramento, California. Both case studies are analyzed through the lens of the resilience justice framework. Part V explores several major themes of resilience/vulnerability and justice/injustice that emerge from these case studies. Part VI identifies several planning and institutional reforms that could make urban water planning more resilient and equitable, including legal reforms, as well as policy, procedural, and structural reforms. Finally, Part VII concludes with thoughts about the potential future of resilience justice in urban water planning, which will require the engagement of not only government officials and planners, but also grassroots activists in low-income communities of color.

¹⁴ See *infra* Part III.

¹⁵ See, e.g., Arnold et al., *Resilience Justice*, *supra* note 13, at 688–91, 693.

¹⁶ See generally Emmanuel Frimpong Boamah & Craig Anthony (Tony) Arnold, *Assemblages of Inequalities and Resilience Ideologies in Urban Planning*, in *RACIAL JUSTICE IN AMERICAN LAND USE* (Craig Anthony (Tony) Arnold et al. eds., Cambridge Univ. Press, forthcoming) (on file with the author).

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II. URBAN WATER PLANNING AND INSTITUTIONS

A. *Urban Water Planning*

Urban water planning is a process of setting policy goals and management strategies for urban water systems.¹⁷ Plans are means by which current conditions are assessed, future conditions are projected, aspirations are identified, decisions and commitments are made, and formal and informal rules for action are set.¹⁸

Urban water planning focuses on four core aspects of urban water systems: water supply, water demand, water quality, and water cost.¹⁹ These four areas are interconnected. For example, failing water-system infrastructure due to lack of sufficient investment can reduce both the quality and available supplies of drinking water, as well as necessitate increases in consumer rates for water services.²⁰ In another example, the structure and level of water rates that users pay can influence demand for water, but so can the perceived availability and reliability of water supplies.²¹

To plan “for adequate, long-term supplies of high-quality water”²² and the capacities of “community water systems to provide potable water to meet current and projected future needs,”²³ many urban water plans address:

- 1) the capacity of the water system to meet projected future water demands, based on technical, management, and financial analyses and identification of future water-service areas;
- 2) the long-term capacity of the water system to meet drinking water quality standards;

¹⁷ See DANIELS & DANIELS, *supra* note 1, at 83–95 (discussing water supply planning at regional, county, and city levels).

¹⁸ See FRANK S. SO ET AL., *THE PRACTICE OF STATE AND REGIONAL PLANNING* 3–4 (1986); DANIELS & DANIELS, *supra* note 1, at 11–12, 20–28.

¹⁹ DANIELS & DANIELS, *supra* note 1, at 83–89.

²⁰ Leigh & Lee, *supra* note 5, at 1–2.

²¹ DANIELS & DANIELS, *supra* note 1, at 86 (exploring role of water pricing in consumer use of water); Shahzeen Z. Attari, *Perceptions of Water Use*, 111 PNAS 5129, 5129–34 (2014) (discussing perceived water availability and household conservation practices); Verolien Cauberghe et al., *Perceptions of Water as Commodity or Uniqueness? The Role of Water Value, Scarcity Concern and Moral Obligation on Conservation Behavior*, 292 J. ENV'T MGMT., 2021, at 1, 6–7 (showing relationship between perceived water scarcity and water conservation actions).

²² DANIELS & DANIELS, *supra* note 1, at 83.

²³ *Id.* at 86.

- 3) measures to protect source waters from contamination, development, or excessive withdrawals;
- 4) water delivery systems, including their reliability, efficiencies, environmental sustainability, and capacities to reach current and future residents;
- 5) water conservation and various methods and tools for water conservation;
- 6) local-government comprehensive planning goals;
- 7) coordination with other local planning, regulatory, and infrastructure agencies and officials;
- 8) investment in water-system infrastructure (e.g., water treatment facilities, water distribution pipes, water pump stations, water storage facilities), needs for system upgrades and capital improvements, and the structural, management, and financial resources required for these upgrades;
- 9) alternative sources of water supplies;
- 10) appropriate water pricing and rate structures; and
- 11) adaptation to drought, disasters, supply disruptions, and contamination from spills, leakages, or infrastructure failures.²⁴

Several other areas of planning are related to urban water planning, including environmental planning for surface waters and groundwater (particularly water pollution),²⁵ watershed planning,²⁶ land use planning,²⁷ stormwater management,²⁸ flood planning,²⁹

²⁴ See generally *id.* at 83–97.

²⁵ See, e.g., *id.*, at 99–124; SALZMAN, *supra* note 8, at 265–69.

²⁶ See, e.g., THOMAS E. DAVENPORT, THE WATERSHED PROJECT MANAGEMENT GUIDE 61–140 (2003); SALZMAN, *supra* note 8, at 265–69.

²⁷ See, e.g., Craig Anthony (Tony) Arnold, *Is Wet Growth Smarter Than Smart Growth?: The Fragmentation and Integration of Land Use and Water*, 35 ENV'T L. REP. 10152 (2005).

²⁸ See, e.g., INTEGRATING PLANNING AND PUBLIC HEALTH 27–29 (Marya Morris ed., 2006); NAT'L RSCH. COUNCIL COMM. ON REDUCING STORMWATER DISCHARGE CONTRIBUTIONS TO WATER POLLUTION, URBAN STORMWATER MANAGEMENT (2008).

²⁹ See, e.g., Marcelo Gomes Miguez et al., *Planning and Design of Urban Flood Control Measures: Assessing Effects Combination*, 135 J. URB. PLAN. & DEV. 100 (2009); Sara Hughes et al., *Centering Racial Justice in Urban Flood Resilience Policy and Planning: Tools for Practitioners*, ENV'T JUST. (2021), <https://www.liebertpub.com/doi/10.1089/env.2021.0045>.

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disaster planning,³⁰ climate adaptation planning,³¹ and public health planning.³² These types of planning are beyond the scope of this Article. To cover all aspects of water and water-related planning in cities is so extensive as to require book-length, not article-length, treatment. All of the areas of planning excluded from this Article concern themselves primarily with subjects and issues that are not limited to urban water supplies. The responsibility for these planning areas usually falls on entities other than urban water suppliers (e.g., environmental agencies, disaster agencies, local land-use planning officials), even if urban water officials are involved or consulted. In contrast, planning for quantity, quality, infrastructure, demand, costs, and delivery of water supplies to urban residents, businesses, and other users is primarily the function of urban water supply agencies and organizations. This Article focuses on these planning matters.

Urban water planners and officials aim to plan for the resilience of urban water systems in four respects: 1) sufficient amounts and reliability of water supplies to meet demand under various scenarios and circumstances; 2) consistently good, or at least safe, quality of water; 3) feasible costs both to the system operators and the system customers; and 4) long-term reliable functioning of the physical infrastructure and the governance and management systems that enable the first three goals to be achieved.³³ Urban water systems are vulnerable to both external shocks and disturbances and internal shocks and disturbances.³⁴ External shocks and disturbances include unprecedented droughts, source-water contamination, and rapid urban development and population growth. Internal shocks and disturbances include infrastructure failure (e.g., pipes, pumps, filtration systems), loss of staff and/or financial resources, and changes in management

³⁰ See, e.g., PLANNING AND DROUGHT 25–42 (James C. Schwab ed., 2013); Elizabeth C. Bristow & Kelly Brumbelow, *Simulation to Aid Disaster Planning and Mitigation: Tools and Techniques for Water Distribution Managers and Emergency Planners*, 139 J. WATER RES. PLAN. & MGMT. 376 (2013).

³¹ See, e.g., Linda Shi et al., *Roadmap Towards Justice in Urban Climate Adaptation Research*, 6 NATURE CLIMATE CHANGE 131, 132–33 (2016); Linda Shi et al., *Explaining Progress in Climate Adaptation Planning Across 156 U.S. Municipalities*, 81 J. AM. PLAN. ASS'N 191 (2015).

³² See, e.g., INTEGRATING PLANNING AND PUBLIC HEALTH, *supra* note 28, at 25–29.

³³ See generally Pierre Mukheibir et al., *Adaptive Planning for Resilient Urban Water Systems Under an Uncertain Future*, AUSTL. WATER ASS'N (AWA) (2012), <https://opus.lib.uts.edu.au/bitstream/10453/19388/1/2010005205OK.pdf>; Leigh & Lee, *supra* note 5.

³⁴ See, e.g., Mukheibir et al., *supra* note 33; Leigh & Lee, *supra* note 5.

direction. Planning for resilience goes beyond mere risk management; it aims to build adaptive capacity in the system.³⁵

Whether urban water planners and officials also plan for equitable outcomes achieved through equitable methods varies.³⁶ Plans for the resilience of urban water systems far too often do not include plans for the resilience of the communities and populations that depend on these urban water systems, especially cities' most vulnerable communities and populations.

Urban water planning processes shape and are shaped by urban water institutions.³⁷ Institutions are systems of rules, norms, and beliefs that structure social action and include both legal regimes and formal and informal governance systems and policies.³⁸

B. *Local Water Institutions*

Urban water planning is typically undertaken by public water supply entities at local or metropolitan-area levels, such as municipal water departments, city water districts (or water and sewer districts), local-government-owned water utilities, or metropolitan-region water agencies or districts.³⁹ A small minority of public water systems are operated by private water companies,⁴⁰ which may have primary or sole responsibility for urban water planning, but local government officials may be involved to some or even a substantial degree depending on the specific arrangements between government agencies and private water companies in that locality.⁴¹

³⁵ See generally Mukheibir et al., *supra* note 33; Leigh & Lee, *supra* note 5.

³⁶ See generally Grasham et al., *supra* note 1.

³⁷ Adler, *Legal Framework*, *supra* note 1; Robert W. Adler, *Institutions Affecting the Urban Water Environment*, in *THE WATER ENVIRONMENT OF CITIES* 195, 195–96 (Lawrence A. Baker ed., 2009) [hereinafter Adler, *Institutions*].

³⁸ Craig Anthony (Tony) Arnold et al., *The Social-Ecological Resilience of an Eastern Urban-Suburban Watershed: The Anacostia River Basin*, 51 *IDAHO L. REV.* 29, 31 (2014) [hereinafter Arnold et al., *Anacostia*] (citing ELINOR OSTROM, *UNDERSTANDING INSTITUTIONAL DIVERSITY* 3 (2005); W. RICHARD SCOTT, *INSTITUTIONS AND ORGANIZATIONS* 48–59 (3d ed. 2008); ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* (1990)).

³⁹ Adler, *Institutions*, *supra* note 37, at 205–06.

⁴⁰ The degree to which public water systems are operated by private water companies ranges from 11 percent to 33 percent, depending on whether one measures assets and customers or total number of distinct systems. Arnold, *Privatization*, *supra* note 9, at 791.

⁴¹ *Id.* at 793 (noting that public-private arrangements may vary from contracts for specific services to private ownership of the water system); Adler, *Institutions*, *supra* note 37, at 205–06.

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Urban water planners may be directly governed by local charters and bylaws, ordinances and codes, contract terms, and other local legal regimes that determine governance of the urban water system, planning and public-participation procedures, permissible water rates, bond and other financing capacities and terms, formal consultation with other officials and entities, water service areas, water conservation policies, and the like. Equally important, urban water planning affects and is affected by planning and infrastructure development undertaken by others locally. These relevant local planning processes include local comprehensive planning, area-specific land use planning, regional transportation planning, local capital investment programs, sewer and stormwater management systems, local or regional watershed planning, and others.⁴²

C. *State Water Institutions*

State laws, regulations, and agencies govern urban water services and supplies in several ways. First, they determine who may be a water supplier in a city or metropolitan area and the scope of its service jurisdiction: city or county governments, special districts, metropolitan or multi-jurisdiction entities, and private providers of public water.⁴³ Second, state laws, regulations, and agencies determine the rights and access of urban water suppliers to sources of water from surface waters and groundwater, both of which are usually governed by different water rights (and perhaps water-management regimes).⁴⁴ State laws might also govern local arrangements to obtain water from regional water supply entities, wholesale water suppliers, and special water projects.⁴⁵ Third, state laws, regulations, and agencies govern rates that may be charged to consumers and terms of service to urban water customers, often giving broader rate-setting authority to governmental water providers and more state regulation of private water providers.⁴⁶ States might have water quality protections that go beyond the requirements of the federal Safe Drinking Water Act or specific programs to help localities provide or improve the quality of their drinking water (in addition to federal agency programs).⁴⁷ State laws, regulations, and agencies may impose water-planning, water-conservation, demand-

⁴² Adler, *Institutions*, *supra* note 37, at 205–07. *See generally* DANIELS & DANIELS, *supra* note 1, at 83–97.

⁴³ *See* Adler, *Legal Framework*, *supra* note 1, at 177–79.

⁴⁴ *See id.* at 172–176; *see also* Adler, *Institutions*, *supra* note 37, at 203–04.

⁴⁵ Adler, *Institutions*, *supra* note 37, at 205–07.

⁴⁶ Adler, *Legal Framework*, *supra* note 1, at 177–78.

⁴⁷ Adler, *Institutions*, *supra* note 37, at 204–05.

management, or infrastructure-investment requirements on urban water providers.⁴⁸

State institutions governing urban water planning vary substantially from state to state.⁴⁹ We give particular attention to California water institutions here, in part, because these are the institutions governing our two case studies of Fresno and Sacramento, and because we perceived that California's state water laws and policies are among the most advanced in the nation with respect to both equity and urban water system resilience.

The California Legislature has established a human right to water. California Water Code § 106.3 provides:

(a) It is hereby declared to be the established policy of the state that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.

(b) All relevant state agencies, including the department, the state board, and the State Department of Public Health, shall consider this state policy when revising, adopting, or establishing policies, regulations, and grant criteria when those policies, regulations, and criteria are pertinent to the uses of water described in this section.

(c) This section does not expand any obligation of the state to provide water or to require the expenditure of additional resources to develop water infrastructure beyond the obligations that may exist pursuant to subdivision (b).

(d) This section shall not apply to water supplies for new development.

(e) The implementation of this section shall not infringe on the rights or responsibilities of any public water system.⁵⁰

Article 10 of the California Constitution directly addresses water use, supplies, and conservation in the state.⁵¹ Section 2 requires that water resources be used in a beneficial and reasonable way, and expressly prohibits unreasonable use of resources.⁵² It also states that the conservation of water is to "be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public

⁴⁸ See, e.g., California state laws cited *infra* notes 50–82.

⁴⁹ Adler, *Institutions*, *supra* note 37, at 203.

⁵⁰ CAL. WATER CODE § 106.3 (2021).

⁵¹ CAL. CONST. art. X.

⁵² *Id.* § 2.

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welfare.”⁵³ Section 5 provides, “[t]he use of all water now appropriated, or that may hereafter be appropriated, for sale, rental, or distribution, is hereby declared to be a public use, and subject to the regulation and control of the State, in the manner to be prescribed by law.”⁵⁴ Section 6 states, “[t]he right to collect rates or compensation for the use of water supplied to any county, city and county, or town, or the inhabitants thereof, is a franchise, and cannot be exercised except by authority of and in the manner prescribed by law.”⁵⁵

California’s constitutional protection of water resources is the foundation for extensive state regulation of water under the California Water Code. The Code has thirty-five divisions that regulate different aspects of water in California.⁵⁶ There are also numerous state agencies with some degree of authority over water in California.⁵⁷ The Water Code has provisions that both restrict and empower local and regional water management decisions. The Water Code acknowledges that “water management decisions can best be made at a local or regional level, to the end that local and regional operational flexibility will maximize efficient statewide use of water supplies.”⁵⁸

Division 6 of the California Water Code requires the following types of plans: the state water plan, integrated regional water management plans, urban water management plans, agriculture water management plans, groundwater sustainability plans, groundwater management plans, and water supply planning to support existing and planned future uses.⁵⁹

In particular, urban water management plans (“UWMPs”) are required under the Urban Water Management Act (Division 6, Part 2.6

⁵³ *Id.*

⁵⁴ *Id.* § 5.

⁵⁵ *Id.* § 6.

⁵⁶ CAL. WATER CODE div. 1–35 (2021).

⁵⁷ There are many different lists of state agencies with some degree of control over water in California. *See, e.g.*, Lisa Buetler, *Water Agency Roles and Responsibilities from California Water Plan Update 2005*, CTR. FOR COLLABORATIVE POL’Y, CAL. STATE UNIV., SACRAMENTO (March 2008), https://www.waterboards.ca.gov/wqcc/2008spring/docs/handout_agency_roles.pdf; Chris Micheli, *California’s Four Water Entities: What’s the Difference?*, CAL. GLOBE (Sept. 10, 2020, 6:19 AM), [https://www.watereducation.org/state-agencies-california-involved-water-issues](https://californiaglobe.com/articles/californias-four-water-entities-whats-the-difference/#:~:text=California%20has%20four%20water%2Drelated,State%20Water%20Resources%20Control%20Board; WATER EDUC. FOUND., <i>State Agencies in California Involved in Water Issues</i>, <a href=) (last visited April 14, 2022).

⁵⁸ CAL. WATER CODE § 380(c) (2021).

⁵⁹ *See id.* div. 6, §§ 10000–12999.

of the California Water Code).⁶⁰ According to the Act, an updated UWMP must be filed every five years and submitted to the California Department of Water Resources.⁶¹ The Urban Water Management Plan Act applies to urban water suppliers with “3,000 [or more customers] or supplying more than 3,000 acre-feet of water annually.”⁶² The UWMP must “describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities[,] . . . measures for residential, commercial, governmental, and industrial water demand management[,] . . . [and] a strategy and time schedule for implementation”⁶³ Urban water suppliers may vary the content of the plan based on the characteristics of the local community and area, as well as its capacities to conserve water and use it efficiently.⁶⁴ Plans must have assessments of water service reliability “during normal, dry, and multiple dry water years” in five-year increments over a twenty-year period, including assessments of water supplies from all sources and water demand based on population projects from available state, regional, and local data.⁶⁵ UWMP contents do not create any rights to water at any specified levels, amounts, or rates.⁶⁶

Several detailed legal requirements for the content of UWMPs are especially critical in the California Water Code. One requirement is for the plan to forecast future water demand and future water supplies, including their sources, reliability, and vulnerability (including to seasonal or climatic shortages).⁶⁷ Water use projections must include forecasts of water needed to supply the locality’s projected low-income housing units, which are to receive priority in meeting their water needs.⁶⁸ California requires urban water suppliers to develop detailed demand-management measures and conditions state funding on such measures.⁶⁹ The state’s policy to achieve a “20 percent reduction in urban per capita water use” before 2021 applies to urban water suppliers.⁷⁰ The California Water Code also requires UWMPs to include

⁶⁰ *Id.* §§ 10610–10656.

⁶¹ *Id.* §§ 120, 10621(a), 10644.

⁶² *Id.* § 10617.

⁶³ *Id.* § 10615.

⁶⁴ CAL. WATER CODE § 10615 (2021).

⁶⁵ *Id.* § 10635(a).

⁶⁶ *See, e.g., id.* § 10635(d).

⁶⁷ *Id.* § 10631(f).

⁶⁸ *Id.* § 10631.1.

⁶⁹ *See generally id.* § 10631.

⁷⁰ CAL. WATER CODE § 10608.16(a).

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urban water shortage contingency analyses and measures.⁷¹ Plans must address recycled or reused water, wastewater, and the relationship of water quality to water management strategies.⁷²

The California Water Code governs the process by which UWMPs are to be adopted, including the role of the public. Urban water suppliers must “encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the adoption of . . . the plan.”⁷³ Water suppliers must make either draft or final urban water plans available to the public via the following process: notice to public, public hearing and adoption, and public availability. First, the California Water Code states that “prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection.”⁷⁴ Before the mandated hearing, “notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier”⁷⁵ The acceptable publication method is defined in Government Code § 6066: publication of notice “shall be once a week for two successive weeks” and by “[t]wo publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication . . . and terminates at the end of the fourteenth day, including therein the first day.”⁷⁶

Second, the urban water supplier must hold a public hearing prior to adoption of the water management plan.⁷⁷ The purposes of the legal requirement for a public hearing are:

- (1) [a]llow community input regarding the urban retail water supplier’s implementation plan for complying with this part;
- (2) [c]onsider the economic impacts of the urban retail water supplier’s implementation plan for complying with this part;
- [and] (3) [a]dopt a method, pursuant to subdivision (b) of Section 10608.20 for determining its urban water use target.⁷⁸

According to the State Department of Water Resources, the governing body of the urban water supplier “shall consider all public

⁷¹ *Id.* § 10632(a).

⁷² *Id.* §§ 10633, 10634.

⁷³ *Id.* § 10642.

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ CAL. GOV’T CODE § 6066 (2021).

⁷⁷ CAL. WATER CODE § 10642.

⁷⁸ *Id.* § 10608.26(a)(1)-(3).

input” prior to adoption of the plan.⁷⁹ Finally, after adoption, the urban water supplier must submit the plan to the California Department of Water Resources, the State Library, and the local county and, within thirty years, make the final plan “available for public review during normal business hours.”⁸⁰

All local governments in California are required to include environmental justice goals, policies, and objectives in their comprehensive plans (“General Plan”), including disadvantaged communities’ health risks, exposure to pollution, and access to public services, public facilities, and safe and healthy housing.⁸¹ The California Assembly passed AB 1001, which requires all governmental entities to consider environmental justice in all environmental impact assessments and authorizes measures to mitigate adverse impacts on the air and water quality of disadvantaged communities. As of April 2022, the bill was awaiting California Senate approval.⁸² Environmental justice plays a major role in many of the state’s agencies’ policies and programs.⁸³

D. Federal Water Institutions

The primary federal source of requirements that urban water planners must consider is the Safe Drinking Water Act (“SDWA”).⁸⁴ Public water supply systems must comply with Maximum Contaminant Levels (“MCLs”) for specified drinking-water contaminants, as set by the

⁷⁹ CAL. DEP’T OF WATER RES., *Urban Water Management Plan Guidebook 2020*, Sec. 10.2, p. 10-4 (Mar. 2021), <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans/Final-2020-UWMP-Guidebook/UWMP-Guidebook-2020---Final-032921.pdf>.

⁸⁰ CAL. WATER CODE § 10645(a).

⁸¹ CAL. GOV’T CODE § 65302(h)(1).

⁸² A.B. 1001, 2021 Gen. Assemb., Reg. Sess. (Cal. 2021), https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB1001 (last visited Mar. 10, 2022).

⁸³ See, e.g., *Environmental Justice*, CAL. WATER BD. (Sept. 10, 2020), https://www.waterboards.ca.gov/water_issues/programs/outreach/education/justice.html; *California Environmental Justice Policies*, ENV’T HEALTH COAL., <https://www.environmentalhealth.org/index.php/en/where-we-work/state-of-california/california-environmental-justice> (last visited Mar. 10, 2022); Rob Bonta, *Environmental Justice*, OFF. OF THE ATT’Y GEN., <https://oag.ca.gov/environment/justice> (last visited Mar. 10, 2022); Press Release, Off. of the Att’y Gen., Att’y Gen. Becerra Establishes Bureau of Environmental Justice (Feb. 22, 2019), <https://oag.ca.gov/news/press-releases/attorney-general-becerra-establishes-bureau-environmental-justice>; *Environmental Justice Program*, CAL. ENV’T PROT. AGENCY (Oct. 2021), <https://calepa.ca.gov/envjustice/>.

⁸⁴ Adler, *Legal Framework*, *supra* note 1, at 177.

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U.S. Environmental Protection Agency (EPA) under the SDWA.⁸⁵ The EPA sets MCLs by first setting Maximum Contaminant Level Goals (“MCLGs”), which are aspirational goals for achieving optimal health outcomes regardless of cost. Then, the EPA sets the MCL at a level that is as close to the MCLGs as possible and at which the health benefits exceed the costs of compliance, given technology limits and financial feasibility.⁸⁶ Urban water planners must plan for the treatment facilities and processes needed to comply with SDWA MCLs. They must plan for water distribution infrastructure, such as pumps and pipes, that will avoid contaminating drinking water supplies before they flow from household faucets (e.g., lead pipes). And they must plan for the risks that aging infrastructure failures will produce costly and/or catastrophic water-safety crises. They must consider the potential that new contaminants may be added or MCLs may be lowered due to perceived health risks, better technology, or lower costs of compliance. Urban water planners need to consider their legal authority and other entities’ plans to protect source water, including the SDWA’s authority for local governments to regulate to protect sole source aquifers by establishing critical aquifer protection areas and wellhead protection programs.⁸⁷ They must consider the enforcement risks and moral and political costs for violating MCLs, even though it has been reported that as many as 20 percent of public water systems have significant violations of the SDWA.⁸⁸ Plans must include immediate and effective responses and remedies to any violation.

Urban water planning often considers the potential to obtain loans from the EPA’s State Drinking Water Fund to fund costly infrastructure. According to the EPA:

The Drinking Water State Revolving Loan Fund (DWSRF) was established by the 1996 amendments to the Safe Drinking Water Act (SDWA). The DWSRF is a financial assistance program to help water systems and states to achieve the health protection objectives of the SDWA. . . . EPA then awards capitalization grants to each state for their DWSRF based upon the results of the most recent Drinking Water Infrastructure Needs Survey and Assessment. The state provides a 20 percent match. . . . As water systems repay their loans, the repayments and interest flow back into the

⁸⁵ *Id.*; Salzman, *supra* note 8, at 124–25.

⁸⁶ Adler, *Legal Framework*, *supra* note 1, at 177; SALZMAN, *supra* note 8, at 124–25.

⁸⁷ Adler, *Legal Framework*, *supra* note 1, at 177.

⁸⁸ SALZMAN, *supra* note 8, at 125.

dedicated revolving fund. These funds may be used to make additional loans. Building on a federal investment of over \$21.0 billion, the state DWSRFs have provided more than \$41.1 billion to water systems through 2019 . . . for:

- improving drinking water treatment
- fixing leaky or old pipes (water distribution)
- improving source of water supply
- replacing or constructing finished water storage tanks
- other infrastructure projects needed to protect public health⁸⁹

The Bipartisan Infrastructure Bill, officially titled the Infrastructure Investment and Jobs Act,⁹⁰ enacted by Congress and signed into law by President Biden in 2021, provides historic new levels of funding for water infrastructure:

- \$11.7 billion to the Drinking Water State Revolving Fund (SRF).
- \$15 billion to the Drinking Water SRF for Lead Service Line Replacement.
- \$4 billion to the Drinking Water SRF for Emerging Contaminants.
- \$5 billion to Water Infrastructure Improvements for the Nation (WIIN) Grants to address emerging contaminants.⁹¹

In addition to the SDWA, the Clean Water Act (CWA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or the “Superfund law”), and other environmental regulatory regimes affect the extent to which sources of urban drinking water might be polluted and who has responsibility for avoiding, mitigating, or cleaning up polluted source waters.⁹² Nonetheless, these regulatory regimes impose few direct requirements on urban water-supply planners and managers. Finally, federal, state, and local legal and governance institutions’ control over land use, transportation, economic development, and other factors affecting urban growth

⁸⁹ *How the Drinking Water State Revolving Fund Works*, U.S. ENV’T PROT. AGENCY, [https://www.epa.gov/dwsrf/how-drinking-water-state-revolving-fund-works#:~:text=The%20Drinking%20Water%20State%20Revolving%20Loan%20Fund%20\(DWSRF\)%20was%20established,protection%20objectives%20of%20the%20SDWA](https://www.epa.gov/dwsrf/how-drinking-water-state-revolving-fund-works#:~:text=The%20Drinking%20Water%20State%20Revolving%20Loan%20Fund%20(DWSRF)%20was%20established,protection%20objectives%20of%20the%20SDWA) (last visited Mar. 10, 2022).

⁹⁰ Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 12 Stat. 503 (2021).

⁹¹ *Water Infrastructure Investments*, U.S. ENV’T PROT. AGENCY, <https://www.epa.gov/infrastructure/water-infrastructure-investments> (last visited Mar. 10, 2022).

⁹² See Adler, *Institutions*, *supra* note 37, at 196–198.

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indirectly affect the planning constraints, opportunities, and issues that urban water planners must address.⁹³

III. RESILIENCE JUSTICE

The conceptual and analytical framework of resilience justice is a tool for assessing whether urban water planning is equitable. 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.⁹⁴ The resilience justice concept or framework is a way to study and see marginalized communities' unequal vulnerabilities under conditions that are inevitably dynamic, such as climate change, unprecedented drought, pollution, economic shocks, political or social upheaval, gentrification, and the like.⁹⁵ It is also a means by which we can identify policy and planning reforms and governance system changes that can empower marginalized communities and build their adaptive capacities to navigate and thrive in an uncertain and changing future.⁹⁶ "Thus, resilience justice is meant to be both a critical and constructive way of thinking about both systemic injustice and the resilience of marginalized and oppressed communities."⁹⁷

As we have recently observed:

Community resilience is the capacity of a community to adapt to disturbances while retaining its core functions and structure and to thrive in an environment characterized by change through capacity building. Vulnerability is generally considered to be the functional opposite of resilience or adaptive capacity: . . . a community with high vulnerability is characterized by conditions and capacities that increase the probability that disturbances or cross-system changes will cause undesirable transformations in the community. . . . A resilient community is one that has four different types or dimensions of resilience:

- (1) The community has the strength to resist unwanted disturbances and changes (maintenance of function);

⁹³ See generally WET GROWTH: SHOULD WATER LAW CONTROL LAND USE? (Craig Anthony (Tony) Arnold ed., 2005).

⁹⁴ See Arnold et al., *Resilience Justice*, *supra* note 13, at 685–87.

⁹⁵ See *id.*

⁹⁶ See *id.* at 685–86

⁹⁷ *Id.* at 686.

- (2) The community has the recovery capacity to bounce back from shocks and disasters (return to function);
- (3) The community has the flexibility to adapt to changing conditions (evolution of function); and
- (4) The community has the transformative capacity to use disturbances and changes to restructure itself in desired ways (transformation of function).⁹⁸

The resilience justice concept and analytical framework builds on ideas about both resilience and justice emerging out of the Global South and low-income communities of color in North America.⁹⁹ It also builds on and synthesizes five key clusters of thinking and research:

- 1) environmental justice;
- 2) the resilience of systems;
- 3) vulnerability analysis, especially the vulnerability concept of justice developed by Martha Fineman and applied to environmental justice by Cliff Villa;
- 4) the human-capabilities concept of justice developed by Amartya Sen and Martha Nussbaum, and extended to communities-capacities concepts of justice by collective-justice scholars; and
- 5) anti-racism, anti-colonialism, and social-justice meanings of resilience in society, as contestations of and alternatives to neoliberal structural resilience.

Environmental justice, as discussed in scholarly literature and advanced by grassroots movements, is fundamentally about the systemic inequities that people of color and low-income people experience with respect to environmental harms, burdens, and benefits, including racial, ethnic, and class disparities in the content and effects of environmental laws, policies, processes, and practices.¹⁰⁰ One important dimension of resilience justice is the effects of systemically unequal environmental conditions, ranging from toxic pollution to insufficient green and blue infrastructure like parks, trees, green spaces, and well-functioning streams, on the vulnerabilities and resilience of

⁹⁸ *Id.* at 686–87.

⁹⁹ *See, e.g.*, Boamah & Arnold, *supra* note 16.

¹⁰⁰ Three foundational works on environmental justice, including descriptions of the environmental justice movement, are ROBERT D. BULLARD, *DUMPING IN DIXIE: RACE, CLASS, AND ENVIRONMENTAL QUALITY* (1990); LUKE W. COLE & SHEILA R. FOSTER, *FROM THE GROUND UP: ENVIRONMENTAL RACISM AND THE RISE OF THE ENVIRONMENTAL JUSTICE MOVEMENT* (2001); DORCETA E. TAYLOR, *TOXIC COMMUNITIES: ENVIRONMENTAL RACISM, INDUSTRIAL POLLUTION, AND RESIDENTIAL MOBILITY* (2014).

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low-income neighborhoods of color.¹⁰¹ Moreover, urban water crises, such as in Flint, Michigan, have been characterized as environmental justice problems.¹⁰²

However, resilience justice goes beyond the conceptual bounds of environmental justice because it is concerned with a broader array of community conditions and inequities than just traditionally environmental conditions and inequities. The environmental justice movement and its literature have their origins in unequal conditions of pollution, waste, and toxic facilities.¹⁰³ The relationships between environmental justice and several other concepts of justice have been explored, including climate justice,¹⁰⁴ disaster justice,¹⁰⁵ water justice (or water equity),¹⁰⁶ equitable land use planning and regulation,¹⁰⁷ food justice,¹⁰⁸ and health equity.¹⁰⁹ Each of these concepts, however, also have a meaning and function independent of the environmental justice concept. Resilience justice emerged in part because of multi-faceted and multi-systemic inequities that are not limited to environmental systems. For example, resilience justice calls attention to how the vulnerabilities of low-income communities of color to gentrification generally and green (or environmental) gentrification are closely intertwined with one another, due in part to housing conditions, economic forces, and institutional arrangements.¹¹⁰ Contaminated drinking water and high drinking water costs to consumers are both issues of resilience injustice when they affect vulnerable and marginalized communities. These issues are often linked by inequitable patterns of underinvestment in

¹⁰¹ Arnold et al., *Resilience Justice*, *supra* note 13, at 666–68.

¹⁰² See, e.g., Lindsey J. Butler, Madeleine K. Scammell & Eugene B. Benson, *The Flint, Michigan, Water Crisis: A Case Study in Regulatory Failure and Environmental Injustice*, 9 ENV'T JUST. 93 (2016); SALZMAN, *supra* note 8, at 154–55 (2017).

¹⁰³ See generally BULLARD; COLE & FOSTER; TAYLOR *supra* note 100.

¹⁰⁴ See generally David Schlosberg & Lisette B. Collins, *From Environmental to Climate Justice: Climate Change and the Discourse of Environmental Justice*, WIREs CLIMATE CHANGE, 2014, at 1.

¹⁰⁵ Robert R. M. Verchick, *Disaster Justice: The Geography of Human Capability*, 23 DUKE ENV'T L. & POL'Y F. 23, 24 (2012).

¹⁰⁶ See generally Gerlak et al., *supra* note 9; see also Jerry van den Berge et al., *supra* note 7, at 179.

¹⁰⁷ See generally CRAIG ANTHONY (TONY) ARNOLD, FAIR AND HEALTHY LAND USE; ENVIRONMENTAL JUSTICE AND PLANNING (2007).

¹⁰⁸ See generally Danielle M. Purifoy, *Food Policy Councils: Integrating Food Justice and Environmental Justice*, 24 DUKE ENV'T L. & POL'Y F. 375 (2014).

¹⁰⁹ Mary Evelyn Northridge & Lance Freeman, *Urban Planning and Health Equity*, 88 J. URB. HEALTH 582, 591 (2011).

¹¹⁰ Arnold et al., *Resilience Justice*, *supra* note 13, at 693–94.

urban water infrastructure, even though contaminated drinking water would more likely qualify as an environmental justice issue while unaffordable water rates would not.

Moreover, environmental justice concepts are held together by the common subject of human environments but they encompass several different types of justice as their object, including distributive justice, procedural justice, corrective justice, and social justice.¹¹¹ With its focus on social vulnerability and the systemic nature of injustice in complexly interlinked social, economic, political, cultural, and environmental systems, the object of resilience justice is the equitable capacities and resilience of marginalized and oppressed communities.

Thus, the science and study of systemic resilience is also a foundation for the resilience justice concept.¹¹² We recently described the relevance of systems and their resilience to human communities in society:

Human communities are complex, dynamic, adaptive systems that affect and are affected by other environmental, social, and institutional systems through cross-system feedbacks. Surprise disturbances, unprecedented new conditions, and even evolutionary changes in basic system elements and functions can produce sudden, rapid transformations, and even collapse, of communities. Any concept of justice must necessarily consider the relevance of resilience thinking to how and why communities undergo substantial systemic changes, as illustrated by Hurricane Katrina's impacts on low-income Black, Latino, and Asian neighborhoods in New Orleans in 2005, the collapse of aspects of Puerto Rican communities during and after Hurricane Maria in 2017, and the vulnerabilities of residents of low-income neighborhoods of color to socioeconomic housing market shocks.¹¹³

The resilience justice concept's concern with systemic vulnerabilities in marginalized and oppressed communities

¹¹¹ See generally Robert R. Kuehn, *A Taxonomy of Environmental Justice*, 30 ENV'T L. REP. 10681 (2000).

¹¹² Three of the classic works on this topic are C.S. Holling, *Resilience and Stability of Ecological Systems*, 4 ANN. REV. ECOLOGY & SYSTEMATICS 1, 9 (1973); PANARCHY: UNDERSTANDING TRANSFORMATION IN HUMAN AND NATURAL SYSTEMS (Lance H. Gunderson & C.S. Holling eds., 2002); and WALKER & SALT, *supra* note 10. For an analysis of the dynamic cross-system relationships among ecosystems, social systems, and legal and governance institutions in urban water basins and the resilience of these systems, see generally Arnold et al., *Anacostia*, *supra* note 38.

¹¹³ Arnold et al., *Resilience Justice*, *supra* note 13, at 688.

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acknowledges the role of vulnerability not only in the human condition generally but also in how we define and seek justice, a major contribution to scholarly thought on justice by Martha Fineman.¹¹⁴ According to Fineman, vulnerability and therefore inequity are defined by unequal power, resources, and social goods, and not just suspect classifications of race, ethnicity, and gender.¹¹⁵ Clifford Villa recently applied Fineman's vulnerability theory to redefining environmental justice.¹¹⁶ Villa argues that we should see environmental injustices through the lenses of the communities most affected by environmental harms, understand why they are affected, and see what can be done to remedy it.¹¹⁷ He centers systemic racism and the disproportionate vulnerabilities that Blacks, Latinos, and indigenous peoples experience at the heart of his vulnerability reframing of environmental justice, while also calling for the inclusion of other vulnerable groups and communities in environmental justice concerns.¹¹⁸

Resilience justice is defined not only in the negative—opposition to systemically unequal vulnerability—but also in the positive: the equitable capacities of all communities to persist, adapt, transform, and thrive in an uncertain and unstable world. Amartya Sen and Martha Nussbaum have pioneered a human capabilities concept of justice out of Global South and feminist perspectives, defining justice not by equal distribution of resources but instead by the conditions that are necessary to support the essential capabilities of all humans to function, have well-being, and determine their own future, including control over one's environment and effective participation in political life.¹¹⁹ Collective justice scholars have reconceptualized and extended the human capabilities theory's focus on individual human beings to a broader focus on the communities in which people function, affiliate, and seek their individual and collective well-being, including social-

¹¹⁴ See, e.g., Martha Albertson Fineman, *The Vulnerable Subject: Anchoring Equality in the Human Condition*, 20 YALE J.L. & FEMINISM 1, 8 (2008); Martha Albertson Fineman, *The Vulnerable Subject and the Responsive State*, 60 EMORY L.J. 251 (2010); Martha Albertson Fineman, *Beyond Identities: The Limits of an Antidiscrimination Approach to Equality*, 92 B.U. L. REV. 1713 (2012).

¹¹⁵ See generally the three sources cited in the immediately preceding footnote.

¹¹⁶ Clifford J. Villa, *Remaking Environmental Justice*, 66 LOY. L. REV. 469, 509–16 (2020).

¹¹⁷ *Id.* at 512.

¹¹⁸ *Id.* at 516–21.

¹¹⁹ See generally AMARTYA SEN, *DEVELOPMENT AS FREEDOM* (1999); MARTHA C. NUSSBAUM, *WOMEN AND HUMAN DEVELOPMENT: THE CAPABILITIES APPROACH* (2000); JOHN M. ALEXANDER, *CAPABILITIES AND SOCIAL JUSTICE: THE POLITICAL PHILOSOPHY OF AMARTYA SEN AND MARTHA NUSSBAUM* (2008).

geographic communities, such as neighborhoods, and the capacities of human communities to function and thrive.¹²⁰

Finally, resilience justice rejects neoliberal and conservative definitions of resilience that structurally aim to protect existing social, political, and institutional systems from bottom-up challenges and major change and restructuring.¹²¹ Instead, drawing on anti-racist, anti-colonialist,¹²² anti-inequality, anti-domination, and anti-oppression concepts of social justice, resilience justice is an alternative way of conceiving resilience—especially the empowered and activist resilience of marginalized and oppressed communities—as an essential element of social justice movements and systemic transformation.¹²³ Capacity-building, empowerment, activism, and enhancements of collective strengths are essential to marginalized and oppressed communities having the resilience to resist injustices and threats, adaptively navigate uncertain and unstable conditions, and transform in self-determined ways.¹²⁴ Boamah and Arnold have stated:

[R]esilience justice, if properly framed as a political-ideological concept, serves to (1) illuminate power relationships and the social construction of inequality and risk; (2) engage people and institutions with deep structural “issues of justice, fairness, and legitimacy”; (3) facilitate grassroots self-organizing of oppressed groups like slum dwellers in Africa; and (4) give voice to the experiences of subordinated communities with vulnerability and adaptation. In commenting on “progressive community-led environmental initiatives,” Shaw writes that “resilience should be viewed as having the potential to develop as a more radical and transformational agenda that opens up

¹²⁰ See, e.g., Jonathan Kusel, *Assessing Well-Being in Forest Dependent Communities*, 13 J. SUSTAINABLE FORESTRY 359 (2001); David Schlosberg & David Carruthers, *Indigenous Struggles, Environmental Justice, and Community Capabilities*, 10 GLOB. ENV'T POL. 12 (2010); Spiros Gangas, *From Agency to Capabilities: Sen and Sociological Theory*, 64 CURRENT SOCIO. 22, 23–24 (2016); Mario Biggeri et al., *Local Communities and Capability Evolution: The Core of Human Development Processes*, 19 J. HUM. DEV. & CAPABILITIES 126, 126–29 (2018); Claudia Eger et al., *Gender and Capacity Building: A Multi-Layered Study of Empowerment*, 106 WORLD DEV. 207, 208 (2018).

¹²¹ Arnold et al., *Resilience Justice*, *supra* note 13, at 689.

¹²² For an excellent article that reframes environmental justice from an anti-colonial perspective, see generally Nadia B. Ahmad, “Mask Off”—*The Coloniality of Environmental Justice*, 25 WIDENER L. REV. 195 (2019).

¹²³ Arnold et al., *Resilience Justice*, *supra* note 13, at 689–90.

¹²⁴ *Id.*

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opportunities for political voice, resistance, and challenging power structures and accepted ways of thinking.”¹²⁵

IV. CASE STUDIES: FRESNO AND SACRAMENTO

A. Overview

We applied a particular version of an analytical framework of resilience justice to urban water planning using in-depth assessments of urban water plans adopted by the City of Fresno, California, and the City of Sacramento, California, both in 2016,¹²⁶ as case studies. We focused on these cities’ planning for supplies, demand, quality, and costs of water for the public, which necessarily includes planning for customer rates, water system infrastructure investments, and the management and governance of the urban water system.

We selected Fresno and Sacramento as study areas because of opportunities that arose to make relatively deep inquiries into their water plans and conditions. Even though Fresno and Sacramento came out with new urban water management plans in Summer 2021,¹²⁷ after we had completed our analyses of their prior plans, we have not attempted to engage in new resilience justice assessments because we are not aiming to describe the current state of water planning in those cities. Within a few years those water plans will have changed again. Instead, we are seeking to show how the concepts and analytical framework of resilience justice can be applied to urban water planning and to illuminate that even in cities that have relatively resilience-oriented and equity-oriented water planning, water planning typically falls short of improving the resilience and reducing the vulnerabilities of low-income communities of color. For example, in California, severe and sustained drought, poor planning, and mismatches between supply and demand left low-income residents unable to afford increasingly scarce water supplies from 2012–2016.¹²⁸

¹²⁵ Boamah & Arnold, *supra* note 16; see also Keith Shaw, “Reframing” Resilience: Challenges for Planning Theory and Practice, 13 PLAN. THEORY & PRAC. 308, 309–10 (2012).

¹²⁶ CITY OF FRESNO: 2015 URBAN WATER MANAGEMENT PLAN (2016) [hereinafter FRESNO UWMP]; CITY OF SACRAMENTO: 2015 URBAN WATER MANAGEMENT PLAN (2016) [hereinafter SACRAMENTO UWMP].

¹²⁷ CITY OF FRESNO: 2020 URBAN WATER MANAGEMENT PLAN (2021); CITY OF SACRAMENTO: 2020 URBAN WATER MANAGEMENT PLAN (2021).

¹²⁸ Dan Tarlock, *California Adapts to Prolonged Drought: Any Lessons for the Humid Midwest?*, 51 VAL. U. L. REV. 519, 520 (2017); Laura Feinstein et al., *Drought and Equity in California*, PAC. INST. & THE ENV’T JUST. COAL. FOR WATER, 1–4 (Jan. 2017),

Moreover, California as a state has relatively robust environmental justice laws, water planning laws, and urban water institutions that engage the public and contemplate urban water system resilience, at least in comparison to most other states.¹²⁹ If these institutional features are not producing equitable water plans for marginalized communities' resilience, it will tell us a lot about how much we need to transform urban water planning everywhere.

In conducting our resilience justice assessments, we developed seven questions to ask about the effects of urban water plans on marginalized communities, with our primary focus on low-income neighborhoods of color:

- 1) Does urban water planning build marginalized communities' capacities to resist, bounce back from, adapt to, and transform with sudden shocks (or disturbances) and changing conditions?
- 2) Does urban water planning engage marginalized communities' residents in diverse, inclusive, and meaningful ways of participating in policy making and implementation?
- 3) Does urban water planning improve marginalized communities' environmental conditions, including the distribution of and access to green and blue infrastructure?
- 4) Does urban water planning improve marginalized communities' economic, social, and political conditions?
- 5) Does urban water planning reduce disparities in marginalized communities' conditions and capacities?
- 6) Does urban water planning include feedback loops for ongoing monitoring and revisions of the policies and plans, including engagement of marginalized communities' residents and monitoring for marginalized communities' vulnerabilities and adaptive capacities?
- 7) Does urban water planning anticipate, minimize, and mitigate any adverse effects of water plans and water system management on the resilience of marginalized communities?

These seven questions are 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

https://ejcw.org/wp-content/uploads/2016/08/DroughtAndEquityInCA_Jan_2017.pdf.

¹²⁹ See *supra* Section II.C.

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qualitative and critical methods to community-engaged resilience justice assessments in low-income communities of color.¹³⁰

B. *Fresno Case Study*

1) *Does urban water planning build marginalized communities' capacities to resist, bounce back from, adapt to, and transform with sudden shocks (or disturbances) and changing conditions?*

Fresno's 2015 Urban Water Supply Plan, as adopted in June 2016, makes no mention at all of marginalized communities, including low-income communities or communities of color, other than to include the City's plans for increased numbers of single-family and multi-family residential housing units for extremely-low, very-low, and low-income levels of households, as required by state law.¹³¹ The portion of the plan devoted to demographics merely describes the overall population numbers and projections for the service area, as well as the fact that previously single-family residences had not been metered and were paying only a flat rate for water.¹³² The plan makes no mention of the number and geographic distribution of people or households at or below the poverty line, the number and geographic distribution of households that are vulnerable to water insecurity or other forms of insecurity, such as income, housing, or food, or of the number and geographic distribution of people or households who are non-white and non-Hispanic/Latino and/or who do not use English as their primary language of communication.

At the time that the 2015 plan was being developed, the City of Fresno had available data on potentially vulnerable populations from the 2010 U.S. Census, including race and ethnicity, economic status, gender, age, disability, health, family households, education, and immigrant populations. This data shows that Fresno is a minority majority city, with population distributions of 48 percent Hispanic (or Latino), 27.6 percent white (non-Hispanic), 8.1 percent Black (or African American), 13.4 percent Asian, 2.2 percent mixed race, and 0.8 percent other.¹³³ The different races and ethnicities are geographically separated within the city as well. The part of the population that identifies as white, resides in the northern-most part of the city.¹³⁴ The

¹³⁰ Arnold et al., *Resilience Justice*, *supra* note 13, at 685–94.

¹³¹ FRESNO UWMP, *supra* note 126, § 4.5.

¹³² FRESNO UWMP, *supra* note 126, § 3.3.

¹³³ *Race and Ethnicity in Fresno, California*, STAT. ATLAS, <https://statisticalatlas.com/place/California/Fresno/Race-and-Ethnicity> (last visited Mar. 10, 2022).

¹³⁴ *Id.*

central southern tip of the city is dominated by Latino residents.¹³⁵ The southwestern tip of the city is dominated by Black residents.¹³⁶ Pockets of Asian populations are dispersed throughout the city but also have a concentrated cluster in the southeastern tip of the city.¹³⁷ People born in Mexico make up 20–21 percent of the population in south Fresno, 15 percent of the central Fresno population, and 2–5 percent of the north Fresno population.¹³⁸

The percentage of Fresno's population living at or below the poverty line in 2010 was approximately 30 percent, with the greatest concentration of low-income households being in south Fresno.¹³⁹ Black/African American, American Indian, and Hispanic/Latino households have substantially below-median household incomes.¹⁴⁰ The percentage of the population that is unemployed or not in the work force is greatest among Blacks/African Americans and people of mixed race.¹⁴¹

Fresno has almost equal numbers of self-identified genders, with a slightly greater population of women at almost every generational level in the city.¹⁴² There are more children condensed in the southern part of the city; children in the Edison and Roosevelt neighborhoods make up 30–35 percent of the population. In north, central, and west Fresno, children make up about 25–30 percent of the population.¹⁴³ In contrast, there is a greater concentration of elderly people, meaning people

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *National Origin in Fresno, California*, STAT. ATLAS, <https://statisticalatlas.com/place/California/Fresno/National-Origin> (last visited Mar. 10, 2022) (last visited Mar. 10, 2022).

¹³⁹ *Household Income in Fresno, California*, STAT. ATLAS, <https://statisticalatlas.com/place/California/Fresno/Household-Income> (last visited Mar. 10, 2022).

¹⁴⁰ WELFARE INFO, *Poverty in Fresno, California*, <https://www.welfareinfo.org/poverty-rate/california/fresno#:~:text=28.4%25%20Poverty%20Rate%20in%20Fresno%2C%20California> (last visited Apr. 6, 2022); Reis Thebault, *Fresno's Mason-Dixon Line*, ATLANTIC, <https://www.theatlantic.com/politics/archive/2018/08/fresno-segregation/567299/>; Ann. M. Simmons, *The Worst of Times On Fresno's South Side Poverty Sharply Divides California City*, WASH. POST (June 11, 2006), <https://www.washingtonpost.com/archive/politics/2006/06/11/the-worst-of-times-on-fresno-south-side-span-classbankheadpoverty-sharply-divides-california-cityspan/f8086949-1992-49ae-81a5-8cd2d6ed16aa/>.

¹⁴¹ *Employment Status in Fresno, California*, STAT. ATLAS, <https://statisticalatlas.com/place/California/Fresno/Employment-Status> (last visited Mar. 10, 2022).

¹⁴² *Age and Sex in Fresno, California*, STAT. ATLAS, <https://statisticalatlas.com/place/California/Fresno/Age-and-Sex> (last visited Mar. 10, 2022).

¹⁴³ *Id.*

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eighty years or older, in north Fresno.¹⁴⁴ Households with children reach 45 percent of the households in south Fresno, while about 30 percent of central and north Fresno households have children.¹⁴⁵ Single female households range from 10 percent in north Fresno to 30 percent of the households in southwestern Fresno.¹⁴⁶ Single male households range from 4 percent in the northern part of the city to 12.45 percent in south Fresno.¹⁴⁷

The Fresno population that has achieved college education is concentrated in the north part of Fresno, while populations of people who have some high school, less than high school, and no education are concentrated in the south part of Fresno, particularly the southwestern tip.¹⁴⁸ Of the city's population, 10.5 percent have a disability and 9.1 percent do not have health insurance.¹⁴⁹

Given the failure of Fresno's Urban Water Management Plan to even mention marginalized or vulnerable populations and neighborhoods, it's not surprising that the plan does not address the vulnerabilities of these people and communities to water uncertainties and shocks. Moreover, the plan addresses some aspects of overall urban water system resilience and vulnerability but does not fully analyze some of the most of the serious potential shocks to the system. Systemic vulnerability and overall plan inadequacies will likely have a more substantial adverse impact on low-income communities of color, given their co-vulnerabilities.

The plan assesses declining reliability of water supplies and their sufficiency to meet water demand, in light of four major changes in conditions:

- 1) competition from other water users in the region for limited surface waters and cutbacks in surface water delivered to the city by regional water-supply projects;
- 2) over-reliance on groundwater and diminishing supplies and quality of groundwater due to overdrafts (excessive

¹⁴⁴ *Id.*

¹⁴⁵ *Household Types in Fresno, California*, STAT. ATLAS <https://statisticalatlas.com/place/California/Fresno/Household-Types> (last visited Mar. 10, 2022).

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ *Educational Attainment in Fresno, California*, STAT. ATLAS, <https://statisticalatlas.com/place/California/Fresno/Educational-Attainment> (last visited Mar. 10, 2022).

¹⁴⁹ *United States Census Bureau QuickFacts: Fresno City, California*, U.S. CENSUS BUREAU, <https://www.census.gov/quickfacts/fact/table/fresnocitycalifornia/RHI825216> (last visited Mar. 10, 2022).

pumping in relationship to recharge rates) and contamination;

3) anticipated growth in the total population and water demand in the city's growing service area; and

4) severe and prolonged drought that was underway at the time of plan development and could persist or recur in the future.¹⁵⁰

To address these systemic vulnerabilities, the plan adopts several strategies that could be generally classified as conservation and demand-management, diversification of water supply sources (including re-use of wastewater), and protection of source waters.¹⁵¹ The plan contains goals and action items to reduce the per-user amounts of water usage in general and to increase conservation activities and reduce water usage, especially during periods of unusual water scarcity. These include a water-metering program that had finally metered all single-family residential households, in addition to the already-metered multi-family and non-residential users, to move away from wasteful flat-rate pricing to a system in which all users have higher water bills if they use more water.¹⁵² The plan identifies consideration of alternative conservation pricing structures to further incentivize reduced water usage.¹⁵³ The plan refers to city financial rebates for users buying and installing water-efficient water appliances (e.g., toilets, washing machines), ordinances prohibiting wasteful use of water (e.g., prohibition of washing of outdoor hardscapes with potable water, requirement that outdoor hoses have nozzle controls, implementation of mandatory lawn-watering schedules), public education and outreach, study and remedy of water-system losses, and dedication of permanent and temporary city staff to water conservation programs.¹⁵⁴

The plan also includes strategies for addressing serious water shortages as part of a four stage Water Shortage Contingency Plan for a 10 percent reduction in water supplies (Stage 1), 10–25 percent reduction in water supplies (Stage 2), 25–35 percent reduction in water supplies (Stage 3), and 35–50 percent reduction in water supplies (Stage 4), each of which can be triggered by any of certain specified conditions listed for each stage.¹⁵⁵

¹⁵⁰ FRESNO UWMP §§ 3.1, 3.2, 3.3, 4.2, 6.1, 6.2, 6.6, 6.7, 7.1, 7.2, 7.3, 7.4, 9.1, & 9.2.

¹⁵¹ *Id.*

¹⁵² FRESNO UWMP §§ 9.1.2 & 9.1.3.

¹⁵³ *Id.* § 9.1.3.

¹⁵⁴ *Id.* §§ 9.1.1 & 9.1.4–9.1.7.

¹⁵⁵ *Id.* § 8.1.

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The Water Shortage Contingency Plan (within the Fresno Urban Water Management Plan) calls for a variety of methods for reducing water usage during times of scarcity, including regulatory prohibitions, penalties and enforcements, conservation and demand-management tools, and consideration of increased drought rates and surcharges.¹⁵⁶ The recommendation that drought rate structures be developed and adopted in consultation with experts has not only demand-management goals, but also the goal of adjusting for decreased water revenues to the city when total usage declines, thus providing the city with funds to meet its water-system operational expenses without incurring debt.¹⁵⁷

In addition, Fresno has planned to transition away from a total reliance on groundwater by building a more varied water portfolio that utilizes surface water supplies.¹⁵⁸ Fresno is located in the Kings Sub-basin, which is in the greater Tulare Lake hydrologic region, which, in turn, is within the San Joaquin Valley Groundwater Basin.¹⁵⁹ “The Kings Sub-basin groundwater aquifer consistently supplies Fresno, other municipalities, agriculture, and rural residential areas with a consistent source of water.”¹⁶⁰ The California Department of Water Resources classified the Kings Sub-basin as “critically overdrafted,” and levels will continue to rapidly decline with overuse.¹⁶¹ The groundwater supply is also threatened by chemical contaminants from the agriculture industry.¹⁶² Fresno, in response to settlements in several lawsuits related to water contamination, constructed wellhead treatment systems and blending programs for a number of wells.¹⁶³ In addition to the overuse and contamination issues, natural recharge of the aquifer has lessened, and decreased surface water supplies during prolonged drought diminished alternative water sources that Fresno could use to recharge the aquifer artificially.¹⁶⁴

All these issues have led Fresno to focus on maximizing the use of the available surface water treatment supplies to reduce overall reliance on groundwater.¹⁶⁵ Recently, Fresno has completed construction and brought online two surface water treatment plants, one in the Northeast

¹⁵⁶ *Id.* §§ 8.2–8.7.

¹⁵⁷ *Id.* § 8.6.1.

¹⁵⁸ FRESNO UWMP § 4.1.

¹⁵⁹ *Id.* § 6.1.1.

¹⁶⁰ *Id.* § 6.1.

¹⁶¹ *Id.* § 6.1.3.

¹⁶² *Id.* § 6.1.4 & app. H § 3.3.

¹⁶³ *Id.*

¹⁶⁴ FRESNO UWMP §§ 6.1., 6.1.5.3. & 6.4.1

¹⁶⁵ *Id.* §§ 6.1.5.3. & 6.2.

and one in the Southwest.¹⁶⁶ These surface water treatment plants are a part of a major overhaul in Fresno to expand the water portfolio and combat dwindling water resources.¹⁶⁷ Diversification of the water portfolio is necessary. Generally, plans that seek to secure and stabilize water supply through diversification reinforce community capacity to bounce-back from sudden shocks. A potential and highly realistic shock the Fresno community could experience would be that contamination of aquifers would render groundwater supplies unusable for a period of time.

In general, components of water plans that reduce the vulnerabilities of and threats to the urban water system help to address the unequal vulnerabilities that low-income communities of color have to any shocks, disruptions, or major changes to urban water supplies, quality, and system functions. But the Fresno plan fails to consider and adapt adequately to climate change. The plan does not mention climate change at all. While the Fresno water supply plans account for extreme droughts and hazards that could affect water supply, the plans do not use climate change models as the basis for determining the new water-supply norm. In contrast, all projections in the Fresno plan are based only on historic patterns.¹⁶⁸

With climate change, the unusually extreme weather patterns are predicted to become the norm, and past patterns are inadequate predictors of the future (i.e., “unprecedented is the new normal”; “stationarity is dead”).¹⁶⁹ The EPA predicts that climate change is making California hotter and drier and will result in severe, unprecedented, and lasting water shortages, including decreased overall precipitation, earlier and less snowmelt, increased heatwaves and greater evaporation, and many intersecting vulnerabilities, such as heat-related illness, extreme and frequent wildfires, and loss of crop productivity negatively impacting food supplies.¹⁷⁰ While the state has

¹⁶⁶ *Id.* § 6.4.

¹⁶⁷ *Id.* §§ 4.1 & 7.2.

¹⁶⁸ *Id.* §§ 3.1–7.4 (multiple sections relying on historic data to describe the system and predict future conditions and needs).

¹⁶⁹ P.C.D. Milly et al., *Stationarity Is Dead: Whither Water Management?*, 319 *Sci.* 573 (2008); Christiane Amanpour et al., *Extreme Global Weather: ‘The Unprecedented Is the New Normal’*, *YAHOO NEWS* (Oct. 31, 2012), <https://news.yahoo.com/blogs/around-the-world-abc-news/extreme-global-weather-unprecedented-normal-022221532.html>.

¹⁷⁰ U.S. ENV’T PROT. AGENCY, *What Climate Change Means for California* (Aug. 2016), <https://www.epa.gov/sites/production/files/2016-09/documents/climate-change-ca.pdf>.

faced droughts in previous decades, it is predicted that California will be facing somewhat of a permanent drought by 2060.¹⁷¹

Best practices for water planning now involve express consideration of climate change throughout the plan. These considerations include the use of multiple climate-change models to test proposed plan strategies for their performance under multiple plausible climate scenarios, adoption of strategies that make the water system more resilient to a variety of possible futures, and integration of climate-change adaptation with adaptation to other vulnerabilities and risks to the water system.¹⁷² Not using these models as the basis for normal weather patterns negatively impacts a community's capacity to resist, bounce-back, adapt, and transform after sudden shocks and changing conditions, especially for the most marginalized communities in the Fresno area. Specifically concerning resilience justice, all planning for adaptation to climate change should include climate-justice or climate-equity analyses that address how adaptation strategies unequally affect the vulnerabilities of marginalized people and communities.¹⁷³

Fresno's Urban Water Management Plan makes no mention of the city's water affordability credit program for low-income water users. It does not analyze how socio-economic shocks and changes (e.g., major recession, pandemic) disproportionately affect low-income people and people of color and might create greater need for water affordability credits (i.e., the number of people who qualify and amount of dollars needed). It does not analyze how the city's strategies for addressing water-system threats and vulnerabilities—such as conservation pricing, drought rate structures, significant costs of new water supplies, and significant costs of protecting or treating water quality—could make water rates unaffordable for many of the city's most marginalized

¹⁷¹ Dan Tarlock, *California Adapts to Prolonged Drought: Any Lessons for the Humid Midwest?*, 51 VAL. U. L. REV. 519, 519 (2017).

¹⁷² Craig Anthony (Tony) Arnold, *Environmental Law, Episode IV: A New Hope? Can Environmental Law Adapt for Resilient Communities and Ecosystems?*, 21 J. ENV'T & SUSTAINABILITY L. 1, 35–36 (2015) (hereinafter Arnold, *Episode IV*) (describing the development of two plans for the resilience of the Santa Ana watershed and its water-supply and water-quality systems in Southern California to climate change and other shocks); see also WATER UTILS. CLIMATE ALL., *Decision Support Planning Methods: Incorporating Climate Change Uncertainties into Water Planning* (Jan. 2010).

¹⁷³ See, e.g., Isabelle Anguelovski et al., *Equity Impacts of Urban Land Use Planning for Climate Adaptation: Critical Perspectives from the Global North and South*, 36 J. PLAN. EDUC. & RSCH. 333 (2016); Catherine F. Grasham et al., *On Considering Climate Resilience in Urban Water Security: A Review of the Vulnerability of the Urban Poor in Sub-Saharan Africa*, 6 WILEY INTERDISCIPLINARY REVIEWS: WATER (2019), <https://wires.onlinelibrary.wiley.com/doi/pdf/10.1002/wat2.1344>; Duran Fiack et al., *Sustainable Adaptation: Social Equity and Local Climate Adaptation Planning in US Cities*, 115 CITIES (2021).

households. The plan contains no data on amounts spent on water per household in comparison to overall household income, how many people receive various amounts of assistance from water affordability credit programs and their demographic profiles, and estimated need for water affordability credit funds under various possible scenarios, including unprecedented crises.

2) *Does urban water planning engage marginalized communities' residents in diverse, inclusive, and meaningful ways of participating in policy making and implementation?*

Fresno's Urban Water Management Plan describes a minimal, top-down method for public input into the plan. A draft of the plan was released to the public about two months before its adoption through a city website, at two city offices, and at a public library.¹⁷⁴ The public had thirty days to comment via email, letter, or phone call.¹⁷⁵ Then a public hearing was held forty days after the comment period ended, at 10:00 a.m. on Thursday, June 23, 2016, in the City Council Chambers of the Fresno City Hall.¹⁷⁶ Notice of the draft plan's availability, public comment opportunity, and public hearing were published twice each in the *Fresno Bee* and *The Business Journal* in small-type legal notices.¹⁷⁷ The plan itself does not describe if there were other public notices, such as on city webpages and in city water bills sent to consumers.

In fact, the plan minimally describes these formal opportunities for public input as the only ways that the public was engaged in plan formulation. It does not specify any outreach to groups of marginalized residents or other groups,¹⁷⁸ even though state law requires that urban water suppliers undertake efforts to involve diverse groups within the local population in the development of the plan.¹⁷⁹ The plan, however, describes the city's coordination and collaboration with a number of powerful water providers and governmental entities and appends letters of outreach that were sent to them: the United States Bureau of Reclamation, Fresno Irrigation District, Bakman Water Company, City of Clovis, County of Fresno, Fresno Metropolitan Flood Control District, Friant Water Authority, Garfield Water District, Malaga County Water

¹⁷⁴ FRESNO UWMP app. C, Proof of Publication Notices.

¹⁷⁵ *Id.*

¹⁷⁶ *Id.*

¹⁷⁷ *Id.*

¹⁷⁸ FRESNO UWMP § 2.5.

¹⁷⁹ CAL. WATER CODE § 10642 (2021).

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District, and Pinedale County Water District.¹⁸⁰ There are no indications of any efforts to reach out to neighborhood groups, residents of low-income neighborhoods of color, or local groups involved in environmental, racial, or social justice issues, in order to collaborate with them, get their pre-draft input, or expressly invite their comments on the draft and participation in the hearing. It appears that the water plan content was created primarily by professional experts and powerful leaders of government agencies and other water-provider entities.

Formal legal notices in small-print in published newspapers, drafts buried on pages of city websites, and public hearings at city hall on a weekday morning are methods of public participation that are designed to exclude, rather than include, members of the public generally—and those residents whose economic status, education levels, work and family commitments, and experiences of discrimination and disempowerment marginalize them from public decision making more specifically. Participation is not the same as inclusion, as Kathryn Quick and Martha Feldman have observed:

Participation practices entail *efforts to increase public input oriented primarily to the content of programs and policies*. Inclusion practices entail *continuously creating a community involved in coproducing processes, policies, and programs for defining and addressing public issues*.¹⁸¹

Even as a method of participation, urban water planning in Fresno falls short, because it does not aim to increase public input, but instead merely checks a box of a legal requirement for public input opportunity. As a matter of resilience justice, it fails to engage, empower, and build community influence over urban water plan goals and strategies and water management actions.

Moreover, the plan's discussion of public education and outreach is all about top-down, city-developed programs of demand-management to ask the public about their water uses and methods of water use, inform the public about water conservation goals and methods, and convince or help the public to change their activities to specific water-saving techniques that water officials want to approach.¹⁸² The public education and outreach component of the plan does not appear to contemplate the input of diverse voices into city policies and their

¹⁸⁰ FRESNO UWMP § 2.4.

¹⁸¹ Kathryn S. Quick & Martha S. Feldman, *Distinguishing Participation and Inclusion*, 31 J. PLAN. EDUC. & RSCH. 272, 272 (2011).

¹⁸² FRESNO UWMP § 9.1.4.

implementation or the sharing of power over the city water system with city officials. There do not appear to be any feedback loops or assessment methods for officials to learn whether their public engagement methods are working well or are responsive to the needs of city residents, including low-income residents of color.

3) Does urban water planning improve marginalized communities' environmental conditions, including the distribution of and access to green and blue infrastructure?

The Fresno UWMP addresses problems of drinking water quality and contamination of water sources, particularly groundwater. The plan identifies chemical contamination of groundwater within the Kings Sub-basin as a substantial threat to drinking water supplies, particularly from “1,2-Dibromo-3-Chloropropane (“DBCP”), ethylene dibromide (“EDB”), trichloropropane (“TCP”), other volatile organic compounds (“VOCs”) such as trichloroethylene (“TCE”) and tetrachloroethylene (“PCE”), methyl tertiary butyl ether (“MTBE”), nitrate, manganese, radon, chloride, and iron.”¹⁸³ The plan refers to litigation against the sources of these contaminants and the resulting settlements that are funding remedial strategies.¹⁸⁴ The two primary strategies mentioned in the plan are wellhead treatment systems and blending plans. Wellhead treatment systems are constructed processes to remove pollutants from the groundwater. Blending plans aim to dilute contamination by adding surface or recycled water to groundwater, which becomes naturally filtered as it migrates towards wellheads.¹⁸⁵ A major new aquifer recharge facility in West Fresno is planned to initially recharge 1,200 acre-feet per year of water into groundwater, with eventual recharge capacity of over 75,000 acre-feet of water per year.¹⁸⁶

Fresno’s need to use recycled wastewater for its water supply to meet growing demand and diminishing surface water sources requires strategies and actions to treat wastewater adequately for re-use. The plan obliquely observes that the Fresno/Clovis Regional Wastewater Reclamation Facility (“RWRf”) in the southern part of the Fresno metropolitan area treats wastewater only to secondary undisinfected levels, up to eighty million gallons per day, whereas the North Fresno Water Reclamation Facility, “constructed as part of a residential,

¹⁸³ FRESNO UWMP § 6.1.4.

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

¹⁸⁶ FRESNO UWMP § 6.7.4.

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commercial, and golf course master planned development located in the northern portion of the City,” uses cleaner tertiary disinfected treatment methods at around one million gallons per day.¹⁸⁷ The plan identifies two strategies to address the city’s need for cleaner recycled water. The first is the introduction of wastewater into groundwater near the RWRf to allow natural percolation to treat the water to a quality consistent with tertiary disinfected standards, and then extract the water from fifteen groundwater wells near the site.¹⁸⁸ The second is the construction of a tertiary treatment plant at the RWRf and an entirely new tertiary treatment plant near the Fresno-Yosemite National Airport in southeast Fresno.¹⁸⁹ The city also plans to expand its treatment capacity for surface water, which will increase the available supplies of potable drinking water.¹⁹⁰

However, the Fresno UWMP makes no specific mention of the environmental harms to low-income communities of color in its service area. The low-income Latino and Black neighborhoods of South and West Fresno experience some of the worst environmental injustices in the state of California, including contaminated drinking water and polluted groundwater.¹⁹¹ Contaminated drinking water has been linked to health disparities and harms among low-income people and people of color in the Fresno region.¹⁹² Although some of the most egregiously disparate and harmful water-quality problems in the area are just outside the city’s drinking-water service in unincorporated communities and quasi-rural housing areas, Fresno’s UWMP makes no specific mention of the water-quality problems experienced by low-income neighborhoods of color in the southern and western portions of the service area, nor of the potential for service-area expansion to be a major strategy for addressing environmental injustices and health inequities within the region.

¹⁸⁷ *Id.* § 6.4.2.2.

¹⁸⁸ *Id.* § 6.4.3.1.

¹⁸⁹ *Id.* tbl.6-11.

¹⁹⁰ *Id.* tbl.6-12.

¹⁹¹ CAL. ENV’T JUST. ALL., SB1000 IMPLEMENTATION TOOLKIT: PLANNING FOR HEALTHY COMMUNITIES 116–118 (2017); Monica Vaughan, *West Fresno Ranks Highest in California for Pollution Burden and Health Vulnerability*, FRESNO BEE (Oct. 20, 2021, 1:47 PM), <https://www.fresnobee.com/fresnoland/article255135437.html>; Vic Bedoian, *South Fresno Residents Challenge Warehouse Invasion*, CMTY. ALL. (Jan. 1, 2022), <https://fresnoalliance.com/south-fresno-residents-challenge-warehouse-invasion/>; *Water and Environmental Justice in the Central Valley*, CENT. CAL. ENV’T JUST. NETWORK, <https://ccejn.org/2021/07/21/water-and-environmental-justice-in-the-central-valley/>.

¹⁹² *See, e.g.,* Amy M. Padula et al., *Environmental Pollution and Social Factors as Contributors to Preterm Birth in Fresno County*, 17 ENV’T HEALTH 70 (2018).

Fresno's UWMP also makes no specific mention of how urban water management can be integrated with the provision of green and blue infrastructure in low-income neighborhoods of color. Green and blue infrastructure plays a major role not only in a community's environmental conditions, but also in community health conditions, social capital, and overall resilience to shocks, disturbances, and changing conditions, such as health crises, disasters, and climate change.¹⁹³

Green infrastructure often refers to "projects that include vegetated design elements such as parks, green roofs, greenbelts, alleys, vertical, and horizontal gardens and planters."¹⁹⁴ Green infrastructure projects can provide restorative services to local ecosystems and are incredibly "valuable in densely populated urban areas."¹⁹⁵

Blue infrastructure, on the other hand, "technically refers to infrastructure related to the hydrological functions, including rainwater and urban storm water systems as well as surface water and groundwater aquifers."¹⁹⁶ "[B]lue infrastructure is traditionally discussed as a matter of resilient provision for water supply and water security."¹⁹⁷

Such water infrastructure may be natural, adapted or man-made and provides functions of slowing down, decentralization and spreading, soaking into the underground, evaporating and releasing water into the natural environment. This includes flow control, detention, retention, filtration, infiltration and different forms of water treatment like reuse and recycling. In general, blue infrastructure addresses aspects of water quantity as well as quality control.¹⁹⁸

Low-income neighborhoods of color have inequitably less and worse green and blue infrastructure due to underinvestment, disinvestment, and structural inequalities, making them considerably more vulnerable to harms and threats and, thus, less resilient.¹⁹⁹ Fresno's UWMP fails to address how aquifer recharge and stormwater

¹⁹³ Arnold et al., *Resilience Justice*, *supra* note 13, at 671–678.

¹⁹⁴ PETER WOUTERS ET AL., BLUE-GREEN INFRASTRUCTURE AS TOOLS FOR THE MANAGEMENT OF URBAN DEVELOPMENT AND THE EFFECTS OF CLIMATE CHANGE 2 (2018), <http://download.ramboll-environ.com/environcorp/Blue%20green%20infrastructures.pdf>.

¹⁹⁵ *Id.*

¹⁹⁶ *Id.*

¹⁹⁷ *Id.*

¹⁹⁸ *Id.*

¹⁹⁹ Arnold et al., *Resilience Justice*, *supra* note 13, at 666–69, 678–85, 691–92.

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management strategies could prioritize the creation and maintenance of green and blue infrastructure in the city's southern and western neighborhoods, such as parks and green spaces, trees and vegetation, biotic stormwater controls, and wetlands. It fails to address how existing and new green and blue infrastructure in low-income neighborhoods of color could be made resilient to drought, heat, water shortages, and other shocks, such as through targeted landscape planning and management. Furthermore, the Fresno UWMP does not identify how water (e.g., recycled wastewater) to sustain green and blue infrastructure in low-income neighborhoods of color during times of conservation and shortage is essential to the capacities of those communities and their residents to adapt to crises, such as climate change or health crises, through benefits like shade, places for children and youth to play, and opportunities for residents to connect with natural living environments, which is needed for good mental and emotional well-being.

4) Does urban water planning improve marginalized communities' economic, social, and political conditions?

In general, crises in urban water supplies and systems are bad for the economic, social, and political well-being of low-income communities of color. Thus, strategies designed to avoid or adapt successfully to potential urban water crises help marginalized communities in a general, abstract way—however, the Fresno UWMP does not address three specific economic and socio-political conditions that affect the resilience and vulnerabilities of low-income neighborhoods of color.

The first is the capacity of low-income households to afford and use water-conservation measures. The Fresno UWMP relies substantially on a system of rebates to water consumers for water-saving plumbing fixtures and appliances, landscape-irrigation efficiency methods, and turf replacement.²⁰⁰ To get the rebate, a water user must know exactly which appliances, fixtures, or landscaping materials qualify for the rebate.²⁰¹ Then, they must have the funds to purchase and install the qualifying water-efficient appliances, fixtures, or landscaping materials.²⁰² They need to obtain or print a rebate application form,

²⁰⁰ FRESNO UWMP §§ 4.4 & 9.1.4.3, tbl.8-4.

²⁰¹ See *Water Conservation Program: Rebates*, CITY OF FRESNO DEP'T PUB. UTIL., <https://www.fresno.gov/publicutilities/water-conservation-program/rebates/> (last visited Mar. 10, 2022).

²⁰² See *id.*

complete and sign the form, and submit the completed, signed application form with “a copy of the itemized, dated sales receipt for the new toilet within” forty-five days of the purchase date by postal mail or email to the city’s water conservation program.²⁰³ If city staff deem the purchase to be unqualifying or the form to be incomplete, incorrect, or unsigned, the rebate application will be rejected.²⁰⁴ Moreover, the rebate covers only a portion of the total cost of the water-efficient purchase, with no sliding scale to provide a greater reimbursement amount for those least able to afford these purchases. Low-income water users may not have available funds to make these purchases or to risk that they won’t be reimbursed by a bureaucracy that they may not trust. The plan contains no data about the socio-economic, geographic, racial, or ethnic characteristics of water users that have used rebate programs, making it impossible to assess whether these programs are serving marginalized water customers equitably or effectively.

The second water plan omission is consideration of the capacity of low-income households to afford the city’s water rates. Both Martha Davis and Jaime Alison Lee have identified the unaffordable costs of urban water supplies to low-income consumers of color as a major injustice, including the amounts of water rates, inequitable water shut-off policies and practices, inadequacies of water assistance programs, and lack of accountability for urban water suppliers.²⁰⁵ The Fresno UWMP employs water-conservation pricing strategies and contemplates that Fresno will need to develop a drought water rate structure that increases water rates during times of supply shortages.²⁰⁶ These strategies do not address affordability for low-income households, measures to protect low-income households in times of water crisis and spiking rates, or how affordability assistance programs will be adjusted in response to these strategies. In fact, the plan makes no mention at all of Fresno’s water affordability credit program.²⁰⁷ The plan does not rely on or even reference data about how many

²⁰³ *Residential Toilet Rebate Program*, CITY OF FRESNO DEP’T PUB. UTIL, <https://www.fresno.gov/publicutilities/wp-content/uploads/sites/16/2019/05/2019-05-30-FINAL-Residential-Toilet-Rebate.pdf> (last visited Mar. 10, 2022).

²⁰⁴ *Id.*

²⁰⁵ Davis, *supra* note 7, at 356, 360–64; Jaime Alison Lee, *Turning Participation into Power: A Water Justice Case Study*, 28 GEO. MASON L. REV. 1003, 1013–20 (2021).

²⁰⁶ FRESNO UWMP §§ 3.3.2 & 8.6, tbl.8-4.

²⁰⁷ *Compare Keeping Water Affordable: Fresno’s New Water Affordability Credit Program*, CITY OF FRESNO PUB. UTIL. WATER DIV., <http://www.rechargefresno.com/water-affordability-credit-program/> (last visited Mar. 10, 2022) (discussing Fresno’s Water Affordability Credit Program), *with* FRESNO UWMP (not discussing the affordability credit program).

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households use the water affordability credit program, how many households have their water shut off due to inability to pay, and the socio-economic, geographic, or racial/ethnic characteristics of these households. Water rates aren't considered in relationship to other costs of the basics of life, such as housing, energy, and food, and the vulnerabilities of low-income households to unaffordable increases in the costs of basic necessities across sectors.

Third, the Fresno UWMP does not specifically explore strategies for increasing the engagement of low-income neighborhoods of color in water planning and management, as previously discussed in our analysis of Question 2, above. Developing policies and systems of shared governance with marginalized communities improves their resilience by building the communities' social capital and empowerment.²⁰⁸ And creating urban-water-system structures to engage and be responsive to marginalized people's voices makes the system more equitable.²⁰⁹ Fresno's low-income neighborhoods of color have many neighborhood leaders, environmental-justice and health-equity activists, and water-justice advocates who could be deeply involved in water policy development and implementation.²¹⁰ Inattention to the social and political conditions that marginalize and disempower low-income communities of color from urban water planning and management is a major weakness of the Fresno UWMP.

5) Does urban water planning reduce disparities in marginalized communities' conditions and capacities?

As described in the analyses of the four prior questions, the Fresno UWMP does not address disparities in marginalized communities' capacities to afford water rates generally or in times of scarcity, use water-conservation tools, or exercise power and engage in policy making and implementation in either the urban water system specifically or in urban governance generally. It also does not address the disparities in green and blue infrastructure conditions or the effects

²⁰⁸ Arnold et al., *Resilience Justice*, *supra* note 13, at 692–704.

²⁰⁹ See Lee, *supra* note 205, at 1004.

²¹⁰ See e.g., CAL. ENV'T JUST. ALL., *supra* note 191, at 116–18; Vaughan, *supra* note 191; Bedoian, *supra* note 191; CENT. CAL. ENV'T JUST. NETWORK, *supra* note 191. See generally Miriam Zofith Zuk, *Health Equity in a New Urbanist Environment: Land Use Planning and Community Capacity Building in Fresno, CA* (2013) (Ph.D. dissertation, University of California at Berkeley), <https://escholarship.org/uc/item/4pq5p68j> (extensively describing Fresno marginalized communities' activism and empowerment throughout dissertation).

of climate change, sustained and unprecedented drought gentrification, economic shocks, health crises, and other disturbances on Fresno's low-income neighborhoods of color. It is unclear whether the strategies adopted by the Fresno UWMP will improve water supplies, water-system reliability, water quality, and groundwater contamination in ways that decrease the vulnerabilities of Fresno's low-income neighborhoods of color to shocks to and changes in these conditions by the appropriate authorities, such as lawyers, government officials, or water resource experts. But professionals educated in combatting social inequality should also be included in the process. Diverse voices in the planning process will lend more diversity to the plans themselves.

6) Does urban water planning include feedback loops for ongoing monitoring and revisions of the policies and plans, including engagement of marginalized communities' residents and monitoring for marginalized communities' vulnerabilities and adaptive capacities?

Feedback loops are particularly important for long-term policy monitoring and revision: feedback loops make the plan adaptive to unexpected plan failures as it is implemented and to difficult-to-predict changing conditions.²¹¹ California's mandatory five-year cycle for new or revised urban water management plans creates opportunities for periodic review and revision of urban water plans and management actions—if water providers gather and assess the data about past plans' effects and changing conditions, learn from the data, and apply the lessons learned to modified plans. Even more frequent modifications would be desirable.

Just as the Fresno UWMP has no data on the needs of low-income communities of color or the projected effects of its strategies on these communities, it also has no mechanisms by which those data will be gathered, monitored, analyzed, or used. Moreover, just as the Fresno UWMP has no specific mechanisms for engaging low-income communities of color in the formulation and implementation of urban water plans, it has no specific mechanisms for engaging these communities in feedback loop processes.

²¹¹ On the nature and features of feedback loops in adaptive planning, see Craig Anthony (Tony) Arnold, *Adaptive Watershed Planning and Climate Change*, 5 ENV'T & ENERGY L. & POL'Y J. 417, 440–44, 455, 470 (2010) [hereinafter Arnold, *Adaptive Watershed Planning*].

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7) *Does urban water planning anticipate, minimize, and mitigate any adverse effects of water plans and water-system management on the resilience of marginalized communities?*

Our analyses of the previous questions show that the Fresno UWMP gives no systematic or detailed attention to the resilience of Fresno's low-income neighborhoods of color nor to any possible adverse effects of the plan or its implementation on these neighborhoods. Neither community resilience nor water justice (or resilience justice with respect to the urban water system) is a subject of the 2015 Fresno UWMP.

C. *Sacramento Case Study*

1) *Does urban water planning build marginalized communities' capacities to resist, bounce back from, adapt to, and transform with sudden shocks (or disturbances) and changing conditions?*

Like Fresno, Sacramento did not identify or address marginalized communities, such as its low-income neighborhoods of color, in its UWMP. To assess how Sacramento's UWMP could have identified marginalized communities and to ground our evaluations of the extent that the plan affects the vulnerabilities and adaptive capacities of these communities, we determined which Sacramento neighborhoods are the most vulnerable by using Census Tract data from the 2012-2016 American Community Survey Estimates²¹² across seven neighborhood factors that affect vulnerability: race, income, poverty, educational attainment, age, housing burden, and single female household with dependents.

We defined race as a vulnerability factor if 46 percent or more of population is non-white. We defined income as a vulnerability factor if the median income was \$65,000 or less. We defined poverty as a vulnerability factor if more than 30 percent of the population was determined to be in poverty. We defined educational attainment as a vulnerability factor if less than 30 percent of the population have a bachelor's degree or more. We defined age as a vulnerability factor if between 15 and 35 percent of the total population is sixty-five years or older. We defined housing burden as a vulnerability factor if 60 percent or more of the total households were experiencing housing burden. We

²¹² See *American Community Survey Data Profiles*, U.S. CENSUS BUREAU, <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2016/> (last visited Mar. 10, 2022).

defined single female households with one or more dependents as a vulnerability factor if between 20 percent and 46 percent of the total population are single female households with one or more dependents.

Of the 120 neighborhoods in Sacramento, twenty-five of them had four or more of the vulnerability factors. Having four or more of the vulnerability factors when compared to the other neighborhoods indicates that these twenty-five neighborhoods are relatively more vulnerable neighborhoods. The neighborhoods are:

1. Oak Knoll
2. Norwood Tech
3. West Del Paso Heights
4. Johnson Heights
5. Gardenland
6. Strawberry Manor
7. Richardson Village
8. Wills Acres
9. Noralto
10. Southern Pacific / Richards
11. Dos Rios Triangle
12. Old Sacramento
13. Richmond Grove
14. Central Oak Park
15. South Oak Park
16. Lawrence Park
17. Fruitridge Manor
18. Avondale
19. Brentwood
20. Glen Elder
21. Southeast Village
22. Woodbine
23. Parkway
24. Meadowview
25. Valley Hi / North Laguna

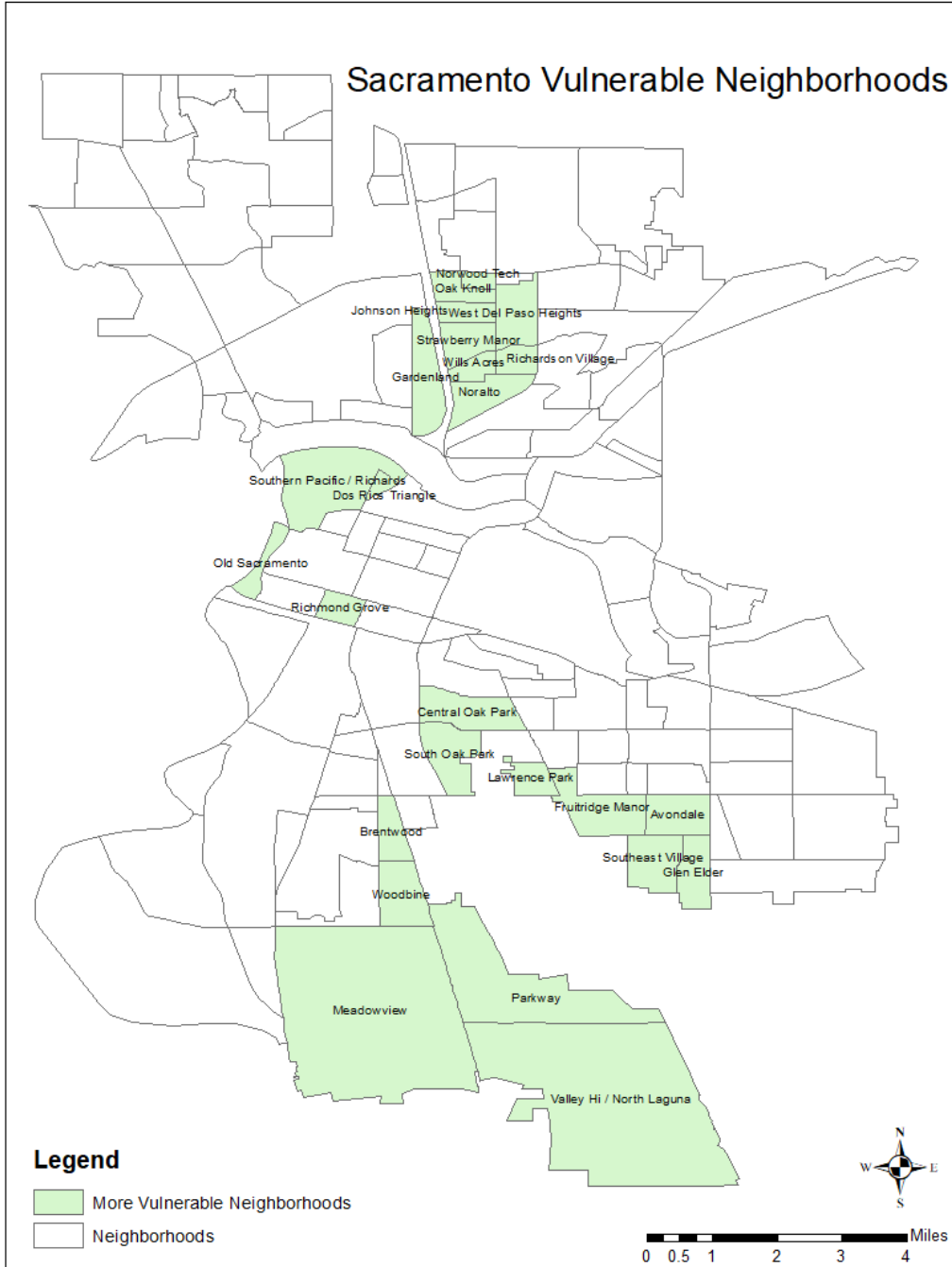
Image 1 shows the location of these neighborhoods, which are clustered in the South, North-Central, and Near-West areas of the city.

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Image 1: Sacramento Neighborhoods with Four or More Vulnerability Factors:



Sacramento's UWMP identifies key trends of substantial population growth, growth in low-wage jobs, and increases in household size, including large households of unrelated people.²¹³ These observations recognize the substantial influx of new residents, many moving from the San Francisco Bay Area to an urban location with lower housing costs and, in the process, driving up housing costs in Sacramento and creating more housing insecurity and overcrowding.²¹⁴ The plan projects that by 2040, there will be a near doubling of demand for water that the City of Sacramento directly provides to its retail customer and forty-eight times more water demanded by other water providers in the metropolitan area, which are served wholesale by the city, despite greater conservation and water-efficiency practices.²¹⁵ The Sacramento UWMP does not expressly address how vulnerabilities to housing insecurity and unaffordability, neighborhood gentrification, and rising water costs due to changing demand-supply ratios will interact with one another to magnify the adverse impacts on low-income people and low-wage workers.

Sacramento's UWMP confidently asserts that it has reliable supplies of water to meet forecasted demand during the time horizon of the plan, and therefore is planning only modest water projects to improve water delivery performance.²¹⁶ This confidence is based on legal rights to water under a settlement agreement with the United States Bureau of Reclamation²¹⁷ and the system's physical capacity.²¹⁸ Sacramento obtains water from a mix of surface water diversions from the American River and the Sacramento River, subject to certain legal limits under particular conditions, and groundwater pumping.²¹⁹ Sacramento does not have plans for the recovery of stormwater as part of its water supply planning.²²⁰ As of 2016, it did not use recycled water but was considering developing a program of water re-use.²²¹ If Sacramento has made a catastrophic error about its legal rights to water or the reliability and capacities of its water system, the area's most

²¹³ SACRAMENTO UWMP, §§ 3.4.1–3.4.4

²¹⁴ Anthony Sorci, *Sacramento Is the Fastest-Growing Big City in California, Topping 500,000 for the First Time*, SACRAMENTO BEE (May 1, 2018), <https://www.sacbee.com/latest-news/article210222499.html>.

²¹⁵ See SACRAMENTO UWMP tbls.4-8 & 4-9.

²¹⁶ See *id.* § 6.8.

²¹⁷ *Id.* § 7.1.2.

²¹⁸ *Id.* § 7.1.1.

²¹⁹ *Id.* §§ 6.1–6.3.

²²⁰ *Id.* § 6.4.

²²¹ SACRAMENTO UWMP § 6.5.

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vulnerable people will be affected worst. Nonetheless, the Sacramento UWMP identifies several strategies that Sacramento could adopt if the reliability of its water supplies is threatened, including rehabilitating or expanding existing water treatment plants, constructing “a new water treatment plant,” obtaining “additional water supplies through contracts,” increasing water conservation measures, “using additional groundwater, and using recycled water to offset potable water use.”²²² Sacramento has a water shortage contingency plan similar to Fresno’s.²²³

Like the Fresno UWMP, the Sacramento UWMP does not make climate-change projections or identify strategies to adapt to climate change. But, instead of ignoring the topic like Fresno did, Sacramento expressly states that it did not complete a climate change section because it had not completed any studies about the impacts of climate change on the water system.²²⁴ The lack of a plan to address climate change adversely affects vulnerable communities, particularly low-income neighborhoods of color.

The Sacramento UWMP has extensive demand-management and conservation strategies, similar to Fresno. Unlike Fresno, though, Sacramento was not fully metered in 2015 and included in its plan a goal of full metering by 2021, ongoing transitions to volumetric rate structures, and consideration of the possibility of tiered rates in the future.²²⁵ The plan expressly commits the City to monitor rate structures for fairness to customers and adequacy in recovering its costs.²²⁶ The plan refers to rebates for water users that switch to water-efficient toilets, washing machines, or landscaping,²²⁷ which are inequitable to low-income households for the reasons identified in our Fresno analysis. But the plan also promises free home water use inspection services.²²⁸ The Sacramento UWMP makes no mention of the City’s Utility Rate Assistance Program (“URAP”) to assist low-income households with credits on their water, sewer, and garbage bills of up to \$400 per month.²²⁹ It is unclear from the plan if and how volumetric rates, tiered rates, drought conservation rates, or economic shocks like

²²² *Id.* § 7.2.

²²³ *See id.* § 8.1–8.9.

²²⁴ *Id.* § 4.8.

²²⁵ *Id.* §§ 9.2.2 & 9.2.3.

²²⁶ *Id.* § 9.2.2.

²²⁷ SACRAMENTO UWMP § 9.3.1.

²²⁸ *Id.*

²²⁹ CITY OF SACRAMENTO, *Sacramento Utility Rate Assistance*, <https://www.cityof.sacramento.org/sacramentoutilityrateassistance> (last visited Mar. 10, 2022).

rising housing prices or increased unemployment would affect URAP eligibility or amounts. The Sacramento UWMP shows historical data about the effects of drought, economic recession, and the combination of both drought and economic recession on retail water production and per capita water use,²³⁰ but does not explore strategies about how to equitably and effectively address the effects of these intersecting vulnerabilities on low-income communities of color.

The best aspect of the Sacramento UWMP, though, is its proactive approach to protecting and monitoring water quality and addressing potential vulnerabilities to water contamination.

[T]he City's water supply meets or exceeds all federal and state drinking water standards. In addition, the City takes a proactive approach to water quality and the potential constraints to its water supply sources. The City's Water Quality Laboratory and Research and Development Section conducts water quality evaluations and studies to proactively address water quality conditions, including effects due to drought and climate change. The City conducts source water protection programs to protect the quality of the City's American and Sacramento River water supplies, including regional efforts. Water quality in both rivers can be influenced by a combination of factors including storm events, reservoir releases, irrigated agriculture, livestock, urban runoff, recreation, and various point sources. These influencing factors can impact water quality parameters (e.g., turbidity, coliforms, Giardia and Cryptosporidium, organic carbon, and volatile and semi-volatile organic compounds, aluminum, iron, and manganese). Raw and treated water quality is routinely monitored by the City, and the water treatment plants are designed to produce drinking water that meets all applicable drinking water quality regulations. The Sacramento and American River Watershed Sanitary Survey Updates, conducted every five years, also that City's water treatment facilities are able to treat the source water to meet all regulatory requirements. As a result, water quality is not expected to impact supply reliability. . . .

In addition to ambient water quality or potential contaminants, the City's groundwater supply is subject to future regulation. Future regulations regarding arsenic,

²³⁰ SACRAMENTO UWMP, at fig.5-1.

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radon, or other chemicals of concern could potentially limit the City's groundwater supply in the future. . . . [T]he City is participating in several groups to help develop mechanisms to manage and protect the Sacramento area's groundwater resources.

The City will continue to regularly monitor groundwater quality and proactively address future regulations to minimize future water quality impacts to its groundwater supply reliability.²³¹

Although this language does not mention any marginalized communities, a proactive approach to water quality builds water-system strength and resilience that protects marginalized communities.

Nonetheless, the Sacramento UWMP does not contain any strategies to address the unequal vulnerabilities of the city's low-income neighborhoods of color to breaks, failures, or inadequacies of water mains. As part of our resilience justice assessment, Sacramento water officials provided us with water main data for all the neighborhoods in the service area. By comparing the data to our list of marginalized neighborhoods, we discovered that water mains in more vulnerable neighborhoods were, on average, older than water mains in less vulnerable neighborhoods and that all of the newest water mains were in neighborhoods with higher incomes and fewer people of color.

2) Does urban water planning engage marginalized communities' residents in diverse, inclusive, and meaningful ways of participating in policy making and implementation?

In contrast to Fresno, the Sacramento UWMP states a strong commitment to encouraging and facilitating public participation in water planning and management.

The City actively encourages community participation in water management activities and specific water-related projects. The City's public participation program includes both active and passive means of obtaining input from the community, such as mailings, public meetings, and web-based communication. The City's website describes on-going projects and posts announcements of planned rate increases to fund these water projects.²³²

²³¹ SACRAMENTO UWMP § 7.1.4.

²³² *Id.* § 2.5.2.

The plan also describes the statutorily mandated public notice, public hearing, and availability of draft and final versions of the plan, as well as communications and coordination with other governmental entities and water providers.²³³

But the plan does not discuss any inclusive outreach aimed at historically marginalized and underrepresented groups and communities. It also does not provide any data on how many members of the public participate, who participates, and how they participate, nor any assessment of the city's community participation strategies. An earnest goal of participation and inclusion is not achieved without effective strategies and actions to implement those strategies.

Like Fresno, Sacramento's conservation outreach programs are described as primarily top-down methods of city experts informing, educating, and assisting the public to promote conservation behaviors.²³⁴ Nonetheless, much more emphasis is put on proactive outreach in Sacramento's plan.

3) Does urban water planning improve marginalized communities' environmental conditions, including the distribution of and access to green and blue infrastructure?

As discussed in our analysis of the first question, the Sacramento UWMP contains several proactive strategies to provide safe-quality drinking water and protect the quality of source waters throughout its service area, as well as to monitor and quickly remedy any adverse conditions. But, like the Fresno UWMP, the Sacramento UWMP does not address how water supply planning and management can facilitate, support, and maintain green and blue infrastructure in low-income neighborhoods of color.

4) Does urban water planning improve marginalized communities' economic, social, and political conditions?

As discussed in our analysis of the first question, the Sacramento UWMP gives more attention to the impacts of economic conditions and shocks than the Fresno plan, but fails to integrate or develop strategies for rate assistance, equitable alternatives to rebates, and other affordability concerns. The plan's enthusiasm for public outreach does not extend to details about how to empower and build social capital

²³³ *Id.*

²³⁴ *Id.* § 9.2.4.

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within low-income neighborhoods of color through engagement in urban water issues.

5) Does urban water planning reduce disparities in marginalized communities' conditions and capacities?

The Sacramento UWMP does not address disparities among more and less vulnerable neighborhoods, including unequal vulnerabilities to climate change, effects of water-rate costs, realistic incapacities to take advantage of conservation measures, and risks of water-main failures.

6) Does urban water planning include feedback loops for ongoing monitoring and revisions of the policies and plans, including engagement of marginalized communities' residents and monitoring for marginalized communities' vulnerabilities and adaptive capacities?

The Sacramento UWMP has some meaningful feedback loops for water quality strategies and commits to monitoring the fairness and efficacy of new water-rate structures. High confidence in water-supply reliability is not matched in the plan itself by descriptions of adequate feedback loops. There are no plans to develop models and monitoring for climate change impacts on the urban water system. The plan makes no mention of marginalized communities, either for monitoring the impacts of water system plans on these communities or engaging them in such monitoring.

7) Does urban water planning anticipate, minimize, and mitigate any adverse effects of water plans and water-system management on the resilience of marginalized communities?

The plan does not directly address marginalized communities at all nor their resilience. Aging water mains, limited rate assistance and rebate programs, the impacts of climate change and sustained drought on low-income communities of color, and the failure to integrate water planning with planning for green and blue infrastructure in marginalized neighborhoods are some of the potentially adverse effects that Sacramento's water-system management could have, yet the plan lacks strategies to address these effects.

V. THEMES

In our resilience justice assessments of urban water plans in Fresno and Sacramento, we identified several planning inadequacies and inequities that cut across the seven analytical questions we asked.

First, the urban water plans give little to no attention to marginalized neighborhood residents' disparately higher exposure to contaminated and/or disrupted water supplies. In Fresno, the water supplied to low-income neighborhoods of color is more likely to come from contaminated groundwater sources than the water supplied to neighborhoods with higher levels of income or fewer people of color. In Sacramento, the oldest and poorest-quality water-distribution infrastructure is concentrated in low-income neighborhoods of color.

Second, the plans fail to use multiple climate-change models to evaluate in rigorous and nuanced ways the urban-water system's vulnerabilities to many different plausible climate-change scenarios. Equally importantly, they fail to include any meaningful or rigorous climate-equity analysis to assess how climate-change disruptions to their water systems would affect marginalized and vulnerable populations and communities.

Third, the plans lack adequate built-in feedback loops to monitor and assess data about actual outcomes of the plans and changing conditions, for both planners and the public to learn important lessons from the plans' successes and failures as they are being implemented, and to adapt or modify the plans during the implementation phase on the basis of those learned lessons. Marginalized and vulnerable communities are most at risk from unnoticed and uncorrected plan mistakes and failures, and they need to be expressly included in the design and use of feedback loops.

Fourth, the processes by which urban water plans are developed, adopted, and implemented fail to include marginalized people, especially residents of low-income neighborhoods of color. Merely making drafts and final versions of plans available to the public and providing formal opportunities for public reaction and comments are not sufficient to engage those who are most vulnerable and most marginalized from the urban governance and water management systems. Both inclusion and community empowerment are missing from urban water planning processes altogether.

Fifth, the urban water plans do not address the environmental conditions in low-income neighborhoods of color that affect those communities' water needs, supplies, quality, and costs. The urban water plans only modestly contribute to or support other agencies' efforts to address nearby land uses contaminating or potentially contaminating

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source waters. Moreover, there is almost no attention to the need of low-income neighborhoods of color for more and better green and blue infrastructure: trees, vegetation, parks, green spaces, community gardens, wetlands, or restored rivers and streams. Green and blue infrastructure helps communities to adapt to climate change and environmental stressors, such as heat, pollution, and flood, but these communities need green and blue infrastructure that is not overly demanding of water. Both water costs and drought-related scarcity are shocks that can disproportionately harm or even kill the green and blue infrastructure in low-income communities of color.

Finally, the plans' provisions for water affordability and conservation rebates for low-income customers tend to be primarily subsidies of fixed or capped amounts and limited availability. They fail to address the financial vulnerabilities of many of the cities' low-income residents. Even more alarming, they contain no plans or inadequate plans for how these subsidies should increase when water rates suddenly spike due to crisis, such as major scarcity from unprecedented drought or extensive failure of aging infrastructure. The plans also fail to consider how multi-faceted crises might increase the number of households unable to afford water rates and decrease the amount that low-income households can afford to pay, due, for example, to a sudden spike in unemployment, housing and other living costs, medical costs, etc. The plans do not expressly address how vulnerabilities to water scarcity, unavailability, or cost might intersect with other vulnerabilities, such as urban heat or the lack of affordable retail supplies of bottled water in or near low-income neighborhoods of color.

VI. REFORMS

The lessons learned from our resilience justice assessment of the Fresno and Sacramento urban water plans suggest some broader insights about what we need to do to make urban water planning more equitable. In our planning processes, plan content, and plan implementation, we need to give express, sustained, and robust attention to the unequal vulnerabilities and adaptive capacities of marginalized and oppressed communities, particularly low-income neighborhoods of color. We need to take a systems approach to assessing both resilience and inequity, including a study of cross-system effects and intersecting vulnerabilities.

Water supply organizations are inherently conservative, being controlled primarily by managers, engineers, scientists, planners, and lawyers who act out of institutional norms and practices developed in their technical professions and in the structured organizations in which

they work.²³⁵ They are reluctant to innovate, seek to avoid socio-political conflict, and fear public engagement, instead feeling more comfortable acting within their organization on a well-established hierarchy of values: water supply reliability, water quality, and water cost.²³⁶ Given the social-ecological-institutional complexities and systemic injustices of threats to both urban water system resilience and the human communities that depend on urban water systems, water policy and management must transform its emphasis to the human actions, movements, and social dynamics of water systems, including planning processes, organizational practices, operational rules, public values and attitudes, and community engagement.²³⁷ “According to the 2006 United Nations World Water Assessment Program (UNWWAP), the most important water problem facing the world today is not water scarcity, but rather its governance.”²³⁸

To make urban water systems more resilient to shocks, disturbances, and changes, urban water officials need to use adaptive planning methods.²³⁹ “Adaptive planning is an iterative and evolving process of identifying goals and making decisions for future action that are flexible, contemplate uncertainty and multiple possible scenarios, include feedback loops for frequent modification to plans and their implementation, and build planning and management capacity to adapt to change.”²⁴⁰ Given uncertainties about population growth, water consumption patterns, disasters, energy costs, and the impacts of climate change, among other factors, urban water planners should build flexibility into decision making, consider multiple conceivable scenarios and a broad range of planning options, use proactive strategies and investments to build buffering capacities, and focus on enhancing the urban water system’s resilience.²⁴¹ In particular, it is shocking that many urban water planners, such as Fresno and Sacramento, are not

²³⁵ See Denise Lach, Helen Ingram & Steve Raynor, *Maintaining the Status Quo: How Institutional Norms and Practices Create Conservative Water Organizations*, 83 TEX. L. REV. 2027, 2028–34 (2005).

²³⁶ *Id.* at 2032–34.

²³⁷ See generally Patricia Gober, *Getting Outside the Water Box: The Need for New Approaches to Water Planning and Policy*, 27(4) WATER RES. MGMT. 955 (2013).

²³⁸ Beth Canigli et al., *Water Policy and Governance Networks: A Pathway To Enhance Resilience Toward Climate Change*, 31 SOCIO. F. 828, 829 (2016).

²³⁹ Mukheibir et al., *supra* note 33.

²⁴⁰ Arnold, *Adaptive Watershed Planning*, *supra* note 211, at 440.

²⁴¹ Mukheibir et al., *supra* note 33. Scenario planning is a tool that can support adaptive water planning. See, e.g., Doosun Kang & Kevin Lansey, *Multiperiod Planning of Water Supply Infrastructure Based on Scenario Analysis*, 140(1) J. WATER RES. PLAN. & MGMT. 40 (2014).

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using any climate change models, much less multiple climate change models, to evaluate various water-management strategies and potential system vulnerabilities. Climate change models have been applied to local and regional water planning in Southern California and the Pacific Northwest for more than a decade.²⁴²

Adaptive planning methods must be integrated with resilience justice principles and analyses. Urban resilience, water-system resilience, and the resilience of marginalized and oppressed communities are mutually interdependent.²⁴³ Urban water plans should not prioritize overall water system resilience over the resilience of low-income communities of color, but instead they should identify, adopt, and implement strategies that link the resilience of urban water systems with the resilience of the metropolitan area's marginalized communities.

For example, adaptations to climate change, failing water infrastructure, water-supply insecurity, or water-quality threats should be developed in ways that do not create disastrous or unaffordable rate shocks to low-income water users. Economic shocks and unexpected rate shocks can send low-income households into cascades of crisis and irreversible financial decline. Urban water plans that do not acknowledge and address these affordability vulnerabilities are unjust and therefore, are planning failures.

Specifically, water affordability assistance programs should be designed and updated with consideration of the many conditions and vulnerabilities that affect low-income households. A growing body of research shows that urban water rates disproportionately burden people of color, women, and people with disabilities.²⁴⁴ Urban water providers often under-discount water rates for low-income users, in comparison to the actual affordability burden of those rates (including sewer and stormwater fees), as well as impose low ceilings on the amounts and frequency of rate assistance.²⁴⁵ Low-income water users, who are disproportionately people of color, the elderly, and people with disabilities, are at substantial risk of water officials shutting off their

²⁴² Arnold, *Episode IV*, *supra* note 172, at 36; Lara Whitely Binder, *Preparing for Climate Change in the U.S. Pacific Northwest*, 15 HASTINGS W.N.W.J. ENV'T L. & POL'Y 183, 190–95 (2009); *see also* WATER UTILITIES CLIMATE ALLIANCE, *supra* note 172.

²⁴³ For studies highlighting the interrelationships among watershed social-ecological resilience and the resilience and social-justice of Black and indigenous communities in the watershed, *see, e.g.*, Arnold et al., *Anacostia*, *supra* note 38, and Craig Anthony (Tony) Arnold et al., *Cross-Interdisciplinary Insights into Adaptive Governance and Resilience*, 22 ECOLOGY & SOC'Y 14 (2017).

²⁴⁴ Davis, *supra* note 7, at 357 & n.16; Lee, *supra* note 205, at 1017.

²⁴⁵ Davis, *supra* note 7, at 360–64.

water and foreclosing on their homes for failure to pay water bills that they cannot afford.²⁴⁶

Water plans also should consider the effects of preferred-strategy failure on vulnerable populations and communities and should include alternatives to be implemented in the event that the preferred strategy fails. For example, Fresno's plan to introduce recycled wastewater into groundwater as a way to simultaneously enhance groundwater supplies, recharge the aquifer, and clean or dilute contamination of the aquifer could conceivably fail disastrously, depending on circumstances and shock factors not anticipated in the plan's projections. Given the existing vulnerabilities of South Fresno neighborhoods to groundwater contamination, the plan should specifically address the risks and possible effects if this strategy fails and what the city would do to avoid harm to South Fresno residents and continue to address the groundwater contamination and overdraft conditions that affect them.

Plans should also develop goals, strategies, and implementation actions that are integrated with other policies and programs to improve the resilience of marginalized communities and reduce their vulnerabilities to many shocks and changes. As has been highlighted in this Article, urban water plans should address the needs of low-income communities of color for more and better green and blue infrastructure and the threats to this infrastructure from drought, heat, pollution, and water insecurity. Another area of possible integration would be to link water rate assistance programs, housing affordability/security projects, and anti-gentrification/displacement initiatives to provide the maximum meaningful and effective financial assistance to low-income renters and homeowners who may be unable to afford their housing (and water) as both water and housing costs go up with rapid population growth and housing and water shortages. Urban water plans should expressly consider climate justice and health equity in how the urban water system affects low-income neighborhoods of color.

There are no simple or easy solutions for how to integrate adaptive urban water planning with resilience justice goals, strategies, and actions. But our research suggests that urban water planners are not doing much to assess how their plans and management actions will affect their most marginalized communities, especially under circumstances of crisis. Our resilience justice assessments of the Fresno and Sacramento Urban Water Management Plans demonstrate that urban water planners could engage in systematic critical analyses of their plans' processes, goals, strategies, and implementation actions,

²⁴⁶ Lee, *supra* note 205, at 1013-17.

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using a resilience justice analytical framework. We suggest that our seven questions could guide urban water planners as they develop, review, and modify urban water plans:

- 1) Does urban water planning build marginalized communities' capacities to resist, bounce back from, adapt to, and transform with sudden shocks (or disturbances) and changing conditions?
- 2) Does urban water planning engage marginalized communities' residents in diverse, inclusive, and meaningful ways of participating in policy making and implementation?
- 3) Does urban water planning improve marginalized communities' environmental conditions, including the distribution of and access to green and blue infrastructure?
- 4) Does urban water planning improve marginalized communities' economic, social, and political conditions?
- 5) Does urban water planning reduce disparities in marginalized communities' conditions and capacities?
- 6) Does urban water planning include feedback loops for ongoing monitoring and revisions of the policies and plans, including engagement of marginalized communities' residents and monitoring for marginalized communities' vulnerabilities and adaptive capacities?
- 7) Does urban water planning anticipate, minimize, and mitigate any adverse effects of water plans and water-system management on the resilience of marginalized communities?

We also need to restructure how urban water planning takes place to be less top-down and to integrate the expertise of water managers, engineers, and planners with the bottom-up knowledge, values, and perspectives of community residents in low-income neighborhoods of color. Most community residents do not have the time, resources, or desire to run an entire urban water system, especially when they also want to have input into other urban plans, such as land use, education, neighborhood safety, economic development, watersheds, and the like. But there are several key parts of water-system planning processes that can and should be more inclusive and community-empowering. These include: (1) identifying issues, needs, and vulnerabilities; (2) setting goals and strategies; and (3) monitoring plan implementation and revising the plan accordingly (i.e., feedback loops). Opportunities for the general public to react to expert-developed plans are not sufficient, nor are they equitable.

A growing scholarly literature rejects the binary choices between devolved power to neighborhoods and concentrated power in city or metropolitan-region government. These include work by Sheila Foster

and Christian Iaione on the city as a commons and the right to the city,²⁴⁷ Jaime Alison Lee's Constituent Empowerment Model of urban water systems,²⁴⁸ and our work in the Resilience Justice Project on co-governance as a means of advancing resilience justice.²⁴⁹ These scholars' ideas share much in common, particularly about the need for urban institutional transformations in which governments and other institutions acting with public authority share power with marginalized communities in ways that build power and social capital in those communities.

There are many excellent and varied frameworks of recommended practices for engagement, inclusion, and participation of marginalized community residents in the development and implementation of governance plans. To advance resilience justice, we recommend a co-governance model in which governments partner with neighborhood groups and other grassroots community organizations to organize, equip, and engage residents of low-income neighborhoods of color as co-policy makers with respect to the community conditions and resources affecting them.²⁵⁰ The co-governance model uses many different methods, but has six core features:

- (1) Equitable distribution of power among groups and communities and equitable inclusion of marginalized communities;
- (2) Social-movement mobilization of marginalized communities;
- (3) Democratization of control and power that promotes participation to the maximum amount possible;
- (4) Empowerment of communities and individuals through participatory governance structures and processes;
- (5) Institutionalization of participatory governance structures and processes; and
- (6) Accountability to the public and to the rights of individuals with meaningful legal and political powers of enforcement.²⁵¹

For urban water systems in particular, Jaime Alison Lee has proposed the Constituent Empowerment Model, in which all local-government constituents, but especially low-income residents, residents of color, and elderly residents, are considered the primary focus of the urban

²⁴⁷ Sheila R. Foster & Christian Iaione, *The City as a Commons*, 34 YALE L. & POL'Y REV. 281 (2016).

²⁴⁸ Lee, *supra* note 205, at 1022-23.

²⁴⁹ Arnold et al., *Resilience Justice*, *supra* note 13, at 694-730.

²⁵⁰ *Id.*

²⁵¹ *Id.* at 696.

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water supplier. The urban water supplier is structurally held accountable to consider constituent concerns through a neutral third-party advocate or ombudsperson, who investigates and acts on their behalf through dispute resolution mechanisms, public hearings, and other interventions.²⁵²

Both Arnold's environmental-justice planning for fair and healthy land use²⁵³ and the environmental-justice planning frameworks for revitalized watersheds described by Richard Smardon, Sharon Moran, and April Karen Baptiste²⁵⁴ are multi-method and multi-phase means by which local planners can engage, include, and empower low-income communities of color in planning. These frameworks emphasize the use of many tools and processes to hear marginalized people express their concerns, issues, goals, information, and ideas in their own words. These tools and processes, include engaging marginalized people in process design and agenda-setting, the use of iterative focus groups and charrette processes. Another key method is to include marginalized people in significant numbers in multi-stakeholder collaborative councils and groups. Furthermore, in-depth semi-structured interviews and workshops allow marginalized people to express their voice and influence planning from their own perspectives. There are many other—often similar—frameworks of diverse, inclusive, engaging, and justice-oriented participatory methods in both the scholarly literature and practical publications for planners and other government professionals. Urban water planners have no shortage of good ideas about how to transition from top-down opportunities for the general public to “participate” through reactions to expert-developed draft plans to bottom-up engagement of diverse and marginalized communities in shaping plans and their implementation.

We need to focus on planning reforms, because legal reforms may not change actual urban water planning practices as much as we want or need. For example, in addition to the relatively rigorous legal requirements of the federal Safe Drinking Water Act,²⁵⁵ Fresno and Sacramento officials are already subject to state law requirements to prepare a new or revised urban water management plan every five years, include public participation in water planning, plan for climate change, and incorporate environmental justice into local

²⁵² Lee, *supra* note 205, at 1004, 1022–1044.

²⁵³ See generally CRAIG ANTHONY (TONY) ARNOLD, FAIR AND HEALTHY LAND USE: ENVIRONMENTAL JUSTICE AND PLANNING (2007).

²⁵⁴ See generally RICHARD SMARDON, SHARON MORAN & APRIL KAREN BAPTISTE, REVITALIZING URBAN WATERWAYS COMMUNITIES: STREAMS OF ENVIRONMENTAL JUSTICE (2018).

²⁵⁵ See *supra* Section II.D.

comprehensive planning and environmental impact analyses.²⁵⁶ From a resilience justice perspective, these laws are necessary but not sufficient, as demonstrated by the ways that the Fresno and Sacramento water plans fall short. While strong, well-funded, and well-staffed enforcement of existing laws would be desirable, we know that enforcement persistently falls short and that prevention of harms and injustices is better than corrective enforcement action.²⁵⁷ Justice-oriented and resilience-oriented reforms of planning systems and structures, as well as support for resilience-justice activism and empowerment in low-income neighborhoods of color, do not preclude legal reforms and improved enforcement of existing laws. Nonetheless, many of our water, environmental, and civil-rights laws do not ask the kinds of questions about the systemically unequal vulnerabilities and adaptive capacities of low-income neighborhoods of color to many different conditions and shocks that the resilience justice framework can ask of plans and policies.

VII. CONCLUSION

Reforms to urban water planning are needed to make urban water systems more equitable and resilient for cities' most marginalized and vulnerable communities. Resilience justice is a systems-based concept of justice that addresses the inequitable vulnerabilities of marginalized and oppressed communities, particularly low-income neighborhoods of color, to shocks and disturbances by building these communities' adaptive capacities (resilience) and socio-political empowerment. The application of a resilience justice analytical framework to urban water plans adopted by the California cities of Fresno and Sacramento in 2016 shows that urban water planning often fails to consider the vulnerabilities and resilience of low-income communities of color, adopt equitable strategies to build these communities' resilience, or engage these communities inclusively in the formulation and implementation of urban water plans. The resilience justice concept, the analytical framework we applied in our Fresno and Sacramento assessments, and the planning reforms that we have proposed in this Article could help to make urban water policies and management more equitable and simultaneously enhance the resilience of urban water systems and cities' most marginalized and vulnerable communities.

²⁵⁶ See *supra* Section II.C.

²⁵⁷ See, e.g., the Flint drinking water crisis discussed in the Introduction of this Article and the sources cited in *supra*, note 8.

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