

# A Time of Opportunity

**Water, health, and equity in the Los Angeles region**

Case statement prepared for the Water Foundation

## FUNDING AND AUTHORSHIP

### PREVENTION INSTITUTE

#### Written by Prevention Institute.

Principal authors: Elva Yañez, Rachel Bennett, Eric Bruins and Manal J. Aboelata.

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#### For further information, contact Robert Baird:

[rob@preventioninstitute.org](mailto:rob@preventioninstitute.org)

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Photo credit: Los Angeles County  
Department of Public Works

# The Landscape of Water in Los Angeles

## Toward a Healthy, Equitable, Resilient Future

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*Water resilience includes “integrated strategies to increase drought preparedness and local water self-reliance, improve water quality to protect public health and the environment, and support communities’ abilities to adapt to the effects of climate change.”*

— LA County Department of  
Public Works, 2016<sup>1</sup>

Water resilience is an ambitious goal for Los Angeles County. The region’s history is intrinsically linked to its thirst for imported water—water that has flowed first from the Owens Valley, then the Colorado River and the Sacramento–San Joaquin River Delta—that enabled the growth of agriculture and then urbanization at a scale beyond what local water sources could sustain. Achieving water resilience means defying this history of dependence and returning to a time when local water supplies sustained a greater share of the region’s population and economy, a considerable challenge given LA County’s twenty-fold increase in population in the last century.<sup>2</sup> It also means surmounting multiple challenges on the landscape: dependence on energy-intensive and increasingly unreliable imported water, more extreme cycles of drought and deluge, contamination of waterways and groundwater basins, and fractured treatment and distribution systems that leave some communities without reliable access to clean, safe, and affordable drinking water. In the coming decades, a changing climate will only exacerbate these challenges. To address these threats,

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*“Health equity means that every person, regardless of who they are—the color of their skin, their level of education, their gender or sexual identity, whether or not they have a disability, the job that they have, or the neighborhood that they live in—has an equal opportunity to achieve optimal health.”*

— Braveman, Kumanyika, Fielding, et al., 2011<sup>4</sup>

environmental organizations and—more recently—government officials have promoted the concept of water resilience to bolster local water supplies and protect the system against changing conditions.

This monumental undertaking to reshape the region’s water supply has significant implications for every community in the county, but even more so for those that already bear the burdens of inequitable access to safe, clean, and reliable water. At the core of this new approach is looking at water as an integrated system, rather than through more traditional divisions between stormwater, groundwater, drinking water, and wastewater.<sup>3</sup> This paper contemplates a more inclusive approach to resilience that connects the dots between water supplies, delivery systems, and the health equity implications of new infrastructure investments.

This paper also takes into account the potential for inequities in one part of the water system to seep into the others. An equitable approach to water resilience recognizes the full spectrum of disparate environmental conditions that negatively impact the health of low-income communities of color—such as the overconcentration of air, soil, and water pollution as well as the lack of environmental amenities—and takes the necessary precautions to ensure that system-level solutions do not compound or exacerbate these inequities.<sup>5</sup> On the other hand, more holistic planning offers an opportunity to integrate equity into water resilience efforts and catalyze other benefits of green infrastructure, such as parks and open space, good jobs, and cleaner air.<sup>6</sup> Integrated watershed management also provides a forum for agencies that otherwise wouldn’t coordinate to tackle problems that are bigger than their individual missions, collectively reinforcing resilience.<sup>7</sup> Coordinated response to multifaceted public health threats, such as lead poisoning from paint, plumbing, and soil contamination, ultimately pays off down the road through reduced health costs and increased productivity.

A number of questions guided our research on water, health, and equity in Los Angeles:

- What is the relationship between water-related inequities experienced in low-income communities of color and planned investments in water-related infrastructure improvements?
- How do the costs and benefits associated with these infrastructure improvements align with these inequities as well as the region’s stark disparities along racial and income lines?
- What does it mean from a strategic standpoint to assert the importance of water as a determinant of health?

- How do we leverage the basic awareness that water is essential for health to build public support and momentum to create governance, local capacity, political will, and financing infrastructure to create, operate, and maintain a health-producing water system?
- Finally, how do we adapt the current technical framework of resource management and regulatory compliance to elevate and prioritize community health so that communities can be more effectively engaged in the issues that impact them?

Aside from the technical merits of considering water supply, water quality, and other environmental justice issues together, applying a health lens to water issues yields strategic opportunities to build a bigger coalition and leverage public interest in health and safety into political support for water infrastructure improvements and other resiliency measures. While environmental health issues can be powerful motivators that resonate with affected communities, spurring involvement of community-based organizations and ultimately translating into stakeholder participation in decision-making and electoral mobilization, strategic framing of the problem and its solution is critical to meaningful engagement. The connection between stormwater—and a new stormwater measure—and what it means for the drinking water coming out of people’s taps, green spaces in their neighborhoods, and jobs to support their families may not be readily apparent without greater cross sector learning and public education. Simply put, if issues most relevant to LA’s diverse low-income voters are not addressed, it will be difficult to get these communities and their organizational representatives engaged on other, less visible aspects of water infrastructure. Capitalizing on the salience of drinking water concerns requires connecting these dots, not only for local residents but also for the professionals that work on various aspects of our complex water system.

As we explore comprehensive solutions to LA County’s water challenges, we see a tremendous technical and political value in expanding the conversation to address related issues with demonstrable voter support, in particular: parks and open space, jobs, and public health. Importantly, development of a water measure should follow a community-centered approach that incorporates public participation in decision-making with an intentional, prioritized focus on ensuring equity for those communities that currently face or are most at risk for water-related inequities. Efforts to make the region’s water system more resilient must address equity head-on so that all LA region residents benefit from reliable access to clean, safe, and affordable water.



Photo credit: Andrea Jaramillo

# Water is a Determinant of Health

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*“There is nothing more fundamental than having a safe supply of water for yourself, for your family, for businesses to thrive, and for communities to thrive.”<sup>8</sup>*

— Key informant

Globally and locally, the challenges of water in the 21<sup>st</sup> century are one of quality, quantity, and equitable access. A large body of evidence demonstrates that access to and availability of clean, safe, and affordable water is a fundamental human need, essential for life, well-being, individual health, and population health. When asked about the relationship between water and health, our key informants were unequivocal in their responses. “Water is life,” said one.<sup>9</sup> “It is *the* fundamental basis for healthy communities,” said another.<sup>10</sup> In fact, the growth in understanding of the mechanisms linking water and health has contributed to the science of public health and the discipline of epidemiology. According to the Centers for Disease Control and Prevention, water treatment played an integral role in three of the “Ten Great Public Health Achievements in the 20<sup>th</sup> Century”: control of infectious diseases, healthier mothers and babies, and fluoridation of drinking water to prevent tooth decay.<sup>11, 12, 13</sup>

It is well-documented that in the absence of clean drinking water, people are at risk for a range of health problems, including but not limited to dehydration from a lack of adequate fluid consumption;<sup>14</sup> gastrointestinal and respiratory illnesses and eye, ear, or skin infections from exposure to waterborne pathogens;<sup>15</sup> neurological, immunological, dermatological, and reproductive problems from consumption of or contact

with water contaminated by lead;<sup>16</sup> cancers from exposure to various toxins in water;<sup>17</sup> and dental caries, increased risk of type-II diabetes, and childhood obesity from consumption of sugar-sweetened beverages in place of water.<sup>18,19</sup> When people do not trust the quality of their tap water, they purchase retail or bottled water. However, even though bottled water is far more expensive than tap water, less information is required to be disclosed about bottled water quality, it is less stringently regulated than tap water in some respects,<sup>20,21</sup> and, in some cases, bottled water is itself contaminated.<sup>22,23,24</sup> Bottled water also often lacks fluoride, an essential nutrient for oral health, particularly among children.<sup>25</sup> The cost disparity is enormous: in LA County, the average price per gallon of tap water is approximately one-half cent, versus 35 cents at a retail water facility and over two dollars for bottled water sold at grocery stores.<sup>26,27</sup> Low-income families' reliance on purchased water creates a financial burden, affecting their ability to pay for other daily essentials, such as food, transportation, education, and medical care.<sup>28</sup>

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*“Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.”*

— World Health Organization, 1946<sup>29</sup>

Many of the aforementioned health impacts associated with water are influenced by policies, practices, and norms across multiple sectors, such as natural resource management, public works, parks and open space, transportation, planning, public health, private water purveyors, the beverage industry, and other private-sector actors. These conditions are not exceptional or unique to Los Angeles: they reflect the systematic production of inequities through historical and current-day policies, practices, and procedures throughout the United States. It is no surprise, then, that water-related health inequities mirror those of other inequities in the built environment. Too often, low-income communities and communities of color are starved for health-promoting resources and infrastructure like healthy food, safe parks, clean air, and quality housing—and they are overburdened by concentrations of unhealthy land uses such as liquor stores, hazardous waste storage, and industrial facilities that emit toxic pollution. As one key informant, a public health leader, emphasized: “Water is a primary determinant of health.”<sup>30</sup> And yet water quality is often viewed as a technical problem, rather than a community health issue with social and economic ramifications. The reasons that some communities lack access to high-quality water are so intertwined with socioeconomic and political factors that a more comprehensive perspective is needed.

Looking at water issues through a public-health framework entails a solution-oriented approach that:

- Examines data on the health and health equity impacts associated with water;

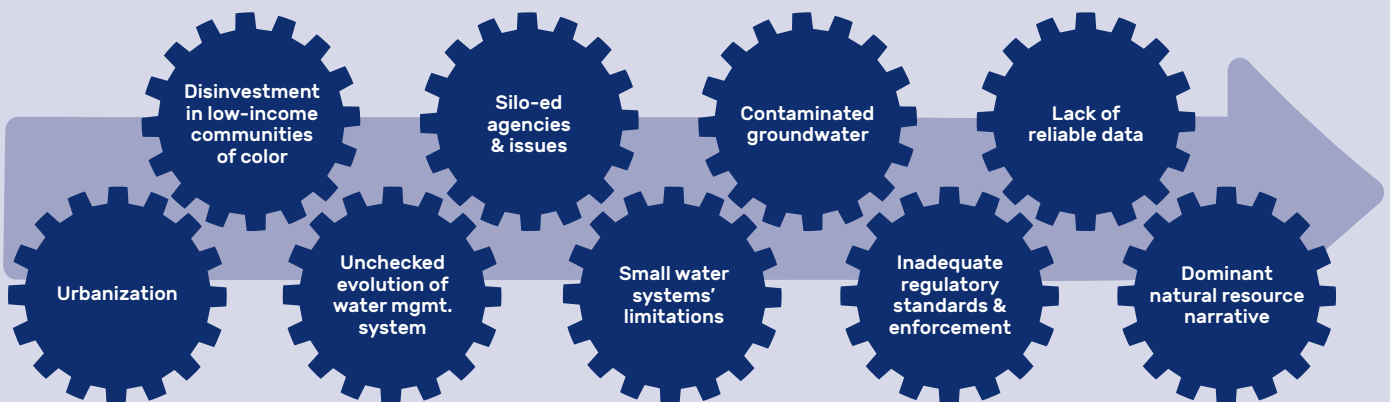
- Identifies the root causes of water-related inequities;
- Lays out the risk factors for water-related health conditions and resilience factors that protect against those risks;
- Uses this information to identify strategic actions with a specific focus on prevention, systems and policy change, community resilience, and harm reduction for those most impacted; and
- Identifies all the players that need to be involved to address the issue comprehensively.

Such an approach creates new opportunities to support a healthy, equitable, resilient Los Angeles region and create the ‘big tent’ needed to engage relevant stakeholders. To better understand the perceptions and evidence about water and better articulate a public health approach, we undertook a qualitative research project to explore and document barriers and opportunities on the current landscape.

## The Production of Inequities in the Water System

The graphic of gears in the diagram below illustrates a sampling of policies, practices, and norms that have contributed to the production of inequities through the water system. Like the gears of a machine, these factors are interrelated and exacerbate one another. These forces most often conspire against people of color and low wage earners to diminish opportunities and outcomes, but the production of inequity also marginalizes other groups based on income, social status, and additional factors. But just

as health inequities have been created, there are strategic intervention points and pathways to produce a healthy, equitable, resilient water system. In such a system, both the tools of water-related fields and the processes through which they work can increase community access to health-promoting resources while protecting people from hazards. Achieving this in Los Angeles requires comprehensive, integrated solutions developed with the participation and consent of all segments of the population.



Selected Factors That Have Produced Water Inequities in the Los Angeles Region



Photo credit: iStock

## Our Approach

With support from the Water Foundation, Prevention Institute completed a landscape analysis focused on water, health, and equity in the Los Angeles region. Our process consisted of a series of key informant interviews and a rapid review of the literature. The purpose of this qualitative research effort was to better understand how key informants operating in the region view the links between health, equity, and water to inform a strategic framework for robust and diverse outreach, engagement, and advocacy related to future water infrastructure investments.

In consultation with Cecilia Estolano, a consultant to the Water Foundation who has extensive experience in economic development, urban revitalization, and environmental issues, Prevention Institute staff identified a list of 15 potential key informants based on our knowledge of organizations and individuals working in the region. As a composite, the interviewees represent various sectors working in the water arena, geographic diversity, different facets of the water system, and the kinds of organizations that could potentially be engaged as part of a diverse, multi-sector collaboration around water issues. Prevention Institute staff developed and sent a formal invitation to these 15 individuals; almost all responded favorably. We interviewed a total of 15 individuals, representing 13 institutions. The following list outlines the organizational and content expertise of the key

informants interviewed. Each individual interviewed is a recognized expert in their field.

- 3 representatives of non-governmental organizations (NGOs) working on water/environmental issues
- 3 representatives of NGOs working on social justice issues
- 2 representatives of NGOs working on public health issues
- 2 representatives of a government agency working on public health issues
- 1 representative of a NGO working on air quality/environmental justice issues
- 1 representative of an academic institution working on water/urban planning issues
- 1 representative of a public utility agency
- 1 representative of a private funder working on water/environmental issues
- 1 elected official representing a small city in LA County

Drawing upon Prevention Institute's expertise conducting qualitative research as well as project staff experience with stormwater public finance measures, we developed a set of questions and prompts to guide the series of semi-structured interviews. The interview guide, found in Appendix A, was designed to garner rich, relevant data regarding:

- The work of the interviewees and their water-related activities and priorities;
- The water-related priorities of their constituents;
- Their understanding of the links between water and health;
- Water-related health disparities and inequities experienced in the Los Angeles region;
- Challenges and barriers to engaging low-income communities of color and the organizations that represent them in efforts to improve water quality, infrastructure, management and climate change resiliency;
- What they considered to be best or promising practices linking water and health in these communities;

- Their perspectives on groups that have excelled in making the connection between water and health;
- Challenges to broad-based collaboration;
- Best practice strategies and approaches to multi-sector collaboration to advance community health or the environmental factors that influence it; and
- Other related issues of significance to the interviewee.

Prevention Institute analyzed the interview findings for recurrent themes that served as the basis of our analysis. Additionally, we conducted a scan of the literature to provide additional context for our analysis and to better understand the state of the field and evidence base from the perspective of available literature. Sources included scholarly and grey literature from fields including natural resources management, environmental justice, public health, environmental law, urban planning, and more.

Interestingly, none of the interviewees raised wastewater as a current issue with health inequity implications. Clearly wastewater is an important part of the water system with many links to health. As previously mentioned, controlling infectious diseases through the proper handling and treatment of sewage is responsible for many of the greatest public health advances in the 20<sup>th</sup> century. However, unlike many older cities on the East Coast, the Los Angeles region has separate sanitary sewer and storm drain infrastructure, preventing many of the health issues that still occur in other places where heavy rain events can cause untreated sewage to run into waterways. Wastewater does still alter natural waterway function where treated effluent is released into rivers, providing an artificially higher base flow rate in rivers during the dry season. Treated wastewater also provides an opportunity for recycling and groundwater recharge. In our research, we did not come across evidence that wastewater systems contribute to health disparities in LA County; therefore, we did not explore these issues further. We don't intend to assert that relevant health concerns don't exist, but do note that it was not a focus of the current research, nor was the issue explicitly raised by key informants.



Photo credit: Getty Images

# From Source to Tap

## Issues and Opportunities Related to Drinking Water and Health Equity

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*“Drinking water has slipped through the cracks.”<sup>31</sup>*

— Key informant

The conversation around water resilience in Los Angeles has largely overlooked the part of the water system with the most relevance to the average resident: drinking water, including the treatment and distribution infrastructure that converts water supplies into the potable drinking water that comes out of the faucet. Every community’s geography, governance, and demographics affect its relationship to water. This relationship is informed by direct experience with the water coming out of the tap, as well as general education, awareness, and cultural attitudes about water issues.

Moving toward a more water resilient future requires recognizing that communities are not all starting from the same place. Based on their research in California’s Central Valley, Carolina L. Balazs and Isha Ray developed the Drinking Water Disparities Framework, which illustrates how natural conditions, the built environment, and socio-political factors operating at the regional, community, and household levels all interact to create and reproduce inequities in drinking water.<sup>32</sup> This framework is equally applicable to urban communities in LA County. It is the combination of greater exposure to contamination plus a lower capacity to cope with that pollution load that

produces a composite burden for low-income communities of color. Through action—or inaction—state, county, and municipal agencies and individual households all play a role in determining levels of exposure to pollutants and the capacity to implement coping mechanisms (including ‘coping’ strategies at the community level, such as improving water treatment processes, or at the household level, such as purchasing bottled water). The framework further illustrates how one actor’s lack of capacity (e.g., state regulators) creates additional burdens on others (e.g., households) to compensate.

Problems that disproportionately affect low-income communities of color identified by informants and in the literature review include:

- Contaminated soil and aquifers<sup>33,34</sup>
- Inadequate or unmaintained infrastructure, including distribution systems and on-premise plumbing<sup>35</sup>
- Under-resourced water agencies<sup>36,37</sup>
- Greater reliance on poor quality water sources<sup>38</sup>
- Lax oversight of water utilities and older housing stock<sup>39</sup>
- Greater vulnerability compounded with other exposure to environmental health risks, including cumulative risks from toxics in water, air, and soils, lead in housing, and other sources<sup>40,41</sup>
- Distrust and perceptions that may or may not reflect actual health risks<sup>42</sup>
- Less access to quality health care to prevent and address the impacts of exposure<sup>43</sup>
- Fewer economic resources to address these issues<sup>44</sup>

These problems manifest themselves differently in each community. One of the knottiest challenges in addressing drinking water quality is untangling the relationship between perceived water quality issues and measurable health risks. As discussed below, both actual contamination and perceived poor water quality affect how the community interacts with water, with real health consequences. Strategies to restore the relationship between communities and their water must ensure that the water is clean and safe enough to deserve the community’s trust. Even after infrastructure improvements are made, it will take time for attitudes and behavior to adjust. Healing this relationship will take culturally and socioeconomically relevant public engagement and education over time.

## Prevalent Distrust of Drinking Water

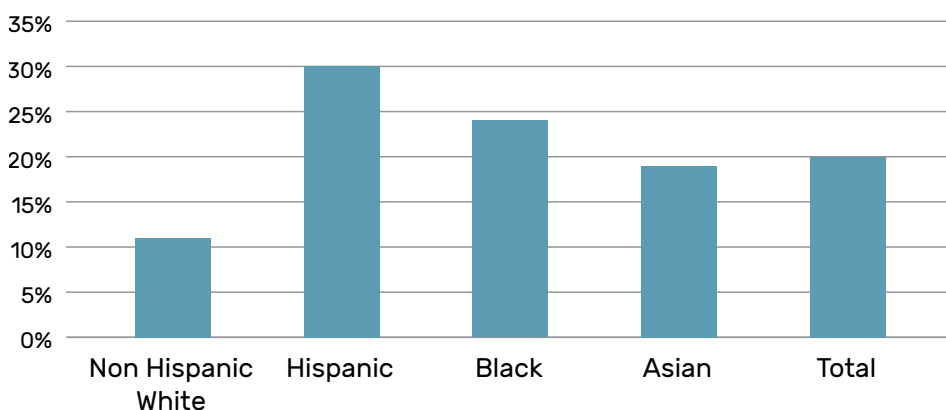
According to the 2015 American Housing Survey, one in five households (20%) in the Los Angeles-Long Beach metro area reported that they believe their water is not safe to drink, almost three times the national average.<sup>45</sup> About a third of adult respondents (34%) to the 2015 LA County Health Survey reported that regular tap water in their community was “not too safe” for drinking (as compared to “somewhat safe” or “very safe”, and 46.% reported that they use only bottled or delivered drinking water at home.<sup>46</sup> The data are even more stark when disaggregated by demographic factors, such as race/ethnicity, housing tenure (ownership status), and household income:

- One in three Hispanic households (30%) and one in four Black households (25%) in the Metro Area reported their water is not safe to drink, compared to one in nine non-Hispanic White households (12%). (A separate study conducted by the Los Angeles County Department of Public Health found that half of Latino adults (50%) and more than a fifth of African-American adults (22%) reported their tap water was “not too safe” to drink, compared to less than a fifth (19.5%) of White adults.)
- One in four renters (25%) in the metro area reported their water is not safe to drink, compared to one in seven homeowners (14%).
- About twice as many low-income households (those that earn less than \$50,000 per year) in the metro area reported their water is not safe to drink, compared to those earning more than \$50,000 per year.

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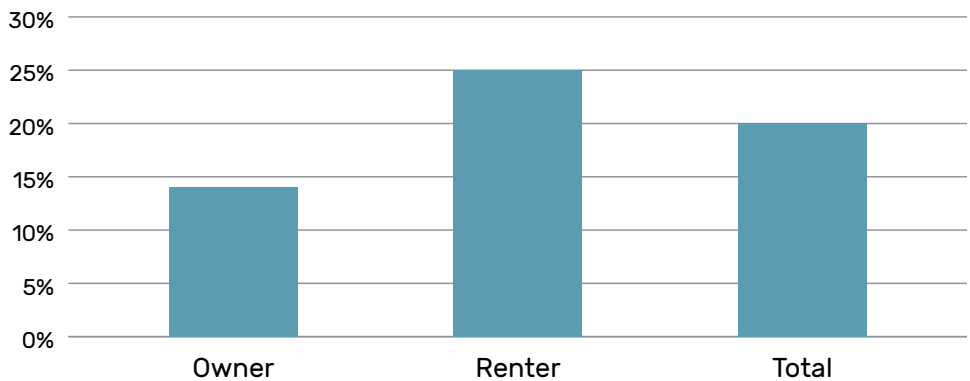
### Households Reporting Water that is Not Safe to Drink by Race/Ethnicity

Source: American Housing Survey, 2015<sup>47</sup>



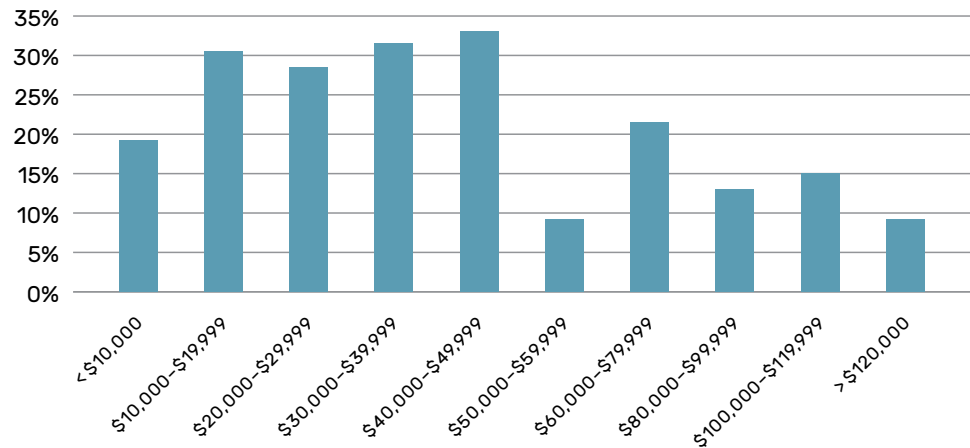
## Households Reporting Water that is Not Safe to Drink by Tenure

Source: American Housing Survey, 2015<sup>48</sup>



## Households Reporting Water that is Not Safe to Drink by Household Income

Source: American Housing Survey, 2015<sup>48</sup>



These metropolitan area aggregate statistics conceal deep geographic disparities within the region. In Watts, for example, an area that is heavily impacted by poor water quality and other land-use and environmental inequities, Physicians for Social Responsibility conducted a small-scale assessment of Jordan Downs public housing residents in 2016-17. Preliminary results of that assessment indicate that the residents' perceptions of and trust in their water supply are significantly worse than countywide figures. Almost all residents surveyed (95%) reported not feeling safe drinking tap water, and nearly two-thirds (62%) said they are not comfortable using it for cooking.<sup>50</sup> Almost nine in 10 (87%) reported that their tap water was brown, rusty, or murky, and all said that they purchase bottled or other retail water.<sup>51</sup>

## Maywood

Maywood—a small, densely populated city southeast of downtown Los Angeles—illustrates many of the interrelated challenges around drinking water. Maywood’s population of 27,000 is almost entirely Latino, with just over half the population foreign-born.<sup>52</sup> Economic and educational outcomes are strongly correlated with positive health outcomes,<sup>53</sup> and Maywood residents have lower income and educational attainment than County averages: one in four Maywood residents live below the poverty level and two-thirds of households earn less than \$40,000 per year.<sup>54,55</sup> Just 38% of the city’s residents have completed high school, compared to 76% of County residents.<sup>56</sup> Notably, rates of childhood and adult obesity are higher in Maywood than the County as a whole, as are death rates due to type-II diabetes and heart disease.<sup>57</sup> While diabetes ranks as the seventh leading cause of death in LA County, it is the second leading cause of death in Maywood.<sup>58</sup> It is well recognized in the public health field that factors in the community environment—such as limited access to healthy food and beverages,

or a lack of safe places for physical activity—underlie high rates of preventable chronic diseases like type-II diabetes.<sup>59</sup>

Maywood’s population faces additional health risks from their drinking water supply. The city is served by three private water utilities, despite being only one square mile in size. Unlike most nearby service providers, Maywood’s water companies rely exclusively on local groundwater even though the area has an extensive history of soil and water contamination from industrial activity and a merged aquifer that allows contaminants to flow between shallow levels and deeper ones that supply drinking water. Before treatment, wells exceed standards for Manganese and Trichloroethylene (TCE) by more than 1,000 times the legal limit.<sup>60</sup> Residents frequently complain about brown, bitter-tasting tap water, sometimes with visible particles floating in it. Many have stopped owning white clothing because it gets stained when washed. Yet despite obvious water quality issues, the utilities insist it meets all federal standards.<sup>61</sup>

## Socioeconomic and Cultural Factors

A recurring narrative, found particularly in low-income and immigrant communities, is that tap water is unsafe or untrustworthy.<sup>62</sup> Studies have found that Latinos and African Americans are more likely than other racial/ethnic groups to exclusively drink retail or bottled water, with Latinos being most likely to do so, and that the lowest income Latino households do so to the greatest degree.<sup>63,64</sup> Issues of mistrust stem from historical, cultural, as well as present-day experiences. “If people’s water tastes, looks, and smells bad, it reinforces the perception that it is unsafe and untrustworthy,”<sup>65</sup> said one key informant. Although several interviewees pointed to a lack of public awareness about municipal water supplies generally being a clean and healthy drinking option, one researcher we spoke with said that, “Communities

with lower levels of education and higher levels of foreign born population tend to mistrust their water irrespective of the actual water quality.”<sup>66</sup> Another key informant echoed this, saying, “In Mexico, you can’t drink the water, not from the *manguera* [tap/hose].”<sup>67</sup> One interviewee who works in government and who has water delivered to his own home, said, “we don’t even drink the tap water at all... I just take for granted that I have this service that drops off three huge bottles for our family every month and I just pay the cost.”<sup>68</sup> Another remembered, “when I grew up, I heard, ‘don’t you drink that tap water!’ It was a water quality and safety issue we faced.”<sup>69</sup> That is a common experience across Los Angeles, but one with hidden economic and health impacts. Given the drinking water quality inequities many low-income communities face, it is no surprise that people turn to bottled water. “But that’s not really the solution,” said one interviewee. “The solution is that we should be making our tap water safe.”<sup>70</sup> Whether or not people’s perceptions are accurate according to water quality tests or to people working in or with water systems, it is essential to embrace the reality that people—regardless of income, race/ethnicity, or country of origin—want and expect high quality water which includes so-called aesthetic issues like taste and color.

## Small Water Systems and Outdated Infrastructure Exacerbate Inequities

The region’s water quality problems are generally concentrated in South and Southeast LA County, particularly in small, low-income cities. Key informants repeatedly mentioned El Monte, Gardena, Inglewood, Maywood, and Watts, as well as the Antelope Valley, as specific examples of communities with persistent drinking water concerns. Small water companies that serve low-income communities of color generally lack the funding, management, and technical expertise to address water quality issues. The region’s larger systems have the resources to develop imported water sources, which are generally cleaner and require less treatment before use, while smaller systems rely on poorer quality water sources that require more treatment. These systems don’t have the same economies of scale as their larger counterparts, making treatment more costly and leaving less funding for maintenance of the distribution system to ensure that water is still safe by the time it reaches consumers’ taps. The net result is that some of the most vulnerable communities in LA County must pay higher rates for lower quality water—water that they often aren’t willing to drink.<sup>71</sup>

Some of the hardest inequities to address are those that have no regulatory tools, yet these preventable differences have real impacts on community health. Secondary contaminants affect the taste, smell, and color of tap water, but amelioration isn't required by the federal Safe Drinking Water Act.<sup>72</sup> In places like El Monte, Gardena, Inglewood, Maywood, and Watts, the water can come out of the tap brown and bitter tasting—and for all practical purposes undrinkable—without violating primary drinking water standards.<sup>73</sup> Even if there isn't technically a violation, these contaminants sow distrust among affected residents, leading them to pay for more expensive retail water. Furthermore, when resident complaints go unanswered, it only reinforces distrust of government agencies within disenfranchised communities.<sup>74</sup> As one key informant reflected, "If I am a member of the public, I'm not concerned about whether some industry's meeting the regulations. I want to know whether my health is being impacted."<sup>75</sup>

Adding complexity to this issue, some water quality problems may be caused by contaminated soil that permeates distribution pipes after the point of treatment, or contamination may also be introduced by on-premise pipes and fixtures in older housing units that haven't maintained or replaced their plumbing.<sup>76,77</sup> The latter is the responsibility of the property owner (in some cases, the city or county housing authority or Housing and Urban Development) rather than the utility. As a result, the customer may still receive contaminated drinking water even when the water utility is delivering safe and clean water to the property. Many small utilities do not have the resources to do the forensic testing needed to identify sources of contamination after treatment, and aren't required to do so, by law. Without stronger regulatory tools, more public oversight, and effective advocacy, these systems have little incentive to do more than meet bare minimum standards.

The connection between system size and water source is critical in the context of water resilience. Urbanization has irreversibly altered Los Angeles' hydrology. Reintroducing more natural processes back into the built environment is a critically important approach for a resilient water future, but does not come without risk, especially in areas with groundwater contamination. While the complexity of these issues are beyond the scope of this paper, it goes without saying that local water systems need the resources and capacity to ensure that groundwater contamination is documented, monitored, treated and stormwater infiltration issues addressed appropriately.<sup>78,79,80</sup>

## Economic Impacts

People's lack of trust in the safety of their tap water results in a reliance on purchased water from retail sources. On top of the higher water rates described above for people served by small water systems which disproportionately serve smaller, low-income cities or unincorporated communities, this places a disparate financial burden on families who must spend scarce household resources on water—an issue that every single key informant spoke about in our interviews. One described that, “in many communities where people don’t trust the water, they spend a significant chunk of their very limited resources on bottled water. This is a real issue if you are living on a fixed income of \$10,000 or \$15,000 for a family and you are spending hundreds of dollars on bottled water in addition to having to pay for your water bill. It’s a significant problem.”<sup>81</sup> A Pacific Institute study that examined expenditures on retail water found that low-income Latino communities spend an average of four percent of their household income on drinking water.<sup>82</sup> This significantly impacts people’s ability to pay for other basic needs in addition to paying their water bill and traveling to purchase water detracts from time spent with family.<sup>83, 84</sup>

## Beverage Industry Marketing

In *Forcing the Spring: The Transformation of the American Environmental Movement*, Robert Gottlieb describes the aggressive marketing of bottled water in low-income communities and how it exacerbates public concerns about tap water, particularly among “immigrant communities that had experienced significant water quality problems in their home countries.”<sup>85</sup> A narrative reinforcing mistrust of tap water, and some communities’ preference for purchasing retail water, is influenced in part by beverage industry marketing practices. Local neighborhood water stores and multinational beverage corporations alike perpetuate messages that retail and bottled water are healthy choices. Companies like Coca-Cola and PepsiCo dedicate as much as \$20 million annually to marketing their bottled water products. These investments have big payoffs; recent industry figures show that bottled water is the best-selling beverage in the nation, with annual sales topping \$15 billion.<sup>86</sup> As noted nutritionist and public health advocate Marion Nestle describes, “Up to 40 percent [of bottled waters actually] start out as tap water.”<sup>87</sup> Beverage companies typically draw water from municipal supplies, clean or filter it, add minerals, and repackage and sell it, “with profit margins of 20 to 60 percent.”<sup>88</sup>

In Los Angeles, as Gottlieb explains, private water companies have “at times engaged in misleading marketing practices or failed to inform the public about the purity of their product,” exploiting communities’ fears about water quality and the taste and odor problems people experience, and making a huge profit.<sup>89</sup> One key informant emphasized that water agencies have not done enough to “market” tap water, which costs a fraction of bottled water, adding that the \$15 billion consumers spend on bottled water annually represents a huge loss of potential revenue to fund public water system repairs.

## Public Health Impacts

From a public health perspective, the preference and push towards retail water can be problematic for several reasons. First, quality standards for tap water are monitored more stringently and more frequently than for bottled water.<sup>90</sup> In 1999, in the most comprehensive independent testing of bottled water in the U.S., the Natural Resources Defense Council (NRDC) tested over 1,000 bottles of 103 brands of bottled water and found that one-third “contained significant contamination (i.e., levels of chemical or bacterial contaminants exceeding those allowed under a state or industry standard or guideline).”<sup>91</sup> Several other independent studies have confirmed NRDC’s findings over time.<sup>92, 93, 94</sup> Marion Nestle explains that, “Under current federal regulations, bottled waters do not have to be tested as rigorously as tap waters or disinfected to the same extent... the bottled water industry is largely self-policed.”<sup>95</sup> This is in part due to the fact that the Food and Drug Administration is responsible for regulating the safety of bottled water, and their standards are less stringent than the Environmental Protection Agency’s (EPA).<sup>96</sup> In Los Angeles, retail water facilities (neighborhood water stores) are much more common in predominantly low-income communities of color.<sup>97</sup> This land use and zoning issue impacts health because, as a 2004 study found, nearly two-thirds of filtration machines at LA water stores showed evidence of fungal growth, and nearly one-third had either coliform growth or turbidity in excess of EPA guidelines, all of which may cause gastrointestinal health impacts for consumers.<sup>98</sup>

A second public health concern is that the process by which retail and bottled water is filtered often removes minerals that support health including fluoride, calcium, and magnesium.<sup>99</sup> Fluoride, in particular, is an essential nutrient for oral health. Studies have found an association between communities that rely solely on purchased water and the

incidence of tooth decay, an often overlooked public health problem.<sup>100</sup> The American Medical Association has highlighted the particular risk this presents for child and adolescent health.<sup>101</sup>

A third, more commonly recognized problem is the consumption of sugar sweetened beverages in place of water, which is associated with elevated rates of obesity, type-II diabetes, and other chronic diseases.<sup>102</sup> As one key informant described, “I don’t hear any household saying, ‘my tap water is terrible, but I still drink it.’ They go out and buy other water. There is almost always a health impact because people are drinking less water and more sugar-sweetened beverages.”<sup>103</sup>



Photo credit: Los Angeles County  
Department of Public Works

## Clean, Fair, and Healthy Issues and Opportunities Related to Stormwater and Health Equity

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*“It is not only the responsibility of government to protect its citizens from air and water pollution and harmful toxic chemicals and water, but also government must ensure that certain segments of society do not receive less protection than others.”*

— Water, Place, and Equity, 2008<sup>104</sup>

The Los Angeles region is under increasing pressure to capture more stormwater to meet water quality regulatory standards, increase water supply, and reduce flood impacts. Using both federal law (commonly known as the Clean Water Act) and state law (under the Porter-Cologne Water Quality Control Act), the State Water Resources Control Board regulates water quality and beneficial uses of California water. The Los Angeles Regional Water Quality Control Board implements these federal and state water policies in the region by regulating discharges from municipal separate storm sewer systems (MS4's). The National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater permit for MS4's sets stormwater quality standards for the region, requiring a significant decrease in pollutants. The 2012 permit designates the LA County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the flood control district as permittees.<sup>105</sup>

This system of federal and state regulation has resulted in debate over the responsibility of local jurisdictions to control the volume of stormwater discharges as well as the approaches to capture, cleanse, and

## Stormwater and Public Health

Untreated urban runoff is the leading source of pollution affecting Los Angeles' rivers, creeks, and ultimately the ocean and our region's iconic beaches.<sup>108</sup> Untreated urban runoff can contain trash, animal waste, pesticides, fertilizers, bacteria, petroleum hydrocarbons, and toxic heavy metals (including lead, mercury, chromium, and arsenic), leading to well documented health risks.<sup>109,110</sup> Exposure to recreational water polluted by urban runoff can result in several types of serious illnesses including gastroenteritis, respiratory illness, hepatitis, and eye, ear and skin infections.<sup>111,112,113</sup> Children, pregnant women, the elderly, and immunocompromised people are at greatest risk from waterborne pathogens.<sup>114</sup> In communities further upstream, urban runoff can also lead to pooling of water near homes and schools creating breeding grounds for mosquitoes, which are vectors of numerous infectious diseases.<sup>115</sup> This is particularly problematic in communities that lack parks and green space, where children may play in stormwater channels, local rivers and washes, and be exposed to myriad health risks.<sup>116</sup>

Inadequate stormwater management can result in flooding during storms, which has public health and economic impacts—events that are projected to increase in frequency with climate change. Droughts, too, are projected to increase with climate change, and will impact communities' access to clean, affordable drinking water. As water becomes increasingly scarce and expensive, food costs will increase, all of which will disproportionately affect the health and economic stability of low-income populations.<sup>117</sup> Additionally, in communities where access to recreational water spaces is limited or non-existent, children and adults may be less likely to know how to swim, which increases the risk of drowning when people do encounter water.<sup>118,119</sup> Increasing communities' access to multi-benefit "green" infrastructure creates opportunities for people to socialize and be physically active, activities that are important for preventing and managing a range of illnesses and injuries.<sup>120,121</sup> Such spaces also provide opportunities for stormwater capture, groundwater recharge, native plant habitats, air purification, shade from heat, and a reduction of the urban heat island effect.<sup>122</sup>

restore water, while mitigating flood risk. Complicating this situation, with few exceptions local governments have no dedicated funding source for the infrastructure improvements required to prevent and mitigate stormwater pollution to comply with the MS4 permit. Unlike utility services, where there is a clear fee tied to the use of a service, stormwater improvements provide general benefits that don't fit a fee-for-service utility model. In California, Proposition 218 limits the ability of local agencies to raise revenue from property-related fees without voter approval. Moreover, stormwater management is highly fragmented, involving multiple actors and sectors including non-profit organizations, businesses, residents, water utilities, elected officials and legislative bodies, and government agencies—operating at all



Photo credit: Los Angeles County Department of Public Works

levels of government—local, regional, state, and federal.<sup>106, 107</sup> Although many of our key informants identified stormwater pollution as a key issue in their work, when asked about water-related disparities in the LA region, the majority focused on drinking water and did not mention stormwater disparities or their associated health inequities. This highlights a key gap in the knowledge base and an opportunity to educate professionals and community members alike.

## Traditional Approaches to Stormwater Management

In general, stormwater policy in Southern California has overlooked environmental justice and equity issues. A key factor is that neither the Clean Water Act nor the Porter-Cologne Act requires policymakers to take environmental justice problems into consideration in the development and implementation of rules and regulations concerning water quality.<sup>123</sup> Inattention to environmental justice and equity issues related to stormwater policy is also reflective of state and federal environmental policy frameworks, which do not take into account fundamental elements of an environmental justice analysis framework—place of residence, as well as economic, racial, and ethnic disparities. Other institutional barriers to equitable stormwater policies include the highly fragmented and silo-ed nature of water management, the guarded decision-making practices of government agencies, and the marginalization of stakeholders, particularly low-income communities of color, in decision-making.<sup>124</sup>

The problem of polluted stormwater runoff in the LA region is unlike traditional environmental justice issues in that pollution impacts are not fixed at the source point of pollution—that is, the place where rain falls, runoff originates, or factories discharge. As a result of natural water flows and engineered conveyance systems, the toxins, bacteria, and pathogens transported by stormwater and urban runoff accumulate at local beaches and nearby ocean waters. Nonetheless, race, class, and inequalities in wealth and power to influence government decision-making clearly factor into the distribution of the cost and benefits of pollution control approaches as well as the types of infrastructure utilized.<sup>125</sup>

Race and class considerations also factor into compliance with stormwater regulations. Cities across the region face the threat of the serious financial burden resulting from fines associated with violations of the regional MS4 permit requirements. The magnitude of these fines has the potential to divert general fund dollars that cities in the region use to conduct basic government functions and provide essential services.<sup>126</sup> Because these fines could have a disparate effect upon smaller cities' limited tax bases as well as low-income residents who are more reliant upon local government programs, identifying the appropriate infrastructure solutions and associated financing tools that take economic inequality across jurisdictions into account is paramount.<sup>127</sup>

Traditional centralized approaches to stormwater capture and abatement have historically favored 'gray infrastructure' to collect and convey stormwater runoff through networks of gutters, storm drains, and sewers. Gray infrastructure is considered by many to be more cost efficient and utilitarian. According to researcher Joshua Cousins, "in Los Angeles where most of the precipitation falls within a short seasonal period, many actors focused on supply perceive centralized [infrastructure] as the most desirable option to capture large amounts of runoff."<sup>128</sup> Unfortunately, these traditional approaches have not solved persistent stormwater problems. "Instead they have shifted, and in many cases exacerbated, the impacts of stormwater runoff, trading urban flooding for pollution" as well as making fundamental modifications to nearby rivers, streams, lakes, and estuaries.<sup>129</sup>

According to Kamieniecki and Below (2008), centralized gray infrastructure approaches to stormwater abatement would position the region's coastal communities as the primary or direct beneficiaries of

the resulting clean water and beaches, leading to increases in property values as well as a strengthened local economy associated with tourism and ocean industries. Meanwhile, inland communities would pay a proportionately greater amount in financing these types of control measures and would receive fewer direct benefits. The significant racial/ethnic and economic differences between the region's inland and coastal communities call into play the equity implications of centralized gray infrastructure approaches to stormwater management. Residents who live near the coast are predominately white and affluent, while a majority of those who live inland are low-wage earners and people of color. Rural communities make up a smaller segment of the region's population; they have a larger percentage of whites and higher per capita income compared to inland communities, but not as high as coastal communities.<sup>130</sup>

## **Flooding Risks Remain in Low-Income Communities of Color**

LA County's significant investment in flood control infrastructure has largely addressed flood risks in the vast majority of the county. Additional modifications to the Los Angeles River and Rio Hondo channel structures starting in the 1990s have aimed to further mitigate the risk of the channels overtopping and flooding downstream communities during peak storm events.<sup>131</sup> However, those areas where localized flood risks remain are largely in low-income communities of color where storm drain infrastructure is outdated or inadequate, particularly in the east San Fernando Valley and South and Southeast Los Angeles.<sup>132,133</sup> Flooding in these areas is generally caused by intense periods of rainfall that can overwhelm storm drains. (Additional risk exists in wealthier foothill communities where fires and subsequent debris flows are recurring threats along the edges of open space areas as well as coastal areas where communities are susceptible to waves and tidal action.) Higher flood risk in low-income communities of color is a nationwide problem, highlighted by recent flooding in Houston. These risks are compounded when communities lack the economic resources to prepare for and recover from flooding.<sup>134</sup>

Climate change is projected to intensify precipitation events and resulting flood risks by magnifying Los Angeles' drought and deluge cycles with more intense rain and more intense drought.<sup>135</sup>

Additionally, due to higher temperatures, more of LA County's precipitation is likely to fall as rain rather than snow in the San Gabriel Mountains, leading to higher flow rates from the mountains into urban rivers rather than a more traditional gradual melting.<sup>136</sup> While these risks will affect the entire region, their impacts will be concentrated on those parts of the county that are already exposed to elevated flood risks. These risks can be mitigated by appropriately sited green infrastructure to capture and detain stormwater in communities with a history of flooding.

## **Integrated and Green Infrastructure Approaches to Stormwater Management**

According to the US Environmental Protection Agency, green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage stormwater and create healthier urban environments.<sup>137</sup> Decentralized stormwater management practices involving green infrastructure captures and infiltrates rain where it falls, thus reducing stormwater runoff and improving the health of surrounding waterways.<sup>138</sup> Aging infrastructure, ongoing development pressure, and extreme drought and flooding associated with climate change have given rise to integrated water resource management and green infrastructure best practices that capture, recycle, and utilize stormwater as a beneficial resource, contribute to ecosystem resilience, and provide multiple benefits to communities through ecosystem services.<sup>139</sup> This multiple benefit approach must weigh potential tradeoffs of cost-effectiveness in capturing and cleaning stormwater, optimizing regulatory credit under the applicable MS4 permit, and providing co-benefits to disadvantaged communities to maximize overall public benefits from green infrastructure investment. An emphasis on multi-benefit projects is consistent with the direction of the State of California's Strategic Growth Council with its wide variety of infrastructure financing initiatives, as well as Prop 1, the 2014 state water bond measure, which prioritizes funding for projects in disadvantaged communities. A focus on multi-benefit water-related projects in disadvantaged communities will position LA County for leveraging and attracting state dollars.

## **Health Benefits of Green Infrastructure**

Green space produces critically important health benefits. According to researcher Jennifer Wolch, "ecosystem services provided by urban green space not only support the ecological integrity of cities, but can

also protect the public health of urban populations. Green space may filter air, remove pollution, attenuate noise, cool temperatures, infiltrate stormwater, and replenish groundwater; moreover, it can provide food,” all of which have public health benefits.<sup>140</sup> Recent research has linked green infrastructure, cultural ecosystem services, and key determinants of health, including neighborhood built environment, social and community context, health care, education, and economic stability.<sup>141</sup> With regard to the built environment, aesthetically pleasing urban green space can foster a sense of place and place attachment, enhancing community satisfaction.<sup>142</sup> Other studies have found that urban green space, in particular tree canopy and vegetation, are linked to reductions in violent crimes, assault, robbery, burglary, and vandalism.<sup>143</sup> Access to green space also increases opportunities for physical activity, which plays a key role in overall physical and mental health as well as reducing risk of chronic diseases including type-II diabetes, cardiovascular disease, and childhood obesity.<sup>144</sup> With regard to social and community context, access to urban green space has been shown to increase social cohesion and civic participation, which is associated with physical and psychological well-being as well as social capital.<sup>145</sup> Exposure to green space can also reduce stress and anxiety in addition enhancing physical and spiritual restoration.<sup>146</sup>

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*“A situation where poor and minority communities must absorb higher costs and obtain fewer benefits of pollution control should not be permitted on ethical, moral, and legal grounds. Yet, this scenario currently exists in Southern California.”*

— Water, Place, and Equity, 2008

## Green Infrastructure Inequities

Despite a growing body of research supporting the contributions of green infrastructure in community health, safety and wellbeing, several review articles demonstrate that urban ecosystem services, green space, and the benefits they provide are not equitably distributed across urban populations.<sup>147</sup> Much of the literature on the lack of access to green space focuses on parks and open space, and there are many studies showing that “racial/ethnic minorities and low-income people have less access to green space, parks, or recreational programs than those who are White or more affluent.”<sup>148</sup> Furthermore, parks that are located in low-income communities of color are often poorly maintained or lack amenities compared to parks in more affluent communities.<sup>149</sup> Inequities in the distribution and quality of green spaces impacts highly urbanized areas as well as inner-ring suburbs where poverty has grown over the last few decades.<sup>150</sup>

Locally, the 2015 LA Countywide Parks and Recreation Needs Assessment documented the extent of green space inequities in LA County; fully 53% of County residents live in a ‘high need’ or ‘very high

need' park catchment area.<sup>151</sup> A companion study by the LA County Department of Public Health found that those LA County cities and unincorporated areas with less park space per capita have higher rates of premature mortality from cardiovascular disease and type-II diabetes, higher prevalence of childhood obesity, and greater economic hardship compared with cities and communities with more green space per capita. Within LA County, the study found that African Americans and Latinos are more likely than Asian Americans and Whites to live in cities and communities with less park space.<sup>152</sup> Through grant guidelines that articulate a preference for green infrastructure and multi-benefit projects, LA County can leverage efforts already underway to eliminate inequities in parks and open space while concurrently improving the region's stormwater infrastructure and enhancing water resilience.

## **Green Infrastructure and Risk of Displacement**

A number of studies have documented the increased property values associated with proximity to green infrastructure, in particular parks and community gardens. More recent research has focused on a related issue: the potential of successful green infrastructure projects to "set off rounds of gentrification, dramatically altering housing opportunities and commercial/retail infrastructure that supports lower income communities."<sup>153</sup> Community interventions, such as building new or refurbished parks, are often financed with public dollars and the intent to enhance health and the environment in underserved communities. But over time, coupled with shifting job and housing markets, these investments can inadvertently create a cascading effect that disrupts the social fabric of a neighborhood and pushes people to the margins, leading to displacement.<sup>154</sup> The need to increase awareness about unintended consequences of green infrastructure interventions coupled with proactive strategies to mitigate displacement outcomes is underscored by Cousins' research that found stormwater specialists are not deeply aware of the relationship between green infrastructure and the social character of neighborhoods.<sup>155</sup>

## **Green Infrastructure and Economic Stability**

Green stormwater infrastructure investments also influence the economic stability of communities. An economic analysis conducted in 2011 found that an investment of \$188.4 billion over a five-year period in infrastructure to manage stormwater and preserve water quality in the U.S. would generate \$265.6 billion in additional economic activity.<sup>156</sup>

## Philadelphia's Green City, Clean Waters initiative

A case example of green infrastructure return on investment comes from Philadelphia's Green City, Clean Waters (GCCW) initiative. GCCW has catalyzed Philadelphia's new green stormwater infrastructure industry, which has contributed approximately \$60 million to the local economy, supports 430 local jobs, and generates nearly \$1 million in local tax revenue.<sup>159</sup> Innovation among local businesses has produced export opportunities benefiting the local economy as well. A recent evaluation examined the local economic impact of this ambitious green stormwater infrastructure initiative five years into its 25-year timeframe. Over this period, GCCW's investment of approximately \$1.2 billion in stormwater infrastructure projects is projected to generate \$3.1 billion for the Philadelphia economy overall, support about 1,000 jobs per year and generate \$2 million per year in local tax revenue.<sup>160</sup>

The GCCW evaluation also found green stormwater infrastructure to be superior to gray infrastructure in terms of generating job opportunities for local residents and contract opportunities for businesses. While the benefits conferred at the local level are distributed throughout Philadelphia's neighborhoods, the majority of GCCW's green stormwater projects are located in the city's low-income neighborhoods, providing needed environmental amenities, important ecological functions, and multiple health benefits to residents. By addressing stormwater on-site and in a distributed manner using green infrastructure solutions, the GCCW initiative has achieved a 'triple bottom line' in Philadelphia by making concrete improvements to the economy, the environment, and social equity for traditionally underserved neighborhoods.<sup>161</sup>

The authors make clear that maximizing the use of green infrastructure is essential to meet the stormwater needs of U.S. communities while providing the multiple co-benefits described above. Nationwide, this investment would create approximately 1.9 million jobs; the estimated number of jobs created in California ranges from 120,402 to 199,526.<sup>157</sup> These jobs are broadly accessible, requiring a high school diploma and some post-secondary education or training. Water infrastructure investments can provide economic opportunities for communities most in need, especially when accompanied by education and training policies and programs to foster career pathways for women and people of color. Good jobs focused on green stormwater infrastructure can counteract income inequality by providing family-supporting wages for middle-skilled workers.<sup>158</sup>

## Equity-Focused Funding Strategies

In the past decade, California lawmakers and voters have approved billions of new infrastructure expenditures. In 2006, the State's then-Governor signed into law a Strategic Growth Plan to "restore and

expand our highways, roads, and transit systems as well as our schools, courthouses, ports, levees, and water supply systems.”<sup>162</sup> Investing in infrastructure that supports each element of the California Strategic Growth Council’s Healthy Community Framework<sup>163</sup> with a particular focus on equity can spur economic growth, improve the environment, and ensure health and well-being for future generations.<sup>164</sup> While many of these initiatives have begun to incorporate provisions to advance equity, the state of the practice is rapidly evolving and not all measures have been equally effective. Generally, those programs with more specific criteria and more rigorous evaluation have made the most impact.

Since 1960, California voters have supported general obligation bonds to address the state’s ongoing and wide-ranging water supply, quality, and infrastructure needs.<sup>165</sup> California’s Proposition 50 (2002) and Proposition 84 (2006) as well as the establishment of the Integrated Regional Water Management (IRWM) planning groups fundamentally changed the State’s approach to water management through recognition of the water-related needs of underserved and primarily low-income communities throughout California.<sup>166</sup> In response, the California Department of Water Resources established “Disadvantaged Communities” programs to prioritize financial assistance for infrastructure and other investments to address the water needs of low-income communities and engage these communities in project planning. Disadvantaged communities, or DACs, are defined by these programs as those with a median household income less than 80% of the statewide average. These measures also prioritized infrastructure investments in low-income communities using bond resources.<sup>167</sup>

In November 2014, California voters enacted Proposition 1, which authorized \$7.12 billion in general obligation bonds for state water supply infrastructure projects, including \$520 million to reduce and prevent drinking water contaminants, address the water needs of disadvantaged, small, and rural communities, and support the State Water Pollution Control Revolving Fund Small Community Grant Fund.<sup>168</sup> Leading up to the election, efforts were undertaken to identify more effective means of engaging with and responding to the DAC water related needs through IRWM planning efforts, including the Disadvantaged Community Outreach Evaluation study completed by the Council on Watershed Health (2013),<sup>169</sup> the Alcanza pilot project supported by the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (2013),<sup>170</sup> and the Disadvantaged Communities Visioning Workshop (2015).<sup>171</sup> The resulting recommendations regarding

best practice engagement strategies informed the development of Proposition 1's Disadvantaged Communities Involvement Program (DACIP), which is designed to ensure disadvantaged community participation in the IRWM planning process, identify water management needs of these communities, and develop strategies and long-term solutions to address these needs. The Department of Water Resources allocated \$51 million for the DACIP overall. The amount allocated for the Los Angeles area DACIP is \$9.8 million; this effort is currently in start-up mode and is overseen by the LA County Flood Control District.

Aside from studies mentioned above that piloted and analyzed DAC engagement efforts, there are few third-party evaluations of the State's DAC programs. A third-party evaluation conducted by UCLA's Institute of the Environment and Sustainability looked at actual spending associated with Prop 84's water quality and safety program in relation to disadvantaged communities. The evaluation report indicates that overall this spending was "moderately successful in targeting funding for disadvantaged communities," which was one of the priorities listed for \$1.2 billion of the total \$1.5 billion designated for safe drinking water and water quality projects.<sup>172</sup> However, the report also found that communities identified as being disproportionately impacted by groundwater contamination and drinking water quality problems by CalEnviroScreen "received no more funding than communities with fewer groundwater contamination and drinking water quality problems." The author asserts that while the water quality and safety section of Prop 84 successfully prioritized disadvantaged communities, the evaluation findings suggest that "more specific criteria for targeting water quality and safety improvements could have been warranted..."<sup>173</sup>

Additionally, the LA County Water Atlas (2015) points out that despite the existence of the CalEnviroScreen tool—which identifies communities facing high environmental health risk due to socio-economic factors and exposure to air, soil, and water pollution—Prop 1 "defines disadvantaged communities simply as communities with median household income below 80% of the state's median household income (or approximately less than \$49,000)." The report suggests that to more precisely identify communities that are disadvantaged in terms of drinking water access, "the state might consider developing additional indicators at the system level [...] like water system size, governance type, and threats and system vulnerabilities faced by community water systems."<sup>174</sup>

In light of the restrictions on the use of bond funding, it is not surprising that the state's DAC programs are focused on community participation in IRWM project planning processes. While ensuring community participation in project planning processes associated with infrastructure or project investments is essential, the program's narrow focus highlights a gap in resources devoted to building organizational capacity in low-income communities of color to address water issues from a technical or advocacy standpoint, such as advancing active participation in policy-related decision-making to determine what should be included in natural resource funding measures as well as where and how those resources should be allocated.

LA County's recently enacted park funding Measure A offers another potential funding model that designates 13% of the parcel tax revenue generated for 'high need' and 'very high need' park catchment areas as a means to reverse decades of inequitable investments in park infrastructure in the region.<sup>175</sup> This funding set-aside was based on a comprehensive countywide park needs assessment conducted with ample participation by parks advocates and community-based organizations, in addition to local agencies throughout the county. Measure A implementation guidelines are currently under development, but as that process unfolds it becomes clear that even with an evidence-based needs assessment and clear language in the ballot measure, explicit language and standards must be developed in grant guidelines while institutional capacity is being built. This is necessary in order to bend the trajectory of infrastructure dollars in ways that create systems-level changes that will begin to reverse inequities and create system-wide improvements that benefit the entire county.

Dedicating greater infrastructure investments to health and safety-promoting stormwater infrastructure in divested, underserved communities will result in multiple benefits to California residents including improved health outcomes, economic benefits, pollution prevention and mitigation, and best use of our land resources.<sup>176</sup> Emerging best practices dictate that incorporating clear criteria for equity allocations in funding measures, formal evaluation to measure outcomes, and oversight to safeguard equity provisions are needed to ensure that designated funding to ameliorate inequities is not diverted for other purposes and produces the intended results. Improvements in the most disadvantaged parts of the system benefit the entire system.



Photo credit: Los Angeles County  
Department of Public Works

# Governance of the Water System

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*“Through history, water has always been provided by various authorities that have power. And that power’s often exercised unequally.”*

— David Feldman, University of California, Irvine<sup>177</sup>

Water governance in LA County is a complex system that is inextricably linked to the region’s political history. The City of Los Angeles’ rapid expansion in the early 20<sup>th</sup> century was in no small part enabled by the waterworks of William Mulholland, who drained the Owens Valley to provide abundant water to a growing city. As the region developed, those with the most political power gained control of the purest water supplies, while those with control of water in turn gained more power. Today, the governance systems that distribute water resources are tightly woven with the systems that have produced other inequities. Access to affordable, safe, and clean drinking water is largely determined by where one lives and is deeply entangled with the region’s history of housing segregation by race and class. According to David Feldman, University of California, Irvine professor and water management and policy specialist, this has benefited certain groups at the expense of others. “Water is not neutral; it’s subject to plans by engineers... and political decisions. The policies we make [dictate] who benefits and who pays.”<sup>179</sup>

Today, the City of Los Angeles Department of Water and Power (LADWP), which owns and operates Mulholland’s Los Angeles Aqueduct, is the largest water utility in the state—serving four million

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## *“Water flows uphill towards money.”*

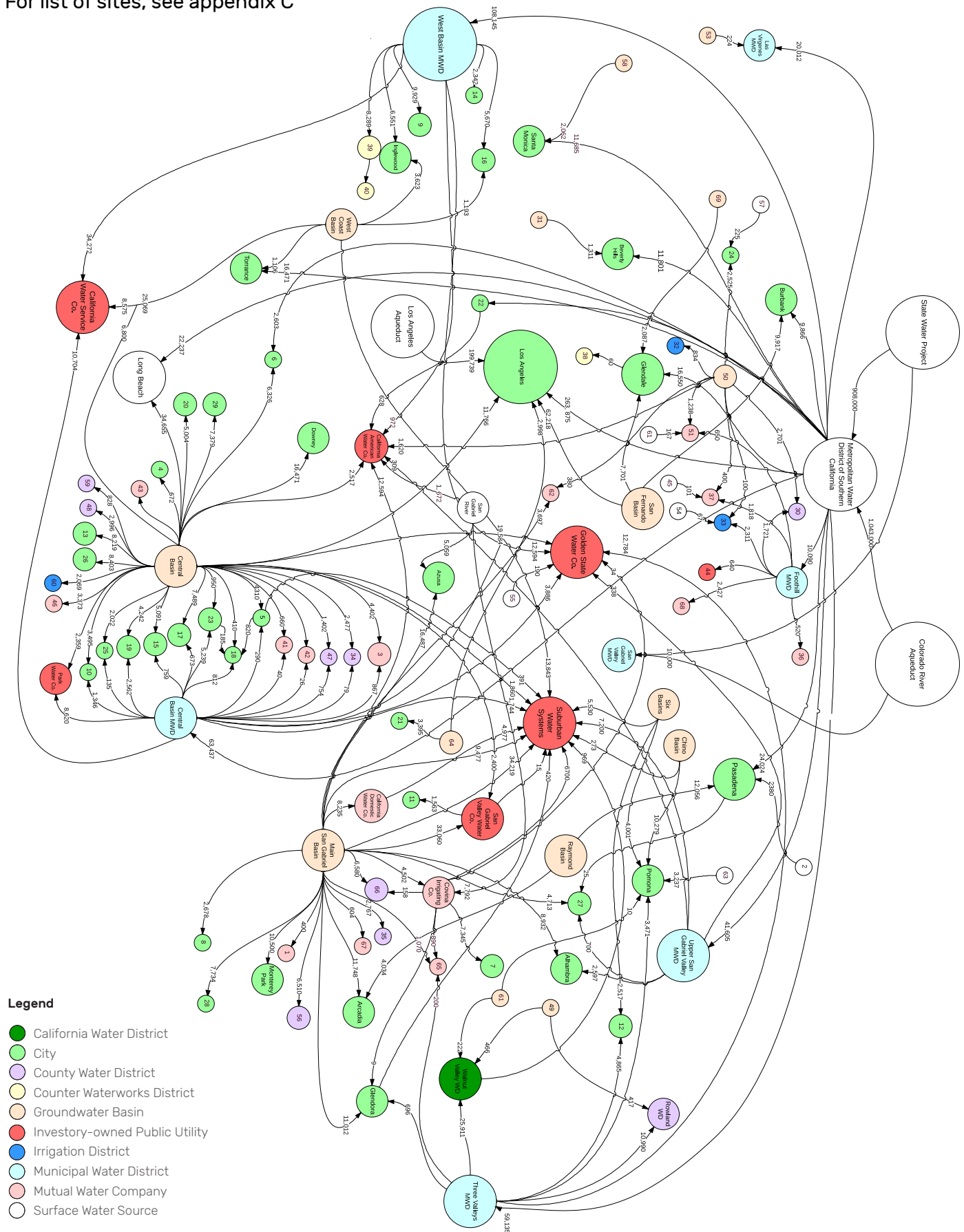
— Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water*<sup>178</sup>

residents—and is a major player in water policy. One interviewee stated, LADWP “gathers, moves, treats, and distributes drinking water to the residents of Los Angeles,” and in so doing it needs to “look out twenty years through its urban water management plan to make sure LADWP has identified how it is going to provide water into the future.”<sup>180</sup> Just a few miles downriver from LADWP’s headquarters in downtown Los Angeles, Maywood’s water system couldn’t be more different, as previously described. While LADWP has access to high quality imported water from the Eastern Sierra, Sacramento–San Joaquin River Delta, and Colorado River, Maywood’s three private utilities rely exclusively on contaminated groundwater to serve 30,000 residents living in just one square mile. Like many smaller systems in south and southeast LA County, these mutual water companies are a relic of the region’s agricultural past when fields and orchards made way for tract homes for the working class.<sup>181</sup> Neighborhoods in small cities and unincorporated areas that lack the same level of municipal services as their wealthier neighbors are now home to disproportionately low-income communities, immigrants, and communities of color. Part of the challenge lies in the fact that, as one interviewee noted, “in LA County there are over 200 small water companies and 100 of those serve fewer than 500 people.” This situation presents significant challenges to monitoring and oversight.

No one would design the system we have today, with 228 different drinking water utilities in the Los Angeles region alone;<sup>182</sup> multiple regional, state, and federal agencies responsible for surface water quality, flood control, and groundwater management; and jurisdictional divisions set more by historical happenstance than strategic foresight. As much as agencies have attempted to “divide the waters,”<sup>183</sup> hydrology dictates that the drop of water that falls in the San Gabriel Mountains—or on a parking lot in El Monte—is the same drop of water that flows into the San Gabriel River and then infiltrates into one of Central Basin’s aquifers or runs out to sea. Different agencies are responsible for ensuring this drop of water does not flood downstream communities (LA County Flood Control District,<sup>184</sup> a division of the Department of Public Works), get contaminated by treated wastewater (Sanitation Districts of LA County,<sup>185</sup> which are technically 24 independent special districts) or by urban runoff (which is the responsibility of each municipality), or pose a threat to human health or aquatic ecosystems (Los Angeles Regional Water Quality Control Board,<sup>186</sup> which is actually a state agency). If this drop were to fall in

# Potable water governance in Los Angeles County<sup>187</sup>

For list of sites, see appendix C



Pacoima instead, it would be controlled by a different set of agencies, including the City of Los Angeles Bureau of Sanitation<sup>188</sup> and, if it ended up in the San Fernando Valley groundwater basin, LADWP would likely use it for drinking water, subjecting it to yet another regulatory agency, the State Water Resources Control Board Division of Drinking Water Programs.<sup>189</sup> Until its transfer to the State Water Board in 2014, regulation of drinking water systems had been handled by the California Department of Public Health,<sup>190</sup> but small systems are still overseen by the LA County Department of Public Health. When water is imported, stored, or recycled, yet more agencies are involved. Amidst this regulatory milieu, no single agency has the authority or responsibility to ensure that the whole system is managed efficiently or equitably. A deeper examination of the governance of our regional water system can be found in Appendix B.

## Re-Engaging Public Health

Water is primarily regulated by natural resource agencies. In 2014, the State of California transferred authority over drinking water quality from the Department of Public Health to the State Water Resources Control Board with the goal of integrating drinking water with other water supply and water quality issues. Since then, public health's involvement in water all but disappeared at the state level. While the State regulates large public water systems, jurisdiction over wells and small water systems with less than 200 service connections lies with the County.<sup>191</sup> The LA County Environmental Health Division is housed within the LA County Department of Public Health and, like its sister agencies in 29 of the other 58 counties across the state, it regulates smaller water systems to ensure these systems are delivering adequate and safe drinking water.

Recognizing that access to clean, affordable, and reliable water is fundamental to health—as are the recreation, green space, and employment opportunities that water infrastructure can provide—the County health department has an opportunity to address water equity from a determinants of health perspective, similar to nutrition and physical activity programs. As one key informant described, “These connections, even within the public health department, probably needed to be more fully examined and more explicitly pulled out[...] but taking a more integrative approach, we can build linkages between water and health through the built environment work that many departments of public health already do.”<sup>192</sup> The Public Health

Department can exercise its regulatory authority over small systems that do not have the resources to adequately treat drinking water, helping to address inequities associated with system size and encourage consolidation where appropriate. It can also integrate tap water safety information into its ongoing public education and awareness campaigns. More importantly, it can act as a convener to bring together water stakeholders in a health-centered conversation and participate more directly in water planning on behalf of vulnerable populations. As watershed planning becomes more integrated, there are more opportunities to insert a health perspective into the broader resource management conversation so that community needs do not get overlooked.



Photo credit: Roxan Rivas,  
Prevention Institute

# Barriers to Effective Engagement and Multi-Sector Collaboration

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*“We have got to figure out what matters to [heavily impacted] communities and be good partners by meeting them where they are at on these issues.”<sup>193</sup>*

— Key informant

Community engagement and multi-sector collaboration are essential components of an integrated, equity-focused water system. Key informants raised a number of barriers that they have encountered on the local landscape that challenge the region’s efforts to achieve water resiliency.

## Gaps in Public Awareness and Education

Many interviewees described a fundamental disconnect between residents and their water as a barrier to effectively engaging low-income communities of color in water advocacy efforts in the region. One called it a “wounded relationship.”<sup>194</sup> Interviewees spoke about the social consequences of channelizing the region’s rivers and tributaries such that people have little connection to these natural resources

and oftentimes “don’t know where our water comes from,” as one key informant observed.<sup>195</sup> Another elaborated: “In LA we’ve done such an amazingly good job of disconnecting people from their water. People don’t have access to water; they have surrendered to the disconnect.”<sup>196</sup> This disconnect was correlated to the lack of public awareness about water issues in low-income communities of color which is a fundamental prerequisite to effective engagement on any type of water advocacy efforts.

Key informants also raised the related issue of limited public education about the full range of water issues in the region as another fundamental barrier to engagement of low-income communities of color on water advocacy issues. Drinking water is one of the only water issues that does rouse public attention, but this attention is often limited to two specific issues: the perceived quality of the water coming out of the tap and the cost of that water. Homeowners in particular can be quick to organize around increases to water rates, even if those increases are necessary to maintain and improve the system. Engagement around upstream and downstream issues is largely absent. In other public health arenas—such as tobacco control and alcohol-impaired driving—public education campaigns have been effective in raising the public awareness about issues, problems, and solutions, thereby creating conditions conducive to increasing public support for and mobilizing direct involvement of individuals and organizations in policy advocacy initiatives.

## Government ‘Silos’

Exacerbating the lack of public education and awareness is the multitude of water systems and silo-ed agencies in the region, making it difficult for residents and organizations that represent their needs to know where to go with their water-related problems. According to one key informant, “people have a hard time knowing who is in charge.”<sup>197</sup> The deeply silo-ed nature of the regulatory structures and public agencies is considered a challenge to multi-sector collaboration on environmental issues in general and water in particular. In addition to the ‘disconnect between people and water,’ key informants also emphasized the disconnect between the issues of stormwater and drinking water, and between the agencies responsible for managing them.

These silos—within and across government agencies—negatively impact the potential for effective multi-sector collaborative action to

advance integrated approaches and improvements to water quality, supply, management and resiliency in the LA region. Moreover, the divide between public health agencies focused on various aspects of drinking water and public works/flood control/sanitation agencies on stormwater has significant implications for advancing water improvement initiatives with a health equity lens. Even when public health departments interface with water, it appears to be separated out into different departments, rather than through a holistic approach consistent with the way people understand water.

The potential of public health agencies to play a meaningful role in water improvement efforts at the local and state level is influenced in part by the diminishing role of environmental health units in monitoring and regulating drinking water,<sup>198</sup> limitations imposed by categorical funding streams, and by the lack of connection between chronic disease units' efforts to promote drinking water as a healthy alternative to sugar sweetened beverages and all other water-related efforts of local and state governments. As one key informant said, "People become so ingrained through categorical funding streams that cross-connections can sometimes become a little calcified."<sup>199</sup> That same interviewee relayed experiences with public health agency staff that are unfamiliar with connections between water, health, and equity or are resistant to taking on water as a public health issue: "Even though it's water and it's public health, people don't understand the connection or necessarily how to integrate it."<sup>200</sup> Another spoke about environmental health/public health departments having little to no role in stormwater issues, and being perceived by colleagues in sister agencies as being more of a hindrance than a help in overcoming regulatory hurdles. By the same token, engineering-focused water agencies have only recently come to fully appreciate the strategic significance of public health concerns underlying voter support for stormwater-related ballot measures.

## **Lack of Investment in Environmental Justice, Social Justice, and Community-Based Organizations**

Whether due to lack of awareness or education, a number of key informants observed that people generally don't pay attention to water issues until there is a problem or crisis. Further, many public agencies and local organizations are not aware of the water problems in their own communities. "It's kind of 'out of sight, out of mind' for a lot of

people until they are confronted with the information. Crises garner attention,” said one interviewee.<sup>201</sup> While crises do focus the public’s attention on an issue, emergency situations put people into a reactive mode and do not allow communities most at risk for experiencing crises related to pre-existing structural inequities to build the capacity necessary for advancing strategic, long term, and sustainable change. This is particularly true in low-income communities of color in the region given that, as more than one key informant observed, there is less capacity focused on water issues in these communities compared to more affluent areas or beach cities due, in part, to competing priorities, such as jobs, public safety, or education. “Right now, the biggest concerns [among residents in my city] are crime and housing affordability, as well as traffic and transportation safety,” said one key informant, an elected official. “When you are triaging things in our city, water has not been the highest priority. I think that happens not just in ours but a lot of other cities.”<sup>202</sup>

But effective advocacy does not take place in a vacuum, which was evident in other key informant observations about structural barriers to involvement of low-income communities of color in water-related advocacy. A number of key informants cited a lack of relevant, authoritative, and timely data focused on water quality and contamination as a fundamental barrier to organized advocacy in these communities. The data that do exist are not user friendly (they tend to require secondary analysis by experts) and are not necessarily relevant to secondary contamination of drinking water and water affordability disparities. Such data could be used by environmental justice, social justice, and other community-based organizations working in marginalized communities to build awareness and capacity to advocate for improvements to water sources, management systems, and infrastructure.

Key informants across the board spoke about the lack of adequate support for organizational infrastructure within low-income communities of color focused on water in general and drinking water in particular as a fundamental barrier to engagement of underserved communities in water-related advocacy efforts. This issue was also referenced by a few key informants as one of the region’s primary water-related disparities. Interviewees who work in these communities observed that the majority of the groups working on water issues in the region are based in more predominantly affluent and White communities—and that mainstream environmental organizations tend to have disproportionately affluent leadership and staff, as compared

to organizations working in communities where some of the deep and historical inequities in clean water and stormwater capture projects exist. Underlying this general lack of organizational infrastructure in low-income or predominantly Latino, African-American, or Asian-American communities is the lack of investment by environmental funders in the environmental justice, social justice, or quality of life groups that are working in and/or effectively represent the interests of their communities on a variety of issues. It is important to note that this situation is changing as understanding grows among philanthropic groups about the lack of basic funding for these groups to work on water issues.

While noting some indications of change, there was a strong sense among key informants that the lack of adequate funder investments inhibits full, potential involvement of these groups—and the communities they represent—in water-related advocacy initiatives. Environmental funders also are oftentimes reluctant to fully support the approaches used by many of the environmental justice, social justice, and community-based organizations operating in the region. Many of the most effective groups emphasize direct action and power-building for community transformation and racial justice; other approaches include community organizing, participatory action research, leadership development, capacity building, coalition building, and policy advocacy. Still other organizations working on various aspects of improving the built environment, public health, and quality of life in LA could be involved but are typically not well supported to engage on the issue of water. As key informants described, it is unrealistic to assume that such organizations will simply take on a new issue when: 1) there are so many competing demands when working in low-income communities; 2) they lack sufficient resources to staff up and become adequately knowledgeable about the complexities of water; and 3) have no promise of commitment from funders for long term capacity to maintain staff time and energy directed toward the work. In other words, groups working in and with low-income communities are probably not going to be as eager to do a “light touch” on water issues, but might be interested in taking a deep dive if they had the evidence, tools, and resources to legitimately engage their constituents, staff, and stakeholders in a manner that is consistent with their theories of change and community transformation strategies.

The underinvestment in these groups and the grassroots-organizing/power-building approaches they utilize is reinforced by a report



Photo credit: Los Angeles County Department of Public Works

published by the National Committee for Responsive Philanthropy. *Cultivating the Grassroots: A Winning Approach for Environment and Climate Funders* examines philanthropic giving to environmental organizations and found that “from 2007-2009, only 15% of environmental grant dollars were classified as advancing ‘social justice’ strategies, a proxy for policy advocacy and community organizing that works toward structural change on behalf of those who are the least well off politically, economically and socially.”<sup>203</sup> Moreover, grants made by funders who give more than 25% of their total dollars to the environment were found to be three times less likely to benefit marginalized groups than environmental funders in general.<sup>204</sup>

*Cultivating the Grassroots* affirms that there are many effective and powerful environmental justice, social justice, and community-based organizations on the ground working to advance a pro-environment agenda, but they are “under-resourced and under-utilized in our overall [environmental] advocacy infrastructure.”<sup>205</sup> *Cultivating the Grassroots* makes the case for investing in local organizations focused on grassroots organizing and related power-building strategies in low-income communities of color, and warns against funding strategies that are not aligned with the environmental perils facing our planet and its people. “Grantmakers made at least \$10 billion in grants to environmental causes from 2000 through 2009, funding

primarily top-down strategies. Yet, we have not experienced significant policy changes at the federal level in the United States since the 1980s remotely commensurate with the level of funding invested toward these ends.”<sup>206</sup> What progress has occurred is largely a result of litigation by environmental groups to enforce existing laws. The report calls for relying on a systems approach for community transformation as well as comprehensive solutions and multi-sector collaboration that are inclusive of approaches that incorporate race, class, and gender analyses—approaches that are consistent with a health equity viewpoint.

*Communities in Action: Pathways to Health Equity*, published in 2017 by the National Academies of Science, Engineering and Medicine, affirms these ideas in recommendations for actions by philanthropic groups to promote health equity in communities through multi-sector partnerships:

“Through greater investments in communities of color and low-income communities, foundations can build on the civil rights movement and advance social justice through advocacy and organizing for structural change. As an example, while strategic foundation support has enabled the success of the environmental justice movement, funding constraints have made it difficult to build organizational infrastructure, community organizing, leadership development, and effective participation in the policy and legal arenas. Reliable, predictable, and flexible multi-year core support for health, environmental justice, and racial equity organizations is necessary for them to carry out their mission, respond to new challenges and opportunities, and serve their communities.”<sup>207</sup>

## **Misalignment Between the Dominant Water Narrative and Community Needs**

The lack of investment in organizational infrastructure in low-income communities of color as well as the limited focus on drinking water quality and water affordability issues in the LA region are related to a dominant water narrative that emerged through our analysis. Key informants emphasized that this narrative reflects the broader institutional culture of mainstream environmental groups as well as their approach to working on water issues in the LA region. The narrative is consistent with Robert Gottlieb’s analysis of the diverse elements

of the environmental movement in the U.S. The water-focused environmental groups operating in the LA region share many of the defining organizational features Gottlieb attributes to the mainstream environmental organizations from a professional and institutional standpoint including reliance on lobbying, litigation, and scientific and legal expertise as well as their close ties to the government agencies in charge of crafting and implementing environmental policies and infrastructure projects.<sup>208</sup> While these approaches have led to important water-related policy gains, legal victories, and infrastructure demonstration projects in the region over time, the need remains for broader public awareness about stormwater problems and drinking water issues, as well as deeper engagement of low-income African Americans, Latinos or Asian Americans in water-related policy advocacy.

The majority of the water-focused environmental organizations in the LA region work on surface or receiving waters (including rivers, streams, and coastal or ocean waters), eliminating sources of pollution, and addressing stormwater runoff, which is commonly understood as the most challenging source of water pollution facing the region. These groups are also actively involved in advancing integrated water management, water supply and efficiency, healthy habitats, and water-focused climate change resiliency. While drinking water quality and water affordability are impacted by this work, these issues do not drive the policy or project activities of these groups.

While conditions are changing in the water-focused organizational landscape in the LA region, key informants identified a lingering gap between what the mainstream groups work on and the disparities experienced in low-income communities of color (drinking water quality and water affordability). And despite progress, the belief remains that the dominant water narrative coupled with traditional environmental approaches pose structural barriers to engagement of low-income communities of color in water-related advocacy and effective multi-sector collaboration. Clearly, there is room for growth within all sectors involved in this work.



Photo credit: City of Los Angeles  
Sanitation

# A Good Solution Solves Multiple Problems

## Recommendations to Produce a Healthy, Equitable Water System in Los Angeles

In order to achieve the vision of water resilience in LA County, we need to fundamentally transform our approach. No longer can we approach our stormwater, groundwater, drinking water, and wastewater as divided systems; we must recognize them as components of an integrated whole. This will require innovative policy and systems change solutions, as well as major investments in physical infrastructure and small water systems' monitoring, maintenance, and technical capacities. It will also require meaningful and long-term investments in 'social infrastructure' including community-based organization capacity, multi-sector collaboration, and resident engagement—all of which are pillars of a health equity approach.

Based on the findings of this research project and Prevention Institute's expertise in advancing policy, systems, and environmental change to improve health outcomes and reverse health inequities, we have developed the following recommendations:

## 1. Cultivate a new narrative that links all aspects of water

Following the lead of the City of Los Angeles and its OneWater model, organizations and agencies should take a watershed approach to all aspects of their work. Changing the way we approach this issue has technical and political implications that all stakeholders should embrace, not shy away from. The fact that stormwater feeds into the drinking water system makes stormwater issues directly relevant to everyone's lives. To maximize success, efforts to increase broad-based support in the region for water quality, capture, management, and resilience should prioritize public health and health equity, and explicitly engage low-income communities of color, not only to address these historical inequities but because weaknesses in the system ultimately impact the entire system. The same holds true for creating buy-in for more immediate concerns, such as improving stormwater infrastructure to meet water quality regulatory standards, increase water supply, and reduce flood impacts associated with climate change.

Drinking water is a particularly salient issue in low-income communities of color where water quality and cost concerns are paramount. Community engagement should emphasize the extent to which a more integrated approach to stormwater has downstream benefits for drinking water. Proponents of a new funding measure must be willing to engage with the issues that communities are raising, even if they don't fit within the silos that agencies are accustomed to operating within. Documented park and open space inequities represent another area of intersection rife with opportunities for advancing multi-benefit projects that meet stormwater objectives and have demonstrated public support.

To build public trust, however, these connections must be more than rhetorical. While it may be a leap to directly address the water coming out of residents' taps in a stormwater measure, there is a strong nexus between funding to capture, clean, and infiltrate stormwater and the condition of the groundwater basins this water will be stored in, the contamination of which is often a primary cause of poor drinking water quality in low-income communities of color. If the premise of a future public finance measure is making better use of local rain as a water source, there is an obligation to make sure that communities that experience soil and groundwater pollution are able to benefit as well. As described previously, failing to address soil and groundwater

pollution could exacerbate health inequities in the communities that rely on contaminated groundwater if not mitigated properly. One advantage of raising revenue from a tax instead of a user fee is that the uses of the funding aren't bound by as many restrictions, so the expenditure plan can be more flexible and responsive to community needs and priorities.

## **2. Incorporate health equity provisions into future water funding measures**

Public investments in water infrastructure offer a critical opportunity to improve the physical conditions that play a significant role in shaping health and quality of life. The enactment of a funding measure for stormwater infrastructure in LA County offers a near term opportunity to allocate these resources in a manner that advances health equity.

Traditional centralized, gray infrastructure approaches to stormwater management in the Los Angeles region have the potential to equally distribute the costs but unequally distribute the benefits of stormwater abatement efforts. Thus, centralized gray infrastructure mechanisms would position the region's more affluent, predominantly White coastal communities as the primary or direct beneficiaries, while inland communities—largely comprised of low-wage earners and people of color—would pay a proportionately greater amount in financing these types of control measures and would receive fewer direct benefits. It should also be noted that the region's inability to find the means to comply with stormwater permit requirements has the potential for inequitable impacts on low-income jurisdictions by exhausting precious general fund resources to pay for stormwater fines and reducing the local government programs that many low-wage earners rely upon.

A mix of green and traditional infrastructure approaches has a greater likelihood of achieving equity while addressing stormwater pollution in the region. Distributed, multi-benefit infrastructure that mimics natural processes for capturing and cleansing stormwater runoff at its source—such as rain gardens, bio-swales, etc.—offers cost-effective, equitable stormwater solutions with important benefits that address multiple determinants of health. Green infrastructure investments can also enhance community stability and economic opportunities through broadly accessible jobs for communities most in need and career pathways for women and people of color. Stormwater funding measures also have the potential to increase equity by prioritizing a

portion of the revenue generated for high need, low-income areas of the County.

LA County's recently enacted park funding Measure A provides important lessons for the region's next stormwater measure. With the backing of 76% of the electorate, Measure A demonstrates that highlighting the health impacts of community infrastructure and intentionally integrating equity programs into a dedicated tax measure for infrastructure improvements is not only possible but part of a winning combination that garnered significant public support. Those planning the next stormwater measure should examine and advance relevant equity provisions, in particular competitive funding programs for:

- Technical assistance to low-income jurisdictions to plan and implement stormwater projects
- Public education about premise- and neighborhood-based stormwater retention
- Opportunities for resident participation in local stormwater project planning and decision-making infrastructure improvements in disadvantaged communities.

This approach, however, needs to be carried through to implementation so as to maintain high voter confidence in the process.

### **3. Support innovative policy and system change solutions using local authority**

Though achieving equitable health and safety outcomes requires effective policy efforts at every level, the processes and outcomes associated with *local* policy can be a pivotal force for protecting public health and ameliorating longstanding inequities produced by policies and practices to begin with. The local playing field often favors advocates and their coalitions, providing critical opportunities to design and influence policies that reflect community values and address community-identified problems with innovative, multi-benefit solutions. At the culmination of a successful community-driven policy initiative, a local jurisdiction may enact a policy that becomes a blueprint for subsequent replication in neighboring jurisdictions. A groundswell of local initiatives can “bubble up,” catalyzing broad change and acting as the tipping factor for state or federal legislation.

Ideas for local policy advocacy and systems change innovation in the drinking water realm that emerged from our research include:

- Advancing local agency action on drinking water problems in response to evidence of discolored, foul tasting tap water that residents are unwilling to drink, beyond a strictly regulatory approach;
- Strengthening regulatory oversight over polluted discharges to groundwater, including monitoring and reporting as well as enforcement of penalties for legal violations;
- Strengthening State regulatory standards to facilitate local action on drinking water contamination;
- Integrating soil and groundwater contamination into policy efforts to address over-concentrations of polluting land uses; and
- Conducting a health impact assessment focused on the consolidation of small water systems in the LA region.

Appendix D provides additional details for two examples of policy and systems change innovation that could be advanced by local jurisdictions in the LA region.

## **4. Invest in community capacity to address water-related health inequities**

Meaningfully addressing water issues with a health equity lens requires lifting up community voices, participation, and leadership. All of the above recommendations will require active and engaged equity stakeholders participating in key agency decisions. For many institutions and agencies, this will require a new way of working with low-income communities of color and the groups that represent their interests, as well as embracing different models of community outreach, engagement, and advocacy. Unlike their more affluent counterparts in the region, low-wage earners and communities of color face multiple barriers to meaningful engagement on water issues. Partnering with community-based organizations that represent the interests of these communities to more fully engage residents is a best practice that has been employed with great success on other health issues including asthma, the overconcentration of polluting land uses, tobacco use reduction, and violence prevention, to name a few. Increasing the capacity of individual organizations to work on drinking water quality, affordability, flooding, and other climate change impacts, as well as expanding the number and geographic distribution of organizations working in these communities on the full range of water issues, is fundamental to building a stronger regional movement for water resiliency.

Real partnership with community-based organizations involves meaningful, long-term investments that support the approaches they have traditionally used to achieve community transformation, not supplanting their capacity by ‘parachuting in.’ The Los Angeles region is home to many sophisticated organizations that are recognized for their equity-focused policy advocacy work. Beyond resident outreach and engagement, these groups rely on proven strategies to achieve success in community-driven change initiatives including but not limited to participatory action research (monitoring, data collection and analysis, etc.), community organizing, coalition building, leadership development, and policy advocacy action. Creating mechanisms and resources that would allow these groups to make connections between water resiliency, health equity, and their core environmental, social, or economic justice missions is a prerequisite. Newer organizations that have taken on community building work in and with low-income communities of color focused on parks and open space, mobility, and infrastructure investments with a social equity perspective would also bring important added value to this work.

A key element of successful community-driven initiatives involves starting at the point where the community finds itself in relation to an issue and making the connections between funder priorities and community needs as defined by residents themselves. In many cases this will mean elevating the water-related disparities identified here and working at the intersection of water and community priorities, such as well-paying jobs, affordable housing, and safe, accessible parks and open space. This new paradigm also involves embracing a theory of change that recognizes root causes and drivers of inequity—including structural racism and bias—and the prioritization of policy, legislative, and organizational practice change as key mechanisms to reverse inequities.

Positioning trusted community-based organizations in the lead and supporting them in applying their core approaches to water quality, capture, management, and resiliency, creates conditions conducive to:

- Finding a common language with residents on water issues connected to individual and community health needs;
- Implementing culturally- and community-relevant strategies for engaging residents on environmental health and infrastructure issues;

- Establishing a level of resident trust in discussions and decision-making on water-related matters; and
- Building a regional constituency for sustainable water resiliency solutions, led by youth and adult resident leaders, indigenous to low-income and Latino, African-American and Asian-American communities.

In areas of the county without established community-based organizations able to take on this work, financial support and technical assistance are needed to allow new organizations to emerge or enable effective organizations to expand their base of operations and share their models. Environmental groups that collaborate on infrastructure demonstration projects or policy advocacy initiatives with community-based organizations working in and with low-income communities of color can implement a version of this recommended approach by instituting an internal policy that contributes a specific percentage of local funding raised for such work to these local partners. For example, NRDC's Urban Solutions program has such a policy in place to ensure that their community-based partners are sufficiently funded, thereby contributing to overall success while strengthening local, community-based capacity.<sup>209</sup>

## 5. Formalize collaboration among agencies, academics, non-profit leaders, and other stakeholders

Despite the region's embrace of integrated water management and its focus on providing environmental, economic, and social benefits in an equitable and sustainable manner, those working on water in



the region remain deeply silo-ed. The many non-profits and public agencies working on stormwater issues are disconnected from their counterparts working to address drinking water disparities and related health inequities experienced in places like Maywood, Watts, El Monte, Inglewood, and Gardena. Moreover, the units and programs within the Department of Public Health that work on various aspects of water have had little interaction with public works, flood control, sanitation and other stormwater focused agencies in recent history.

These divisions create structural barriers to building a strong, diverse, and inclusive regional movement for water quality, capture, and resiliency. They also give rise to strategic obstacles to advance comprehensive strategies to address the region's critical water needs. In order to equitably address our region's water quality, capture, and resiliency needs, it is imperative to elevate drinking water disparities as a priority of the regional water movement. Leadership of this 'big tent' must also be inclusive of the institutions that represent the interests of those communities that disproportionately experience these persistent problems.

Multi-sector engagement and collaboration is a best practice that should serve as a cornerstone in advancing effective outreach, engagement, and advocacy for future water infrastructure in the region. Water-related disparities and health inequities do not have a single cause, and no one institution or sector alone can identify or advance the comprehensive solutions required to address these difficult challenges within the exceedingly complex water milieu. Multi-sector collaboration is a very specific form of fostering connections across different disciplines and types of organizations that can work to identify a shared vision and common goals, and advance shared solutions. Multi-sector collaboration also expands available resources, strategies, and capabilities to achieve outcomes that could not be accomplished by one field alone.<sup>210</sup>

Advancing multi-sector collaboration on regional water issues that is inclusive of the public health sector as well as organizations that work closely with people living in low-income communities and people of color requires a common language and evidence-based understanding among partners about water-related disparities and health inequities as well as the strategies to reverse them. Without a clear understanding of the scope and scale of drinking water-related disparities and inequities, and recognition of the systemic and persistent root causes, well-intentioned solutions may have no effect on

inequities—or even exacerbate them. It is critically important to take into account unintended consequences of potential stormwater and drinking water improvements in light of the history of inadequate land use planning, persistent disinvestment, and lack of health-promoting resources and infrastructure in these communities. Shared understanding of these inequities will help establish baselines and monitor trends over time. In addition, engaging partners that work closely with the populations that experience these inequities will ensure that the solutions developed are consistent with the norms, cultures, and needs of the communities they serve.<sup>211</sup>

One specific way to achieve this would be to convene a ‘table’ that includes representatives from public works and public health agencies; environmental organizations; community-based organizations focused on environmental, social, and economic justice and/or the built environment; academic researchers; and other stakeholders working on all aspects of water. Other important sectors to include are labor, urban planning, and community development. (The LA County Water Resilience Plan is an example of how stakeholders are already coming together in this way, though the scope of that effort is limited to stormwater capture and cleaning.) This table should focus on determining shared goals, common language, and comprehensive solutions and objectives for achieving them, and serve as the venue for associated skill building and data analysis activities. A key outcome would be to find and elevate connections between drinking water quality and stormwater pollution abatement as a means to advance synergies between the people working on these currently silo-ed issues. This would include connections along the lines of those articulated in this report, in ways that would facilitate shared learning and network building.

From an agency standpoint, relevant units within the Department of Public Health, the Department of Public Works, the Department of Regional Planning, Office of Sustainability, and the Community Development Commission should also be communicating and collaborating to incorporate health equity perspectives into integrated water management processes. Initiating effective collaboration across these agencies will require lead work on assessing the landscape within the County’s bureaucracy and defining a strategic approach to the practical aspects of collaboration that address differing mandates, areas of overlap, and historic relationships among the various units.

## 6. Expand and enhance the role of public health in regional water efforts

The enduring connection between clean and safe water, good health, and community well-being positions the public health sector as a key player in advancing water quality, capture, and resiliency initiatives in the LA region. Public health agencies and organizations can add value to outreach, engagement, and advocacy strategies for future water infrastructure investments through their technical expertise and the work they do in and with communities. Public health perspectives backed by compelling data provide credibility to water-related decision-making processes and elevate the importance of ensuring healthy community conditions for all LA County residents.

The current water landscape presents a unique opportunity for the LA County Department of Public Health to assume a more vital role and higher profile in making linkages between water, health, and equity in the region. With internal infrastructure already in place that focuses on water quality, health equity, community engagement, and facilitation of diverse partnerships with many of the community-based organizations that work in and with low-income communities of color, the Department is well suited to be a key player in the multi-sector collaborative activities described above, in addition to taking an active role in integrated water management activities overseen by other agencies. A model of this approach already exists in LA County's Healthy Design Workgroup. Facilitated by the Department of Public Health, the workgroup brings together County staff from the departments of Public Works, Regional Planning, Parks and Recreation, the Sheriff's office, and CEO, among others. The workgroup is charged with developing policies and practices for planning, designing, and building healthy community environments to encourage safe walking, biking, access to transit, and outdoor physical activity opportunities, and promoting community gardens and farmers' markets.

Internally, there is an opportunity to formalize a more holistic approach to the Department of Public Health's water-related initiatives and programs organized around the social determinants of health and grounded in a health equity perspective. This approach is consistent with the Department's current priorities to advance health equity, reproductive health, and environmental justice.<sup>212</sup> Various units and programs within the department already work on issues that relate to water (e.g., Chronic Disease and Injury Prevention; Environmental Health; Policies for Livable, Active Communities and Environments

(PLACE); Nutrition; Acute Communicable Disease Control; Oral Health; Public Health Nursing; and more). Yet, apart from the PLACE Program (which leads the Healthy Design Workgroup that works on stormwater quality issues), few of these Department units/programs have water expertise or a direct mandate to address water in their work. A structured intra-departmental dialogue would help establish a new approach within the agency, and have broader influence on the work of the entire public health community. Coupled with other recommendations herein, this new role for the Department of Public Health could accelerate policies, practices, and norms to reverse or reduce health inequities in the region's water systems. Additional resources and regulatory authority may be needed to implement this vision for an expanded leadership role for Public Health.

A holistic approach to water would open a pathway for Department staff and the broader public health community to contribute relevant lessons learned and best practices from other public health success stories, such as:

- The importance of comprehensive, multi-pronged strategies in relation to building community capacity and organizational infrastructure.
- Working with low-income communities, people of color, and immigrant populations, and strategies for effectively navigating the increasing challenges they face while addressing specific health disparities.
- The shift in focus from individual interventions to policy, systems, and environmental change, and eliminating barriers between the fields of land use planning and public health.
- The critical role of norms change in relation to successful policy advocacy and legislative initiatives.

## **7. Develop a peer-learning/strategy network among mainstream environmental groups and community-based organizations**

The findings from this research effort shed light on the need to build capacity across the board in the non-governmental sector as a means to strengthen the regional water movement. A number of environmental organizations in the region regularly sub-contract with community-based groups to engage their low-income, Latino, Asian-American, and African-American constituencies in infrastructure demonstration

projects or watershed planning efforts. Similarly, community-based groups include mainstream environmental organizations in their policy advocacy efforts as coalition members or advisors. What does not appear to be happening, however, is ongoing peer learning and strategic planning that builds shared understanding and institutional capacity in a mutually beneficial manner, and strengthens the regional water movement. In terms of outcomes, the development and implementation of a peer network would deepen working relationships across the sectors and increase practical knowledge about the inter-relationship of priority stormwater and drinking water issues in the region, the impact of water-related inequities on communities, and theories of change underlying strategies to build power to reverse inequities through policy, systems, and environmental change, including infrastructure investments.

This recommendation cannot be implemented in isolation; it is strategically linked to several recommendations described above, including:

- *Recommendation #4:* Invest in community capacity to address water-related health disparities.
- *Recommendation #5:* Formalize collaboration among agencies, academics, non-profit leaders, and other stakeholders.

## **8. Conduct a robust, culturally competent public education initiative to build awareness and understanding of water issues.**

Public health initiatives have successfully utilized strategic public education campaigns as a means of increasing awareness about health problems, changing community norms, and creating conditions conducive to policy, systems, and environmental change. For example, in the 1980s and 90s, community-level public education campaigns about the dangers of secondhand smoke were implemented by advocates and local public health departments in hundreds of local communities throughout the U.S. These public education campaigns accelerated shifts in community norms, and smoking increasingly became unacceptable in public places. Transformation of local norms led to incremental policy changes at the local and state levels, over time completely eliminating smoking in workplaces, restaurants, bars, and outdoor venues where people congregate. Smoke-free policies have contributed to a significant decline in rates of smoking, making tobacco control a major public health success story nationally and internationally.

In our research, key informants consistently mentioned an ‘education gap’—the overall lack of awareness in the region about water issues, problems, and solutions—and the need for a comprehensive public education campaign that makes the water system easier for people to understand and promotes the linkages between clean and safe water, good health, and community well-being. The ideal public education campaign would include broad framing focused on these linkages as well as more focused messages targeting key sectors, such as city officials and elected officials, small business owners, specific geographic regions, and hard to reach populations including non-English speakers, immigrants, and low-wage earners. A key challenge and opportunity for a regional public education campaign involves developing and delivering culturally relevant messaging about drinking water quality in low-income and immigrant communities where mistrust is high and drinking water quality may be poor. Such groundbreaking work would make it imperative to have a network of community-based organizations working in and with these communities on water, health, and equity issues, and government agencies addressing these disparities and inequities proactively.

## **9. Improve data collection, research, and documentation of water-related health disparities, especially through participatory action research**

Across the board, there was agreement among key informants about the lack of sufficient data regarding water, health, and equity issues, particularly drinking water disparities. The deficit of high quality, consistent data provided by regulatory and other agencies to track water quality problems is experienced at all levels—local, regional, state, and national—on issues ranging from contamination and compliance to attitudes and beliefs about drinking water quality and system trustworthiness. Consequently, as one key informant observed, “there isn’t a knowledge base about water [in our communities] like there is for air quality.”<sup>213</sup> Coupled with lack of investments in the organizations that represent the interests of overburdened communities, the lack of access to timely, authoritative, accurate, and easily understood data is a critical barrier that inhibits awareness of water quality problems, advocacy action, as well as the development and implementation of effective policy, systems, and environmental change solutions from the ground up.

Public health agencies can play a critical role—in partnership with academic institutions and/or other agencies and organizations—in developing robust data focused on drinking water and stormwater disparities, and related health inequities. For example, public health agencies could assess the nature of the public health threat posed by aged, degraded, or contaminated premise plumbing in LA County. Collection of data quantifying water quality degradation in representative premise plumbing systems in geographically diverse parts of the region could serve as a crucial element of a comprehensive approach to reversing related drinking water problems in the region. An epidemiological study to assess the health risks associated with degraded premise plumbing in the region’s high risk communities would help pinpoint drinking water quality solutions.<sup>214</sup> Public health researchers could also model the risks associated with stormwater capture in already contaminated soil and project the health impacts of mitigation efforts as the County increasingly relies on local water sources.

Academic researchers and community-based organizations working with impacted residents can advance participatory action research initiatives to further characterize the extent of water-related health disparities and inequities, in terms of the places and populations impacted, what needs to change, and comprehensive, evidence-informed strategies to reverse them. Given the multitude of potential causes for poor water quality, funding such participatory action research on drinking water quality, especially in partnership with relevant regulatory agencies, could be a cost-effective starting point for isolating the nature of such problems—pre-meter or post-meter—as well as relevant solutions.

This recommendation could be implemented through the formation of a research advisory task force convened by the Water Foundation or undertaken as part of recommendations 5 or 6 above. The task force’s mandate could be to develop a comprehensive research agenda focused specifically on water, health, and equity in the region as well as a roadmap to stimulate funding and research project implementation. The task force should include representation from all relevant public agencies (e.g., public works, public health, planning, and sustainability), water purveyors, the business community, environmental organizations, and community-based organizations working in and with underserved communities.



Photo credit: Umberto Bray

# Looking Ahead

## Realizing the Vision of Clean, Affordable, and Sufficient Water for All

For far too long, the Los Angeles region has suffered the consequences of the ‘disconnect’ between water and people, silo-ed agencies, and the complex narratives that shape institutional agendas and individual perceptions about our most essential resource. For some communities in the region this means not having access to clean water to maintain good health, paying more for water they will not drink, and infrastructure that fails them. While the water challenges we face in the Los Angeles region are unique to our geography, history, and political economy, the root causes of the water-related health disparities and inequities identified through our research share common elements with those faced in other communities. Whether in the ‘global south’ or Southeast LA County, the problem of degraded drinking water is driven in large part by poverty and disinvestment. Similarly, the consequences of poor water governance have the heaviest impact on small, low-income jurisdictions and those populations that have traditionally been left out of decision-making processes.<sup>215</sup>

Equity is a necessary condition for a just society and improvements in water quality, capture, management, and resiliency will not succeed unless health, equity, and justice are ‘baked into’ comprehensive,

actionable solutions that reflect the characteristics and needs of underserved communities, and are monitored closely to ensure the desired outcomes. As we connect the dots between drinking water and stormwater problems, collaborate across sectors and diverse government agencies, and advance comprehensive water resilience strategies, dominant water narratives and notions of efficiency in infrastructure improvements must be aligned with the values of fairness, justice, and equity in the distribution of related costs and benefits, governance procedures, and inclusive, participatory decision-making.<sup>216</sup>

Procedural and participatory equity should be advanced through open, inclusive, and transparent decision-making processes that take into account existing imbalances in political and economic power, technical knowledge, and opportunities to affect outcomes. The goal here is to enable full and ongoing participation in meaningful, respectful forums that level the playing field with those who have traditionally benefited from professional, technical, or economic advantage.<sup>217</sup> Addressing the issue of participation, the Institute of Medicine asserts that “[t]he process of inclusion and engagement is as important as the outcomes, which should directly meet the needs of the local population.”<sup>218</sup>

This is a time of opportunity for water, health, and equity in the region. County leaders are working on a multi-pronged initiative to establish a resilient water future by increasing drought preparedness and local water self-reliance, improving water quality to protect public health, and advancing communities’ ability to adapt to the effects of climate change. At the state level, California legislators have codified access to clean, affordable, and sufficient water as a human right.<sup>219</sup> The key opportunity at this moment is to ensure that the fundamental human right to water is extended *equitably* to all communities across the region. As our population continues to grow and diversify, and our infrastructure ages, achieving a healthy, equitable, and integrated water management system is essential. We can remedy water-related inequities by creating a new paradigm that addresses and manages water from a holistic standpoint, with health and equity intentionally in the lead. This approach requires working in solidarity with the low-income communities and communities of color that currently mistrust our water systems, turn to sugar sweetened beverages as an alternative to tap water, and/or lack the green stormwater infrastructure that benefits other communities.

Failure to act on water, health, and equity is not an option. It leaves the memory and legacy of unfair treatment and dispossession firmly in place. As the authors of *Water, Place, and Equity* emphasize, “Legacies of unfair treatment leave distrust, bitterness, and disinclination to cooperation that undercuts human capacity to deal with present and future complex water problems.”<sup>220</sup> Securing the support necessary for future water infrastructure investments and improvements requires the consent and participation of a critical mass of residents from communities that historically have shouldered the burden of multiple health inequities, including those related to water. Meaningful participation goes beyond basic outreach and community engagement; it requires long-term investments to build capacity, resident leadership, and organizational infrastructure for water, health, and equity in these communities and the institutions that have historically represented them in achieving justice. These and the other evidence-informed best practices recommended here will create the conditions conducive for highly effective multi-sector partnerships and co-production of comprehensive, culturally competent strategies to achieve a water resilient future for the LA region and access to clean, affordable, and sufficient water for all.

For additional information, we have included the following appendices:

- Appendix A: Key Informant Interview Guide
- Appendix B: Governance of the Regional Water System
- Appendix C: Potable Water Governance in Los Angeles County Legend
- Appendix D: Two examples of policy and systems change innovations to advance water, health, and equity in the Los Angeles region

## APPENDIX A: KEY INFORMANT INTERVIEW GUIDE

1. Please tell me more about your [organization's] role in efforts to address water issues in the LA region. *Potential follow-up questions:*
  - a. *For those working on water:* What are your organization's priorities regarding environmental, built environment, or public works infrastructure?
  - b. *For those not working on water:* Please describe your work related to social/environmental justice, health equity, or related issues in low income communities in LA County.
2. Based upon your knowledge and experience, what are the linkages between water (quality, infrastructure, management, and climate change resiliency factors) and community health, safety, and well-being? *Potential follow-up questions:*
  - a. Are there particular linkages that come to mind when thinking specifically about LA County?
  - b. How well are these linkages understood by the general public in LA County? Your constituents?
3. What are your constituents' priorities when it comes to water generally, and more specifically to water and community health/well-being?
4. Based upon your knowledge and experience, what are some of the water related disparities and health inequities experienced in LA County communities? *Potential follow-up question:*
  - a. Can you elaborate on specific disparities and health inequities—their root causes as well as potential infrastructure solutions?
5. Based upon your experience, what challenges or barriers would have to be overcome to effectively engage low income communities of color and the organizations that represent their interests in efforts to improve water quality, infrastructure, management, or climate change resiliency? *Potential follow-up questions:*
  - a. Are there other initiatives that you can point to that have effectively overcome similar barriers?
  - b. What strategies and tactics were especially effective in overcoming those barriers?
6. What are some effective and exciting efforts taking place—or emerging—to link water quality, infrastructure, management, or climate resiliency to community health, especially in low income communities of color? *Potential follow-up questions:*
  - a. Which groups locally are at the forefront of innovative efforts in these communities?
  - b. Are there innovative practices taking place outside of LA County that you think would work well here?
7. Please name some of the groups that are effectively elevating water issues and improvements, especially in low-income communities of color? *Potential follow-up question:*

- a. What in particular have these partners brought to the table or been able to leverage to increase value to the work (e.g., approach, resources, expertise, influence)?
8. In your personal experience, what are some challenges to broad-based collaboration on environmental issues?
9. In your experiences with multi-sector collaborative action to advance community health and well-being—or the environmental, social, or economic factors that influence it—what are some of the approaches or strategies that have worked well?
10. Are there any other issues that we haven't touched upon yet that you think would improve authentic and meaningful engagement of low-income communities on water related issues and public finance measures?

## APPENDIX B: GOVERNANCE OF THE REGIONAL WATER SYSTEM

### Drinking Water Regulation

Of all the waters, drinking water is the most heavily regulated due to its obvious effects on human health. The federal Safe Drinking Water Act, enacted in 1974, provides the foundation for drinking water regulation by federal and state agencies. It compels the federal Environmental Protection Agency to set Maximum Contaminant Levels (MCLs) and rules for how to treat drinking water; these standards are supposed to be as safe as is “feasible,” considering available treatment technologies and treatment costs. Unfortunately, limits have been set for fewer than 100 contaminants—a small fraction of the more than 60,000 chemicals in use in the United States, not to mention potentially harmful microbial organisms. Unregulated contaminants could still pose a health threat.<sup>221</sup> In LA County, most water systems meet their MCLs (about 10 of the smaller ones in LA county violated these standards in 2015)<sup>222</sup> but the water provided by some systems still smells or tastes bad or appears cloudy or colored. Aesthetic issues are covered by Secondary Maximum Contaminant Limits,<sup>223</sup> but compliance with these regulations is voluntary. According to one key informant, water systems “do not have to do anything about secondary contaminants until they get on the primary list.”<sup>224</sup> This leaves residents with no legal recourse to address water that is technically compliant but for all practical purposes undrinkable.

Compounding issues, the sheer number of small systems poses a regulatory challenge since state regulators do not have the staffing levels needed to do more than a minimal level of enforcement. As one key informant interviewee described, “Large systems have to run every test in the world, including testing in homes. Smaller systems [with fewer than 200 ratepayers] don’t have to test in homes. They barely have one person working on treatment.”<sup>225</sup> Even if residents were to organize for better water quality, small private utilities are generally insulated from political pressure without an active regulator. Unless there is a MCL or treatment technique violation, the State Water Board has little statutory authority to require improvements.<sup>226</sup> Furthermore, smaller utilities generally lack the customer base to pay for needed investments in treatment plant upgrades or distribution system maintenance, even when required by a regulator.<sup>227</sup> Complicating the matter, local water systems may be governed by local residents who have to pay for any changes, meaning they need to balance the costs of infrastructure improvements with what they can afford. The result is that low-income communities with small systems are often saddled with higher rates and lower quality water than their larger neighbors.<sup>228</sup> Residents are captive customers with no choice but to pay whatever price for whatever comes out of the tap.

For the last couple of years, the State Water Board and California Public Utilities Commission has been actively encouraging consolidation of smaller

systems in order to achieve economies of scale, but consolidations are occurring at a pace of a handful per year in a state with over 3,000 independent water utilities. Thus far there has been little progress made in urban areas and all of the state funds available for consolidation have already been expended.<sup>229</sup> Short of forcing consolidation, the State can make it easier for smaller systems to access technical assistance and funding for infrastructure upgrades, but small utilities often don't have the technical or managerial capacity to construct, operate, and maintain infrastructure over the long term.

## Groundwater Regulation

Groundwater management offers the greatest potential to add to the local water supply. LADWP estimates that the San Fernando Valley groundwater basin has more available capacity than any proposed dam site for new surface storage in the state.<sup>230</sup> However, many aquifers in LA County are contaminated from legacy industries and ongoing polluting land uses. Water utilities that rely solely on local groundwater, like in Maywood, are extremely vulnerable to such contamination.<sup>231</sup> Though the Regional Water Quality Control Board and the Department of Toxic Substances Control have the authority to regulate discharges to groundwater basins and soils, they have been reluctant to exercise it. Underground pollution can be hard to trace back to the source, making it difficult and time consuming to hold polluters financially liable, if they are even still in business. Because aquifers function like slow-moving underground rivers, contamination isn't isolated to the source; it spreads in a plume that can speed up or slow down in response to pumping or infiltration. Advances in technology have the potential to make tracing plumes much easier, creating opportunities for more effective monitoring and enforcement.

Groundwater pumping has historically been unregulated in California, except for adjudicated urban basins that have court oversight and supply multiple water systems. For example, the Central Groundwater Basin, which lies under the lower Los Angeles and San Gabriel Rivers south of Whittier Narrows, is governed by two court settlements and designated "watermasters."<sup>232</sup> Managing groundwater requires navigating complex water rights to ensure that agencies like the Central Basin Municipal Water District are able to buy imported and recycled water, infiltrate it into the aquifer, and then sell it to water utilities that treat it and deliver it to customers. These agencies essentially manage the inflows and outflows for each part of the watershed, divided by natural geological and hydrological boundaries. Importantly, they are able to monetize the value of water as a resource, providing a potential funding source for more integrated watershed management.

## Stormwater Regulation

After devastating flooding in the early 20<sup>th</sup> century, the LA County Flood Control District and US Army Corps of Engineers began encasing the region's rivers in concrete in order to protect life and property and enable urban development. Channelizing the rivers had many adverse consequences for the region's hydrology and ecosystem, however. Concrete-bottomed rivers don't allow freshwater to infiltrate into the aquifer, leading to gradual depletion of groundwater supplies, but this was not seen as a critical issue at the time with abundant water flowing into the region from the new Los Angeles Aqueduct. While natural rivers and streams provide multiple benefits, including capturing sediment and pollutants and providing places for nearby residents to play, storm drains are extraordinarily efficient at their sole purpose: conveying runoff—and all the pollution

it contains—into rivers and out to the region’s beaches, impacting recreational opportunities, habitat quality, and human health.<sup>233</sup> The flood control channels themselves also pose a safety risk to nearby residents who, with few other places for recreation, use the channelized rivers for recreation and play.

Responsibility for surface water is complicated. The LA County Flood Control District and Army Corps of Engineers maintain jurisdiction over the region’s rivers and manage them primarily as flood control infrastructure, with habitat, recreation, and water capture as secondary purposes. Under the state’s Porter-Cologne Water Quality Control Act and the federal Clean Water Act, the Los Angeles Regional Water Quality Control Board is responsible for setting and enforcing standards to protect surface and groundwater quality. Litigation over enforcement of Clean Water Act standards resulted in a legal judgment holding municipalities financially liable for the contaminants running off their streets into creeks and rivers. Thus, cities, the County, state agencies, and federal agencies all have a stake in stormwater management, but their focus has primarily been risk management and regulatory compliance.

With imported water becoming increasingly expensive and a regulatory requirement to capture and treat stormwater, agencies are now recognizing the value of managing stormwater for more than just flood control objectives. As one key informant said, almost everything we are doing around water management right now is “with the goal of reducing our dependence on imported water in light of the fact that imports are going to be cut and cut over the next few decades, as they have been over the last few years. It now becomes an issue of preparing Southern California, and LA County specifically, for a 100%—or close to 100%—local water reliance future.”<sup>234</sup> To do that, it

becomes imperative to set goals and benchmarks around “more local water supply that is recycled and more stormwater capture, which requires making investments in both of those, as well as maintaining our aqueduct infrastructure as we continue to import.”<sup>235</sup>

Financially, stormwater is the “orphan utility.” Unlike drinking water, groundwater, and wastewater, stormwater management has no sustainable financial mechanism to capture its value or charge users for a service, despite a range of \$5.7 to \$50 billion in estimated need to achieve compliance with water quality requirements.<sup>236</sup> In California, Proposition 218 limits agencies’ ability to levy new fees without a two-thirds vote of the electorate unless the agency qualifies as a utility. This has provided a tall hurdle for raising the needed funding that only a few small cities have been able to overcome. Short of a voter-approved tax measure, cities are forced to use general funds to pay for compliance, with the greatest impact falling on those most reliant on government services. One potential workaround is for utilities to pay for stormwater capture projects that directly result in quantifiable new supplies. However this is likely to continue to be rare due to legal and technical uncertainty; stormwater treatment projects that do not also capture the water would be ineligible.<sup>237</sup>

To satisfy the Regional Water Board, cities have the option to participate in watershed management programs that facilitate collaboration among multiple jurisdictions to identify the most cost-effective water quality projects and share financial responsibility for implementation. Participation in a watershed management program provides limited immunity to cities that make a good faith effort to implement water quality measures, even if those improvements do not fully resolve pollution in the affected water body.<sup>238</sup>

Stormwater projects are important not only for the water quality and water supply improvements they offer, but also for their co-benefits of recreation, open space, habitat, and employment, all of which are determinants of health. Integrated watershed planning can maximize co-benefits while

addressing the primary purpose of water quality and supply. Furthermore, integrated planning brings more partners to the table to address water quality beyond just permittees and regulators, providing a supportive environment for concerns about health equity to be raised.

## APPENDIX C: POTABLE WATER GOVERNANCE IN LOS ANGELES COUNTY LEGEND (See graphic, p. 34)

### Number to Entity Legend

- |  |  |
|--|--|
| 1. Amarillo Mutual Water Co                | 37. Lincoln Avenue Water Company                                 |
| 2. Arroyo Seco Aton Canyon                 | 38. Los Angeles County Waterworks District #21<br>-Kagel Canyon  |
| 3. Bellflower-Somerset Mutual Water Co.    | 39. Los Angeles County Waterworks District #29<br>-Malibu        |
| 4. City of Bellflower                      | 40. Los Angeles County Waterworks District #40<br>-Manna Del Rey |
| 5. City of Cerritos                        | 41. Maywood Mutual Water Co.#1                                   |
| 6. City of Compton                         | 42. Maywood Mutual Water Co.#2                                   |
| 7. City of Covina                          | 43. Maywood Mutual Water Co.#3                                   |
| 8. City of El Monte                        | 44. Mesa Crest Water   |
| 9. City of El Segundo                      | 45. Millard Canyon   |
| 10. City of Huntington Park                | 46. Montebello Land and Water and Company                        |
| 11. City of Industry                       | 47. Orchard Dale Water District                                  |
| 12. City of La Verne                       | 48. Pico Water District  |
| 13. City of Lakewood                       | 49. Puente Basin   |
| 14. City of Lomita                         | 50. Raymond Basin  |
| 15. City of Lynwood                        | 51. Rubio Canon Land and Water Association                       |
| 16. City of Manhattan Beach                | 52. Rubio Canyon   |
| 17. City of Monrovia                       | 53. Russell Valley Basin   |
| 18. City of Norwalk Municipal Water System | 54. San Antonio & Evey Canyons                                   |
| 19. City of Paramount                      | 55. San Dimas Canyon Creek                                       |
| 20. City of Pico Rivera                    | 56. San Gabriel County Water District                            |
| 21. City of San Fernando                   | 57. Santa Anita Canyon   |
| 22. City of San Marino                     | 58. Santa Monica Basin   |
| 23. City of Santa Fe Springs               | 59. Sativa- Los Angeles County Water District                    |
| 24. City of Sierra Madre                   | 60. South Montebello Irrigation District                         |
| 25. City of Signal Hill                    | 61. Spadra Basin   |
| 26. City of South Gate                     | 62. Sunny Slope Mutual Water Co.                                 |
| 27. City of South Pasadena                 | 63. Surface  |
| 28. City of Vernon                         | 64. Sylmar Basin   |
| 29. City of Whittier                       | 65. Valencia Heights Water Co.                                   |
| 30. Cresenta Valley County                 | 66. Valley County Water District                                 |
| 31. Hollywood Basin                        | 67. Valley View Mutual Water Co.                                 |
| 32. Kinneloa Irrigation District           | 68. Valley Water Company   |
| 33. La Canada Irrigation District          | 69. Verdugo Basin  |
| 34. La Habra Heights County Water District |  |
| 35. La Puente Valley County Water District |  |
| 36. Las Flores Water Company               |  |

## APPENDIX D: TWO EXAMPLES OF POLICY AND SYSTEMS CHANGE INNOVATIONS TO ADVANCE WATER, HEALTH, AND EQUITY IN THE LOS ANGELES REGION

Recommendation 3 calls for supporting innovative policy and systems change solutions using local authority. Two examples of these kinds of solutions are provided below.

### Health Impact Assessment of Consolidation

A health impact assessment (HIA) is a tool that can help advance effective policy development. According to the National Academy of Sciences, HIAs collect and analyze scientific data, professional expertise, and stakeholder input to prospectively identify and evaluate public health consequences of proposed policies, programs, and projects, as well as suggested actions that could be taken to minimize adverse health impacts and optimize beneficial ones.<sup>239</sup> HIAs are increasingly utilized by decision-makers in the US at the federal, state, and local levels; the LA County Department of Public Health recently established its own HIA unit.<sup>240</sup>

As described above, many of the small community water systems that serve the region's disadvantaged communities lack the technical, financial, and managerial capacity to adequately provide their customers safe, clean drinking water. Like other small systems in California, they face common problems including poor water quality, increasing retail water costs, and over-reliance on a single source of water. Consolidation of these small water systems with larger, higher capacity

systems is increasingly understood to be a viable means to ensure adequate drinking water supply for all residents of California. Despite having the largest number of small water systems in California, there have been few consolidations in the LA region, increasing preventable risk to customers' health. An HIA could prospectively analyze the potential health and equity impacts that would result from consolidating small water systems in LA County, and help inform policy and programmatic decisions to advance consolidation efforts in the region. An HIA could also identify interim steps short of consolidation that would increase the capacity of small systems to deliver clean, safe, and affordable drinking water, such as technical assistance from health regulators or financial resources.

According to the UCLA Luskin Center for Innovation, while the California state government has eliminated some of the primary barriers to consolidation, local governments with their land use and planning authority can play an important role in advancing consolidation. Countywide policies "that encourage small system consolidation can improve customer affordability and system resiliency, enable responsible economic growth, and reduce the risk of adverse health outcomes for customers."<sup>241</sup> An HIA on small water system consolidation could assist LA County decision-makers to use their authority to be more proactive on this issue and bring small water systems into compliance with the Safe Drinking Water Act.

## On-Premise Plumbing Solutions

The long-term nature of solutions to address degraded drinking water delivery infrastructure and remediate groundwater contamination should not deter local governments from taking action on degraded on-premise plumbing and the resulting tap water that is unsuitable for drinking. State government assistance and municipal incentives and/or requirements to test for and replace degraded, corroded, or lead contaminated plumbing and fixtures in single family and multi-unit rental housing, public schools, and day care facilities can reliably reduce exposure of children and other vulnerable populations in the region to poor quality drinking water and the contaminants it may contain.

Local governments should explore using their authority and resources to:

- Strengthen building code requirements and add inspection requirements for on-premise plumbing before the sale or lease of residential property as well as when major property changes or improvements are made;<sup>242</sup>
- Provide incentives or rebates for low-income homeowners and owners of multi-unit housing in low-income neighborhoods to replace degraded plumbing and fixtures; and
- Purchase equipment in bulk for resale to property owners at lower cost to take advantage of economies of scale on common plumbing fixtures.

Other local innovations to explore focus on expanding, supplementing, or leveraging existing California State programs to:

- Provide assistance to public schools (K-12) to conduct water sampling for lead and to provide technical assistance if an elevated lead sample site is found;<sup>243</sup> and
- Provide funding for the installation, replacement, or repair of drinking water fixtures and associated plumbing that are necessary to address lead contamination identified by a school's public water system.<sup>244</sup>

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