Reclaiming Water and the Right to the City in Los Angeles:

Compton Commons

by

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I hereby declare that I am the sole author of this thesis.

This is a true copy of the thesis, including any required final revisions,
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ABSTRACT

The greater Los Angeles urban area is home to nearly 19 million people, but has local water resources that can only support a population of approximately one million. Los Angeles has always depended upon a large proportion of imported water, but severe droughts within the last three years have resulted in water shortages that have critical implications for the future of the city. In addition to these water supply issues, this thesis examines larger questions of scarcity, inequity and social justice that manifest themselves in the urban fabric of Los Angeles, a city that has the least amount of parks and public spaces of any major city in North America and has been rife with inequality, racism, poverty and crime.

The term 'metabolic rift', refers to the division between humanity and nature, and the resultant ecological crises wrought by industrial capitalism[1]. This concept can be expanded to include all manner of socio-ecological crises produced by processes of neoliberal global capitalism. The metabolic rift is a space of exclusion and subjugation, degradation and precarity, scarcity and toxicity—an expanding territory of perpetual crisis. In examining the evolution of the urban development of Los Angeles in the context of the production of metabolic rifts and increasingly critical water scarcity, this thesis correlates the production of a capital-driven urban fabric and the expanding network of hydrological infrastructures. In this, issues of sustainability, environmental and social justice, as well as critiques of late capitalism and nature-culture discourses are interrogated.

To address issues of water scarcity, this thesis proposes a strategy of tapping into the storm water sewer network of Los Angeles, channelling this water, regarded as a waste product and a hazard, and transforming it into a resource. This water will be reclaimed through a network of constructed wetlands that perform a hybrid function as storm water management and water treatment infrastructure, as well as parks and public spaces. This design proposal also includes a mixed use development in Compton that incorporates housing, community programs and a constructed wetlands park. The ambition is propose a model that can be a robust and sustainable approach to water conservation and management, as well as a space of inclusion—a productive *commons* outside the territory of capitalism.

[1] John Bellamy Foster, "Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology," *The American Journal of Sociology* 105 (2) (1999): 381. doi: 10.1086/210315.

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INTRODUCTION

If there is a term that comprehensively characterizes the 21st century, it would be *crisis*. The most highly discussed among these is anthropogenic climate change and the multitude of negative impacts it has generated. There has also been an emerging awareness of a constellation of crises related to water, in terms of both scarcity and excess. There is extended drought, desertification, and rapid groundwater depletion in a growing number of regions around the globe, as well as a lack of clean drinking water for more than one billion people. Rising sea levels and increasingly extreme weather events have contributed to a dramatic rise in devastating flood events across the world. There have also been a series of global economic crises, as well as unprecedented levels of economic inequality in both developed and developing countries.

When considered separately, these issues, as well as a host of others, can be overwhelming in their complexity, and the prospect of adequately addressing them appears dim. However, if they are not considered in isolation, and could be analyzed as symptoms of a more central structural crisis, this could provide a comprehensive and robust framework to begin to address them. This thesis investigates the possibility that this central crisis has arisen from the structural contradictions at the core of neoliberal global capitalism and the techno-scientific apparatuses that have enabled its explosive expansion and the unprecedented levels of the production of nature it has achieved.

This thesis explores these crises in the context of the historical development of Los Angeles and the contemporary issues it is facing. LA's relationship with water has been defined by phenomena stemming from both scarcity and excess. Socio-economic inequity has left an indelible impact on the fabric of the city and continues to be a critical issue. Los Angeles is a major global city—a first-tier node in world-wide capital networks, and thus, expresses many of the symptoms of stark income inequality and increasingly critical levels of unaffordability in housing markets experienced in cities like New York and London.

Chapter 1 of this thesis investigates the history of the development of Los Angeles through the lens of its relationship to water, which has been, and continues to be, a defining element of the city. Los Angeles has a limited supply of local water resources, and has needed to continually increase this supply throughout the 20th century as population growth surged, and the city and surrounding area expanded to what is now a vast metropolitan area of over 87,000 km^2 with

nearly 19 million people[2]. This has been largely achieved through the acquisition of resources from progressively distant sources—the Owens River, the Sacramento-San Joaquin delta, and the Colorado River.

A counterpoint to this expansion of imported water supplies, as a genealogy of scarcity, is sporadic surges of excess—a history of devastating floods and ongoing efforts to contain their damage. The most iconic and definitive of these mitigation efforts was the work of the US Army Corps of Engineers to transform the Los Angeles River and many of its tributaries into a vast network of concrete-lined channels designed to transport stormwater, as quickly and efficiently as possible, away from highly developed urban areas and into the ocean.

Recently, a multi-year drought has strained California's already limited water resources, prompting a state-wide mandate of a 25% reduction in water use. Increased demand from projected population growth and uncertainty of supply due to climate change suggest that this scarcity will be the 'new normal' and that innovative conservation strategies will be needed to ensure that diminishing water supplies can meet the growing needs of a populous and economically productive state.

Chapter 2 investigates the dynamics of capitalism and its relationship to human and non-human actors in the biosphere through the theoretical framework of the 'metabolic rift'[3], a term coined by John Bellamy-Foster to advance the analysis of the environmental and social degradation wrought by 19th century industrial capitalism as detailed by Karl Marx. In locating the processes of capitalism in both environmental and human spheres, this theoretical construct provides an analytical framework to investigate a myriad of crises.

'Uneven development' is another theoretical construct employed in this thesis to examine both environmental and socio-economic issues. Where the concept of the metabolic rift examines the meta-level crises of capitalism, the theory of uneven development investigates how these are manifested spatially. Chapter 3 details this theory and illustrates its manifestation, in a variety of examples, in the built fabric of Los Angeles. While there are universal tendencies of neoliberal global capitalism, its forces can have highly localized expressions, privileging some people while marginalizing others—enhancing some environments while degrading others.

Chapter 4 introduces a theoretical construct, 'the right to the city', that posits a response to structural inequities of capitalism through the advancement of the notion that participation and

[2] City Population, "Los Angeles-Long Beach Combined Statistical Area," Accessed March 14, 2015, http://www.citypopulation.de/php/usa-combmetro.php?cid=348.
[3] John Bellamy Foster, *ibid.*, 301.

agency in the urban sphere is a basic human right. This challenges the exclusive nature of private property rights, a fundamental construct of capitalism. The second part of this chapter, ***Excavating the Commons***, outlines an alternative model of property rights, 'the Commons', as a third pillar of governance alongside capitalism and representative democracy. Its potential for community-based property ownership, political agency, and economic self-sufficiency will be investigated.

Chapter 5, ***Compton Commons***, extends the investigation into commons-based resource and property management and posits a strategic platform for integrating these concepts into the design of a mixed-use development that provides a foundation for community-building based on inclusivity, resource stewardship, affordability and grassroots economic development. This approach is meant to foster a transition from a 'government' paradigm to a 'governance' model. A top-down approach will be supplanted by a bottom-up approach to resource management. In this model, water resources will be managed by the community at the sub-watershed level in a transparent and inclusive manner that brings together expert knowledge, community consultation and stakeholder involvement in a results-oriented governance process that is based on accountability, flexibility, and transparency. Property and economic development, community services, arts, culture and leisure will be managed in a similar manner—through community involvement and consensus building—not provided from above as a government service or capitalist commodity.

The culmination of this thesis is the design of a masterplan for ***Compton Commons***, a locally-scaled response to the issues that have been investigated. It is not intended to be a comprehensive solution to the issues investigated, but a contribution to a larger contemporary discourse involving of a multitude of proposals, critiques, projections, and future imaginaries. This design proposal is positioned between the practical and the speculative; it has objectives that are ambitious yet achievable, combined with goals that slightly push the boundaries of what is considered possible today.

1.0 LOS ANGELES | WATER

1.1 Ordinary Extremes

Los Angeles has always had a complex relationship with water, a love-hate affair marked by dependence and fear, scarcity and excess. The image of an idyllic paradise of perpetual sunshine spurred the city's early years of explosive growth, attracting a multitude of Easterners who sought out the benign environment of warm air and fair skies—a climate that reputedly had the power to cure a wide variety of ailments.[4] Here at western end of the continent was an earthly Eden, where it was neither too cold nor too hot and where the air was softened by moisture from the ocean but it hardly ever rained. This image of paradise that Los Angeles' boosters have aggressively promoted has driven dramatic levels of urban growth, but the limited amount of local water resources has also historically been the most significant factor constraining the city's otherwise unfettered development. However, Los Angeles is not only about sunshine and water scarcity, it also epitomizes the old adage that when it rains, it pours. Or expressed more dramatically, "it neither rains nor pours; the skies simply open up and dump oceans of water on the land."[5]

LA's mediterranean climate is characterized by long periods of drought punctuated by infrequent and extreme precipitation events. 92 percent of the annual precipitation in Los Angeles falls between November and May. Rainfall is unevenly distributed within each year, also exhibiting greater year-to-year fluctuations than is typical for cities in temperate climates. To a meteorologist, "when viewed serially, historic seasonal rainfall totals in the Los Angeles area display an almost aggravating randomness."[6] In these conditions, meteorological averages lose their value as predictors of typical conditions and "average is only a transitional state between extremes of wet and dry, flood and drought."[7] In LA's climate, extremes are commonplace.

Urban theorist Mike Davis outlines an instructive comparison of how different groups of settlers arriving in Southern California perceived this climate. The first wave of non-native arrivals, "the Franciscans and their Spanish military escorts…were intimately familiar with the dramatic landscape metabolism of the Mediterranean region." In contrast, the large number of Easterners and Midwesterners who began

4 Carey McWilliams, *Southern California Country: An Island on the Land* (New York: Duell, Sloan & Pearce, 1946), 96–103.
5 *Ibid.*, 184.
6 "The Climate of Los Angeles, California," National Weather Service – Los Angeles/Oxnard Weather Forecast Office, accessed February 3, 2015, http://www.wrh.noaa.gov/lox/archive/LAClimate_text.pdf, 26.
7 *Ibid.*, 26–27.

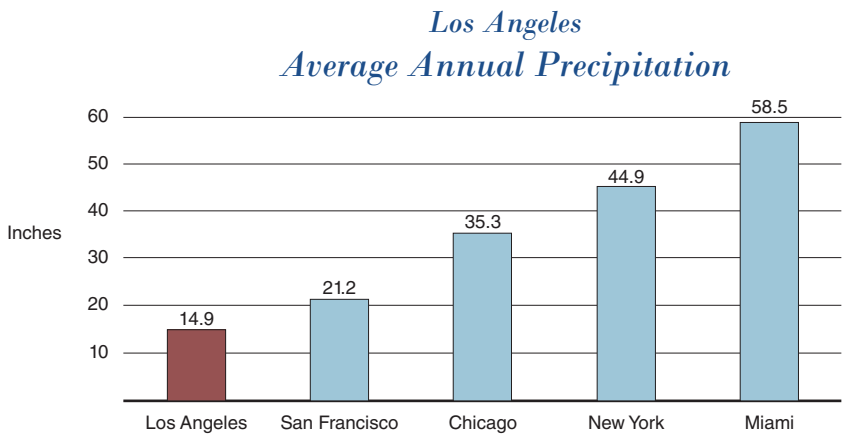


Fig. 1.01 *Average annual precipitation of 5 major U.S. cities*

settling in Los Angeles roughly a century after the Spaniards' arrival literally lacked the words to describe this kind of environment. "English terminology, specific to a humid climate, proved incapable of accurately capturing the dialectic of water and drought," Davis asserts.[8] In one illustrative example, *chaparral*, the word for the thick, tangled, and highly combustible shrubs that cover the hillsides of coastal Southern California, is believed to have originated from the Basque language.[9]

Mediterranean climates differ from the temperate climates of the Eastern U.S. and northern Europe in several important ways. In temperate climes, low-intensity, high-frequency events are the principal climatic driver, but in California's mediterranean climate, the opposite is true. In contrast to the gradual onset of fairly consistent precipitation events, change in climatic conditions comes in sudden bursts—the result of high-intensity, low-frequency events[10] (see Figures 1.01, 1.02, 1.03 and 1.04). Mediterranean environments are also characterized by a much greater degree of complexity than is typical of temperate environments. This is due in part to the topography of Southern California; the mountains ranges surrounding Los Angeles create numerous microclimates within a small area. Each microclimate constitutes a unique ecological niche, resulting in greater biodiversity-more complexity per square mile. This greater complexity also introduces a significant degree of uncertainty, displaying characteristics of a chaotic system in which "small changes in driving variables or inputs – magnified by feedback – can produce disproportionate, even discontinuous, outcomes."[11] An example

8 Mike Davis, *Ecology of Fear: Los Angeles and the Imagination of Disaster* (New York: Metropolitan Books, 1998), 11–13.
9 Merriam-Webster Online, s.v. "chaparral," accessed April 30, 2015, http://www.merriam-webster.com/dictionary/chaparral.
10 Davis, *Ecology of Fear*, 17–18.
11 *Ibid.*, 19.

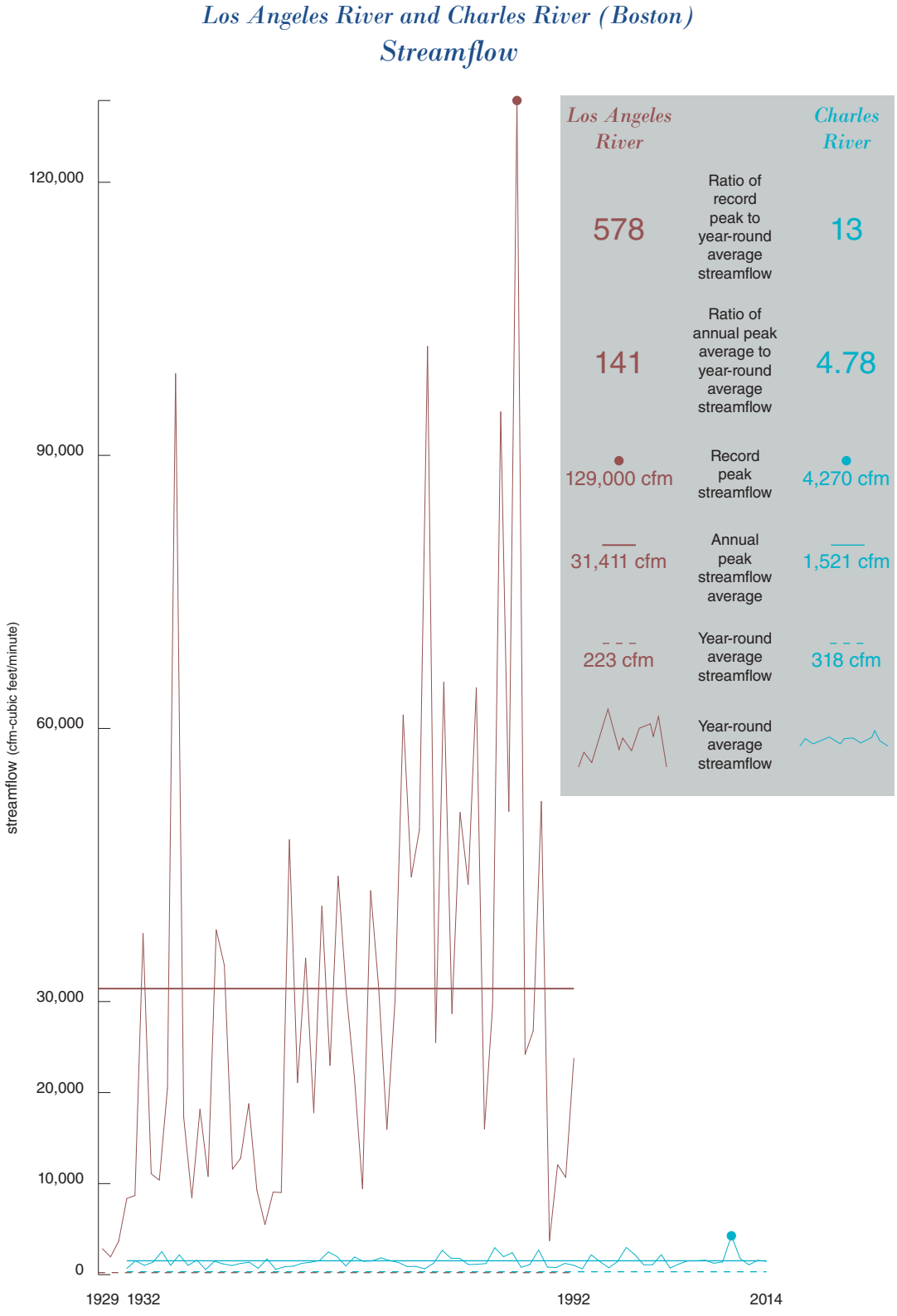


Fig. 1.02 *Streamflow—Los Angeles and Charles Rivers*

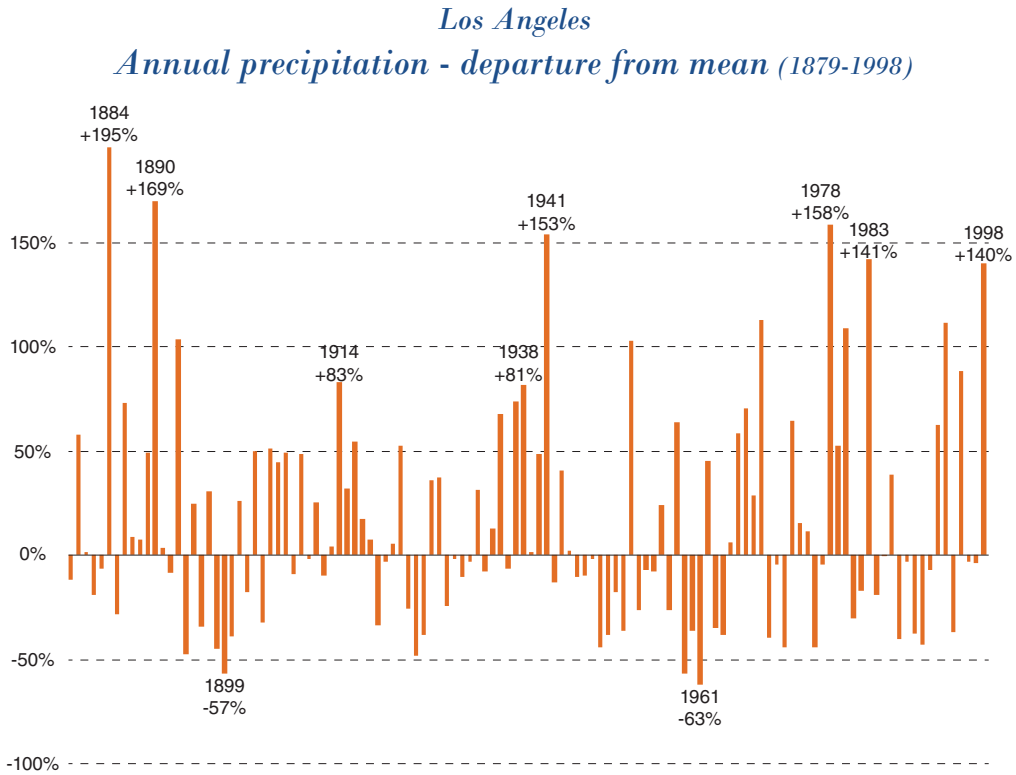


Fig. 1.03 *Los Angeles-Annual precipitation-departure from mean (1879-1998)*

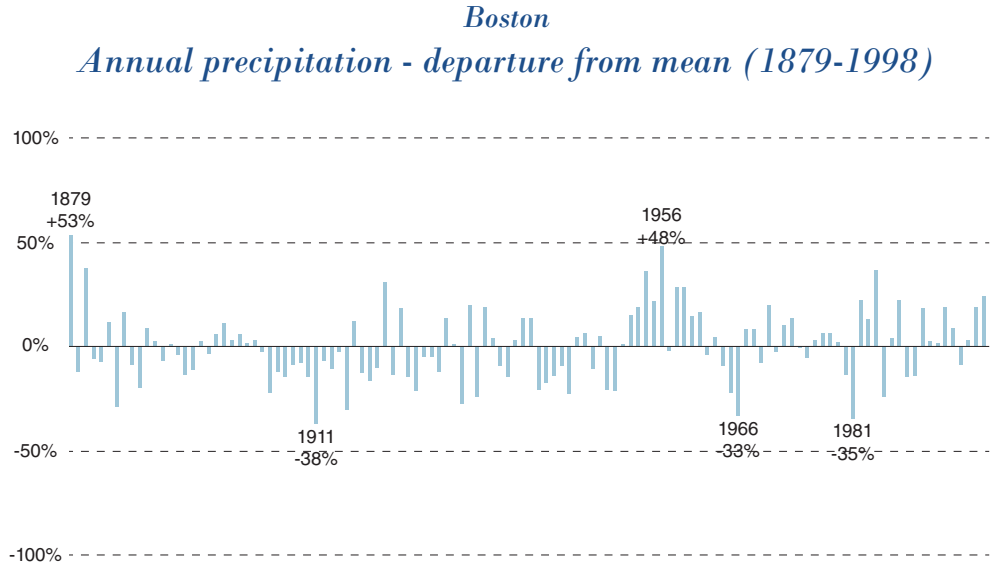


Fig. 1.04 *Boston-Annual precipitation—departure from mean (1879-1998)*

of such a feedback loop, one which has caused major destruction in greater Los Angeles over the years, is the cycle of fire-flooding-erosion. Multiple-year droughts create ideal conditions for wildfire; these fires sweep rapidly through the hills, leaving their slopes barren. When the drought is broken by a heavy rain event, there is nothing to hold the hillsides in place, and massive flows of mud and boulders surge down into the valleys. In these situations, fire and flooding amplify each other's effects. The current drought in California exemplifies this process; extreme drought over several years (2012-2015) was accompanied by heavy—but brief rainfall in the spring of 2015, which caused localized flooding and extensive landslides, followed by wildfires in September 2015.

The chaos and complexity that define the climate and landscape of Southern California share similarities to the dynamic systems of rivers. Geologist Jeffrey F. Mount describes a cycle known as 'dynamic metastable equilibrium', in which dramatic shifts in a river's morphology occur that can be related to long-term changes in climate, tectonics/geology, and "the cumulative impacts of certain land use practices."[12] While the existence of some kind of relationship between these elements is well established, what is less understood is the way that incremental changes in these external variables eventually precipitate short-term bursts of change in rivers. In search of a scientific explanation for such cataclysmic episodes, geologists have proposed theories about thresholds that, once crossed, trigger massive change.[13] Knowledge of these forces is incomplete and predictive models are problematic and nearly impossible to establish. These systems are not random in the strictest sense, but the logic of their operation is so complex that they usually defy human attempts to forecast their outcomes. Tinkering with such complex systems is, from Mount's perspective, a risky and ill-advised endeavour. This point of view, he believes, is

> significantly different from that held by most hydrologists and engineers, who see a river as a…hazard whose seemingly capricious behavior needs to be controlled by bigger and better engineering solutions. Problems created by altering the variables will be corrected by yet more engineering solutions. The geologist sees these solutions as ultimately 'temporary' and doomed to eventual failure.[14]

1.2 Water Supply

1.2.1 The Los Angeles River

The paradoxical nature of LA's natural context is exemplified in what was once a defining

12 Jeffrey F. Mount, *California Rivers and Streams: The Conflict Between Fluvial Process and Land Use* (Berkeley: University of California Press, 1995), 11.

13 *Ibid.*, 12.

14 *Ibid.*, xiii.

natural feature: the Los Angeles River. LA's downtown is located fifteen miles inland from the Pacific Ocean, on a site devoid of any remarkable features, near the part of the river known as the Glendale Narrows—the only reliable, year-round source of fresh water in the entire LA Basin.[15] For the Native Americans who had established their villages along its banks for thousands of years, for the Spanish missionaries who encountered them in the late 18th century, and for the residents of the young city that grew up around the pueblo, the LA River was a source of life. Early accounts described a lush riparian landscape teeming with wildlife, a stark contrast to the industrialized corridors flanking the concrete-lined channels of the contemporary LA River. In the time before the urbanization of Los Angeles there were oak, walnut, willow and cottonwood trees among the bulrushes, reeds and cattails (see Figures 1.05 and 1.06). The riparian corridors of the river provided habitat for deer, antelope, coyotes, gray foxes, mountain lions, and the occasional grizzly bear. The ecosystem of the river and its tributaries supported at least seven species of fish and more than 100 bird species such as nighthawks, cactus wren, roadrunners, long-eared owls, California quail, and green-backed herons, to name a few.[16] Prior to the arrival of Europeans, the Tongva (Gabrielino) peoples native to the Los Angeles region lived a hunter-gatherer lifestyle from the bounties of the river. The Tongva derived the raw materials for all of their food, clothing, and shelter from the plant and animal life sustained by the river's ecosystem.[17] When the Spanish arrived in the region, there were some twenty-six villages within one mile of the river.[18] One of the largest of these villages, called Yangna, is believed to have been located near the present-day location of Union Station in downtown Los Angeles.[19]

On September 4, 1781, a group of eleven families recruited by Spanish authorities established El Pueblo de Nuestra Señora la Reina de los Ángeles de Porciúncula.[20] They tapped the river's flow to supply their needs, beginning with the construction of the *Zanja Madre* (mother ditch), which ran south from the river to the plaza, the hub of the new settlement. In the years to follow, the zanja system was expanded to allow more lands beyond the pueblo to be settled and cultivated. By the 1880s, the system had expanded enough in scale and complexity to require the employment of a zanjero and

15 Blake Gumprecht, *The Los Angeles River: Its Life, Death, and Possible Rebirth* (Baltimore: Johns Hopkins University Press, 1999), 4, 26–30.
16 *Ibid.*, 22–26.
17 *Ibid.*, 31–32.
18 *Ibid.*, 29.
19 *Ibid.*, 29.
20 *Ibid.*, 43.

several assistants.[21] Water from the river, distributed through the zanja network, enabled the transformation of the semi-arid LA basin into a cultivated landscape of vineyards and orchards. The riparian environment described in earlier accounts was gradually replaced by thousands of acres of oranges and lemons, olives and grapes.[22] The abundant harvest from these fields, with embellishment from city boosters, contributed to LA's turn-of-the-century image as a garden paradise. This image, disseminated through a variety of media, from fruit crate labels to World's Fair exhibits, played a significant role in attracting new settlers to Southern California, fostering the region's first major population boom.

1.2.2 The Need for Imported Water

Los Angeles was a sparsely populated agricultural settlement until late in the 19th century, even as San Francisco's population exploded during the Gold Rush era. LA was yet to be connected to the rest of the nation, isolated by mountains on three sides and by an ocean on the fourth (the port at San Pedro Bay, now the nation's busiest, was then in its infancy). In 1876, however, the first transcontinental railroad arrived, virtually assuring that Los Angeles's future would be urban.

By the beginning of the 20th century, the region's population had grown substantially. This wave of growth was unique in that most of people who came to LA at this time were searching not for a living, but for the 'good life'. This contrasts with the desperate motivations of those who would come to LA in subsequent migrations (Dust Bowl refugees during the Depression, African Americans during World War II, and an array of Latino and Asian groups more recently). Those arriving in Los Angeles at the turn of the century were, as characterized by Mike Davis, "the restless but affluent babbitry of the Middle West…retired farmers, small-town dentists, wealthy spinsters, tubercular schoolteachers, petty stock speculators, Iowa lawyers, and devotees of the Chautauqua circuit."[23] It was irrelevant that Los Angeles had yet to develop a burgeoning economic base. The Southern California landscape appealed to their desire for idyllic landscapes, mild climate and a greater contact with the 'exotic'. In *Los Angeles: The Architecture of Four Ecologies* (1971), Reyner Banham argued that "it was this promise of an ecological miracle that was the area's first really saleable product – the 'land of perpetual spring'."[24]

Los Angeles's population was more than doubling every ten years (see Figure 1.07). It

21 *Ibid*., 77.
22 *Ibid*., 55.
23 Mike Davis, *City of Quartz: Excavating the Future in Los Angeles* (London: Verso, 1990), 25.
24 Reyner Banham, *Los Angeles: The Architecture of Four Ecologies* (Berkeley: University of California Press, 1971), 13.

Fig. 1.05 *Los Angeles River (ca. 1900)*

Fig. 1.06 *Farmland and the Los Angeles River looking north from Elysian Park (ca. 1895)*

soon became clear that the river would not be able to supply all the city's water needs for much longer. It was estimated that the river could dependably supply 45 to 50 million gallons per day (MGD). Per capita water use was slightly over 300 gallons per day (far higher than in most cities), so the river could only sustain a population of about 150,000.[25] The discovery of artesian waters beneath the LA Basin seemed to offer a solution to the problem. These waters, like the debris cones and alluvial plain underlying the city, had accumulated over millions of years. When the first wells were drilled in the 1870s, the subterranean water would sometimes shoot up dozens of feet in the air. There was a widespread belief at the time that the supply of these waters was limitless, but by the turn of the century the water table had already declined substantially in many places. Water that had gushed forth in 1875 could scarcely be made to appear in 1900, even with concerted pumping.[26] As Carey McWilliams observed, "the artesian water supply was wasted, as a young spendthrift might dissipate a legacy, in a single generation."[27]

From 1893 to 1904, a drought loomed over the region. William Mulholland, then the city's chief zanjero, became increasingly alarmed about the city's dwindling water supplies, and took the step of installing water meters for the first time. In 1903, he went so far as to propose that the city's further growth be capped.[28] He also advocated an ecologically sensitive approach that focused on maximizing the capture of rainwater to replenish local aquifers through soil and forest conservation.[29] This approach was never implemented as Los Angeles' growth quickly outpaced the capacity of local resources.

1.2.3 The Owens Valley and the Rise of Los Angeles

The closest major water reserves lay over two hundred miles to the northeast, in the Owens Valley, sourced by large quantities of mountain snowmelt. The Owens Valley runs about seventy-five miles long and stretches between the eleven-thousand-foot Inyo Mountains to the east and the fourteen-thousand-foot Sierra Nevada range to the west. At the southern end of the valley is Owens Lake, a broad and shallow water body fed by the Owens River. At the turn of the 20th century, the Bureau of Reclamation, the federal agency responsible for water management in the Western U.S.A., was planning to build an irrigation system there to aid Owens Valley farmers. Mulholland, backed by a syndicate of powerful investors that included Harrison Gray Otis, the

25 Gumprecht, *Los Angeles River*, 96.
26 Marc Reisner, *Cadillac Desert: the American West and its disappearing water* (New York: Viking, 1986), 62.
27 McWilliams, *Island on the Land*, 185.
28 Gumprecht, *Los Angeles River*, 99.
29 Reisner, *Cadillac Desert*, 61.

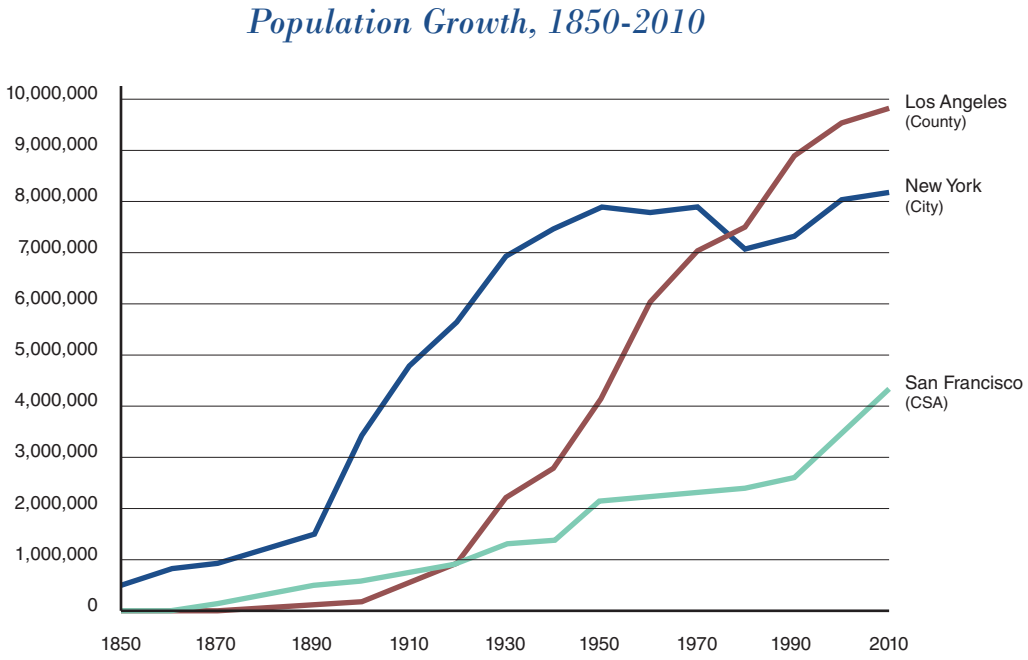


Fig. 1.07 *Population growth—Los Angeles, New York and San Francisco (1850 to 2010)*

Fig. 1.08 *Los Angeles Aqueduct opening ceremony (November 5, 1913)*

publisher of the Los Angeles Times, and his son-in-law and successor, Harry Chandler, had a hidden agenda—to build a massive aqueduct to supply water to Los Angeles.

Eaton, whose family had founded the city of Pasadena, northeast of Los Angeles, wielded his influence in state political circles and then met with President Theodore Roosevelt's advisers in Washington, DC, in an attempt to quash the Bureau of Reclamation's irrigation plan. At the same time, he quietly and systematically bought up water rights and large parcels of land in Owens Valley to sell them to Los Angeles to facilitate their water procurement plans and secure a considerable personal profit. When the city's clandestine aqueduct plan was finally discovered and revealed in 1905, the farmers, ranchers, and miners in Owens Valley rose up in protest. This resistance, however, came too late. Eaton and his friends had seized control of the valley's water rights through a series of strategically placed legitimate land purchases bolstered by bribes and intimidation. While the valley's residents were alarmed and outraged by the city's takeover, Eaton, Chandler, and Otis persuaded the citizens of Los Angeles that an aqueduct was crucial to ensuring the survival of the city. They waged a campaign of influence through disinformation, using Otis' and Chandler's powerful platform—the Los Angeles Times. They ran a series of articles and editorials that gave the impression the city was facing drought. The City of Los Angeles instituted strict restrictions forbidding people from watering their lawns, all the while lowering the city's water supply by dumping it into sewers. Eaton's group, however, withheld their strategy that Owens Valley water would not only serve the city but would also be used to irrigate the San Fernando Valley, a semi-desert region just north of Los Angeles that was not legally part of the city (yet). Otis, Chandler, and others bought up large parcels in the valley and pushed for the bond that would fund the construction of the aqueduct. Bringing water to the San Fernando Valley, in addition to Los Angeles, would net them vast profits on their land acquisitions there, enabling large-scale development. In the summer of 1906, President Roosevelt allowed the aqueduct to cross federal lands. The following year, motivated by fears that they were running out of water, the citizens of Los Angeles voted to approve $22.5 million in bonds to build a 233-mile-long aqueduct to bring water from Owens Valley to the city.

This was the historical premise of Roman Polanski's classic film noir, "Chinatown", which starred Jack Nicholson as a private investigator who becomes embroiled in machinations over Los Angeles's theft of water from a rural valley. In the film's reframing of historical events, power brokers manipulate a public good—the water supply—to amass large personal fortunes in what was ostensibly a real

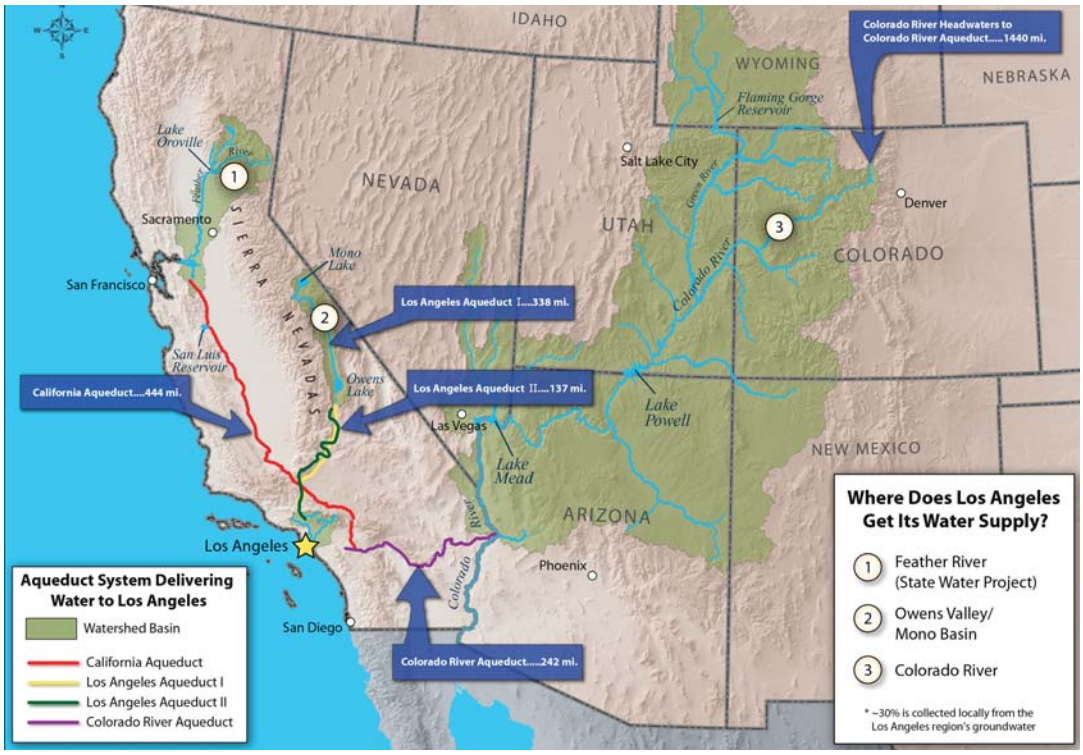


Fig. 1.09 *Map of Los Angeles water supply sources*

estate speculation scam. The film, and the events that inspired it, became a potent founding myth of the city of Los Angeles. It is the apogee of the American 'Wild West' ethos—rapid, infrastructurally-driven development in a context of greed, corruption, lawlessness and violence. While the railroad was the driver of the expansion of the West in the 19th century, the aqueduct was its 20th century counterpart.

William Mulholland supervised the construction of the Los Angeles Aqueduct, which became the world's longest at the time. Starting in 1908, the project took five years, requiring over two thousand workers and the drilling of 164 tunnels to drain water from Owens Valley to the San Fernando Valley and the city. In a defining moment for both Los Angeles and future development in the American West, the Los Angeles Aqueduct was completed on November 5, 1913. It carried water 233 miles from the Owens Valley in the eastern Sierra, across the Mojave Desert and into the San Fernando reservoir, north of Los Angeles. At the aqueduct's opening ceremony, as water coursed down the cascades for the first time, Mulholland made his famous proclamation to Angelenos: "There it is. Take it." (see Figure 1.08). An editorial in the Los Angeles Times the following day glorified the occasion:

> …And a great river has been turned from its course – a course that it followed since the hand of God raised the mountains and laid the oceans in their places

> on the morn of creation – and brought down to serve the people of Los Angeles who are here today, and the millions more who are to come tomorrow, and tomorrow, and tomorrow.[30]

In 1915, Los Angeles annexed the mostly rural San Fernando Valley, more than doubling the size of the city. The arid San Fernando region was transformed into a major agricultural center of corn, cotton, citrus, and walnut growing. These agrarian origins, like most of Southern California, progressively gave way to massive urbanization. By 1960, the valley had over a million inhabitants; by 2007, the valley's population had reached 1.7 million. Without new sources of water, there is no development. Mulholland summed this up in another oft-quoted phrase, 'If we can't get it, we won't need it.'

Los Angeles's growth became self-perpetuating: the availability of water created demand for more housing and jobs, which naturally created demand for more water. This symbiotic cycle of development and escalating water procurement became a defining feature of Los Angeles' growth. What happened in the following years typifies a pattern that has recurred with several variations in the history of Los Angeles, in which a perception of unlimited, eternal abundance gives way to the reality of inadequacy.

1.2.4 Beyond the Los Angeles Aqueduct

In 1923, only ten years after the opening of the Los Angeles Aqueduct, Mulholland had cast his eye to a watershed yet more distant than the Owens Valley, and recommended that the city begin assessing the feasibility of importing water from the Colorado River.[31] That vision became a reality in 1941, when the 242-mile-long Colorado River Aqueduct came online. With the addition of this second aqueduct, Los Angeles' water was now imported from a watershed that spanned from Wyoming to New Mexico. Unlike the Los Angeles Aqueduct, which the city's Department of Water and Power (LADWP) had built on its own, the Colorado River Aqueduct was constructed in cooperation with the federal government (the Hoover Dam, integrated with this project, remains one of the greatest monuments ever to federally-sponsored public works). What the two aqueducts did have in common was the prolonged legal wrangling that accompanied and outlasted the massive physical construction. The city had battled the Owens Valley over water rights, but now the new adversary was the state of Arizona. The arguments reached a peak when a case brought by Arizona reached the Supreme Court in 1956, resulting in "one of history's most

30 Quoted in Richard Gordon Lillard, *Eden in Jeopardy; Man's Prodigal Meddling with His Environment: the Southern California Experience* (New York: Knopf, 1966), 142.

31 *Ibid*., 143.

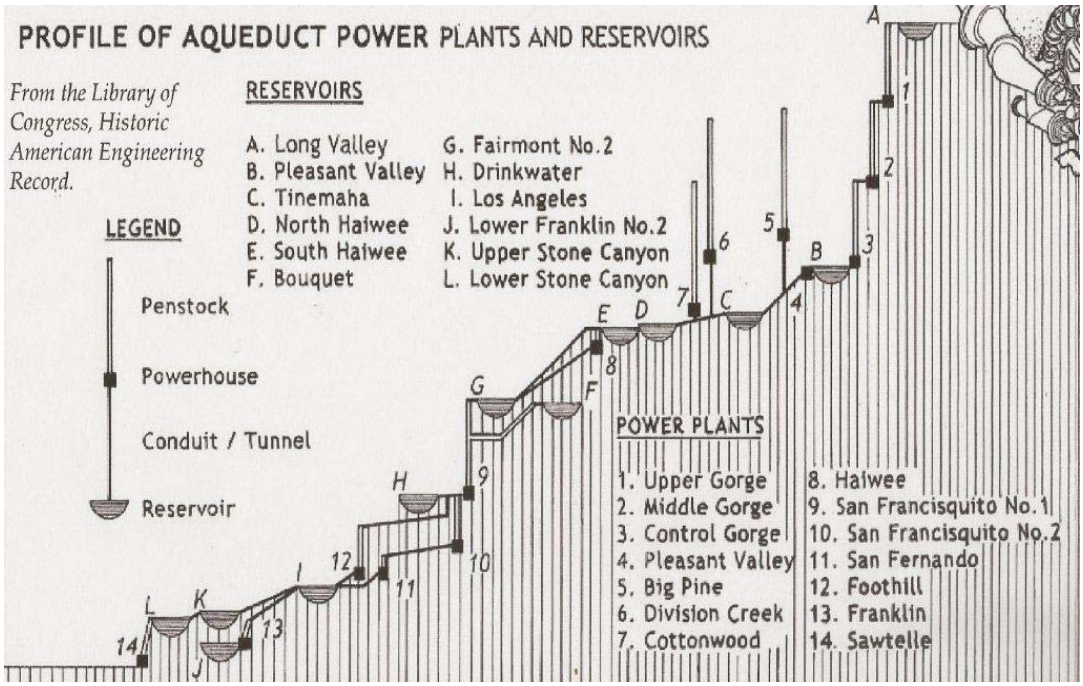


Fig. 1.10 *Section of Los Angeles Aqueduct*

Fig. 1.11 *Los Angeles Aqueduct at Jawbone Canyon*

complicated water cases," a trial that produced more than 22,000 pages of testimony and 4,000 exhibits, and was ultimately decided in Arizona's favor.[32] As with the first aqueduct, these legal battles have continued to this day, with ongoing repercussions for Los Angeles.

By the early 1960s, the region's population had multiplied yet again, and the cycle of searching for another water source began again. The California Aqueduct, completed in phases over the next ten years, would be the largest and longest yet, spanning 444 miles from the Feather River in northern California to the metropolises of the south. California's governor at the time, Pat Brown, promised that the project would "correct an accident of people and geography" by connecting the water-rich north with the water-hungry south[33] (see Figure 1.09). Before this water could reach Los Angeles, however, it had to surmount the Tehachapi Mountains. This herculean feat is accomplished by the Edmonston pumping plant. Every minute, the pumps at the Edmonston plant can lift 2 million gallons of water 1,926 feet over the mountains, after which it flows downhill to the cities below[34] (see Figures 1.10 and 1.11). To do so, this single pumping plant uses, on average, 3,280 GWh (gigawatt hours) of electric power per year, enough to supply a city of 1.4 million people.[35]

1.3. Flooding

1.3.1 Geographical Context

Los Angeles is not unique among major cities, in that it is subject to occasional bouts of heavy rain. However, in the case of LA, the effects of these precipitation events are exacerbated by the region's topography. Less than fifteen miles from downtown, the broad, flat expanse of the basin terminates at the foothills of the San Gabriel Mountains. Their ascent is steep, gaining elevation at the rate of 2,000 feet per horizontal mile, reaching a peak of over 10,000 feet. In the winter, storm systems that have carried moisture thousands of miles across the Pacific meet these mountains and, unable to travel any further, deposit their moisture onto the slopes below. Here, some of the most intense rainfall in the United States has been recorded, such as on a single day in January 1943 when over 26 inches of

32 *Ibid.*, 145.

33 Joel Bourne, "California's Pipe Dream," National Geographic, April 2010, http://ngm.nationalgeographic.com/print/2010/04/plumbing–california/bourne–text.

34 "California State Water Project at a Glance," California Department of Water Resources, accessed March 9, 2015, http://www.water.ca.gov/recreation/brochures/pdf/swp_glance.pdf. (capacity = 4,480 cubic feet per second ~ 2,010,764 gallons per minute)

35 "7.16 Energy," California Department of Water Resources, accessed March 9, 2015, http://www.water.ca.gov/environmentalservices/docs /mntry_plus/DEIR%20–20Volume%201/07.16%20Energy.pdf;
"Table 5A. Residential Average Monthly Bill by Census Division, and State 2010," U.S. Energy Information Administration, accessed March 9, 2012, http://www.eia.gov/electricity/sales_revenue_price/xls/table5_a.xls.
Average monthly electricity use of a California household, 2010: 562 KWh. Average household size = 2.88. (1 GWh = 1,000,000 KWh) (3,280 x 1,000,000) / (562 x 12 / 2.88) = 1,399,358 people

rain fell near the Mount Wilson observatory.[36] The geologically young San Gabriels are among the fastest rising mountains in the world but are being eroded almost as quickly by the torrential rains.[37] It is these waters, powered by the force of gravity, that give the local hydrology its intensity. As the waters work their way down into the valleys below, they sweep up everything that lies in their path, effectively flushing out canyons of anything that is not firmly anchored to the earth.[38] The urbanized region of greater Los Angeles is built on top of material carried down from the mountains in this way: debris cones (at the base of the foothills) and an alluvial plain (further down, in the basin). The very foundations of the modern metropolis constitute the accumulated evidence of past storms.

While huge boulders are carried a mile or two at the most, the water continues across the floodplain to the sea. This dynamic has shaped the Los Angeles River and the landscape of its basin. In a condition typical of rivers in semi-arid Mediterranean climates, the LA River only flowed intermittently along most of its length. Its flows, during most of the year, were too meager to carve out banks, resulting in the lack of a clearly defined channel. Consequently, when the torrents of water did come, there was little to restrain them, and they flowed freely across the basin, seeking out the path of least resistance. Thus, the river was notoriously unpredictable—after a major storm it was not uncommon for the river to have moved twenty miles or more from its previous course. This has happened on several occasions in the 19th century, when its mouth moved from Long Beach to Santa Monica and back again.

It is due to this confluence of climate and topography that Los Angeles faces one of the greatest threats from flooding among all major American cities.[39] "The impetus and fierceness of these floods can be likened to that of the discharge of a bursting dam," noted one of the first reports produced by the Army Corps of Engineers when they began studying the local flooding problem.[40] These floods have, throughout recorded history, killed more people in Los Angeles County than earthquakes. In the 19th century, before large-scale efforts to control the local rivers were mounted, major storms would leave hundreds of square miles of the LA Basin underwater. Evidence from the paleoclimatological record and historical accounts indicate that infrequent, intense floods have been occurring in Los Angeles for thousands of years.[41]

36 "The Climate of Los Angeles, California," National Weather Service, 36.

37 Gumprecht, *Los Angeles River*, 132–34.

38 John McPhee, *The Control of Nature* (New York: Farrar, Straus, Giroux, 1989), 181–272.

39 Gumprecht, *Los Angeles River*, 131. (At the time that Gumprecht wrote this book, LA was the most vulnerable to flooding, but the effects of climate change and sea level rise have made other cities more vulnerable to flooding since then.)

40 U.S. Engineer Office, Flood Control in the Los Angeles County Drainage Area (Los Angeles: U.S. Engineer Office, 1938), 2.

41 "The Climate of Los Angeles, California," National Weather Service, 59.

1.3.2 The Emergence of Institutional Flood Control

Reporting on the plans to build the Aqueduct, the Los Angeles Times published the headline: "Titanic Project to Give City a River."[42] It seemed that the city had forgotten about its original river, which by then had gone completely dry even in the areas where it had once flowed year-round, due to diversions and pumping to supply the growing city. But the river would not disappear entirely. In February 1914, just a few months after William Mulholland presided over the debut of the city's 'new river', the old river reasserted its presence in a major way.

The 1914 flood was merely one more in a long succession of floods that had washed over the LA Basin. In fact, this flood was not even particularly severe by historical standards. It was estimated that during the previous major flood, in 1889, the LA River's peak discharge had been 65 percent greater than in 1914.[43] Before the basin urbanized, there were floods, but not a flooding problem; the latter came only with the introduction of large numbers of humans into the local ecosystem. Before, during major storms, the river had roamed across the basin in unpredictable ways. Floodwaters would inundate large tracts of land, but within a few days they would flow out to sea or seep into the ground, with minimal human impacts. "The Indians had merely walked uphill in flood time and downhill in drought time," ecologist Richard Gordon Lillard points out.[44]

What changed between 1884 and 1914 was, of course, the human factor. In 1880, there were just over 33,000 people residing in all of Los Angeles County. By 1910, thirty years later, the population had increased fifteen-fold, to just over half a million. The assessed value of property had also increased fifteen-fold between 1890 and 1914.[45] With such rapid urbanization underway, an epic battle was shaping up: between the forces of nature, and the forces of capitalism (in the form of real estate development). The capricious whims of a dynamic natural system were quickly proving to be fundamentally incompatible with the static boundaries of private property. With surging demand for real estate, the city's official cartographers now committed the river to a narrow, strictly defined corridor, and proceeded to divide all the surrounding land into saleable parcels.[46] Mapping the river in this way was the first step towards making the static river channel a physical reality.

Jared Orsi, in his history of flooding in Los Angeles, points out a peculiar coincidence: many of the years in which the city experienced its fastest growth were also years in which

42 Gumprecht, *Los Angeles River*, 105.
43 *Ibid.*, 177.
44 Lillard, *Eden in Jeopardy*, 101.
45 Richard Bigger, *Flood Control in Metropolitan Los Angeles* (Berkeley: University of California Press, 1959), 2.
46 Jared Orsi, *Hazardous Metropolis: Flooding and Urban Ecology in Los Angeles* (Berkeley: University of California Press, 2004), 13.

Fig. 1.12 *Floodwaters in Los Angeles River destroy Southern Pacific Railroad Bridge at North Figueroa Bridge (March 2, 1938)*

floods were conspicuously absent. Of course, to newcomers, this absence was hardly conspicuous; for the most part, it went entirely unperceived, as they simply assumed that the mythology of a benevolent climate was true. Those who had inhabited the region for longer knew better; the Mexican community, for example, was aware of the great floods of the 19th century from stories told by their elders. But most newcomers dismissed these stories as exaggerated bits of folklore. Thus, the people who were most actively involved in shaping the city during this era were the people who had the least understanding of the dynamic local climate.[47] Speculators and developers, who were subdividing new tracts on a daily basis, gladly seized upon the ignorance of the newcomers, selling off lots at the mouths of canyons, in floodplains, and sometimes even in dry stream beds.[48]

The 1914 flood, then, came as a surprise to many of the city's residents. When all was said and done, the damage totaled more than $10 million (2015: $230 million).[49] For the first time, there seemed to be a broad consensus that the situation constituted a crisis: that the river could no longer be permitted to inflict such damage

47 Ibid., 13–17.

48 Bigger, *Flood Control in Metropolitan Los Angeles*, 3.

49 *Ibid.*, (All 2012 amounts calculated using the U.S. Bureau of Labor Statistics Inflation Calculator: http://www.bls.gov/data/inflation_calculator.htm)

on the city and that something had to be done at once. Facing public outcry from all quarters, politicians vowed that the city would never again be caught unprepared.

Within one month of the flood, a group of five engineers appointed by the county Board of Supervisors had set to work studying the flood problem. Four of the five engineers divvied up the watershed into sub-areas, with each of them taking responsibility for studying and proposing flood control solutions in one of the areas. Their respective recommendations were then to be synthesized into a single plan. The fifth engineer, James W. Reagan, took on the assignment of determining, for the entire county, the extent of areas inundated in historical deluges. When their research was completed, Reagan came to a radically different conclusion than the other four engineers. A key point of contention between Reagan and the others was whether to focus on measures to reduce upstream causes of flooding (such as soil conservation and small check dams in the mountains), the strategy supported by the majority, or on downstream measures to contain flooding's effects (levees and channel fortifications), the strategy that Reagan favoured.

Consonant with the prevailing ideals of the Progressive era, civic leaders had asked these engineers to propose the 'best' flood control solution, based on a rational analysis of the problem. However, unable to come to any agreement with the others, Reagan finally submitted his own minority report to the Board of Supervisors (and refused to show it to his colleagues beforehand).[50] The fact that the appointed engineers had reached divergent conclusions, that there were multiple possible solutions and no objective way of assessing which was the 'best', belied the era's faith in rationalized decision-making.

Apart from such questions pertaining to engineering and design, there was also the question of implementation. From early on, it was evident that the flood control measures being contemplated did not (and could not) fall within the purview of any existing government agency—an entirely new one would need to be created expressly for this purpose. At the state level, however, past disputes between regions (typically north versus south) had led to a strong tradition of home rule, and the absence of any statewide coordinating body. At the federal level, it would be another twenty years before the Army Corps' mission was extended beyond strictly maintaining navigability. Given the acknowledged need for a unified, region-wide approach, the only remaining space for such an authority to exist was at the county level.[51] The Los Angeles County Flood Control District (LACFCD) was formally created in June 1915, with Reagan named to lead this authority.

Despite the initial hiccups, Orsi cites the establishment of the Flood Control District

50 Orsi, *Hazardous Metropolis*, 41-42.

51 *Ibid.*, 42-46.

as marking the beginning of technocratic, 'assembly-line style' flood control.[52] He argues that this approach has three distinguishing characteristics. First, it "vested much power in unelected experts," a faith rooted in the desire to exclude 'special interests' from policymaking. Second, it was built upon "an alliance between governmental bodies and private economic interests." This aligns with a pattern described by Robert Fogelson in *The Fragmented Metropolis* (1993), in which public authority was used "in the pursuit of an urban environment that maximized growth and private profit" through infrastructural expansion.[53] Third, "although the public was not literally shut out of the decision-making process, policy debates, which so frequently revolved around technical issues and excluded political or moral ones, inhibited participation by nonexpert citizens."[54]

In January 1917, a proposal for flood control improvements was submitted to the Board of Supervisors, and the following month it was placed on the ballot for voter approval. The package was a fairly balanced mix of upstream and downstream measures, a balance necessitated by the need to appeal to voters throughout the district. Several large dams and numerous smaller check dams would be built in the mountains, while the river channel between downtown Los Angeles and the ocean would be straightened and lined with "pile-and-wire fence" (two parallel rows of wooden piles spaced a couple feet apart, lined on both sides with hog wire and filled in the center with brush).[55] Part of the plan also included diverting the river's mouth one mile to the east to prevent it from depositing sediment in the harbor, which was becoming increasingly vital to the region's economy. Despite growing public impatience with the lack of visible progress since the 1914 flood, the bond passed by only a narrow margin, mostly due to the fact that the dispute over who should pay for the work had never really been satisfactorily resolved.[56]

One of the most ambitious projects ever attempted by the Flood Control District began in the 1920s, and is interesting as an early example of efforts to integrate water supply and flood control. Unfortunately, despite the idea's promise, the project ended in dramatic failure and was never built, leaving instead a legacy of mistrust. In May 1924, the District submitted a bond to Los Angeles County voters for their approval. The centerpiece of the bond package was a proposal to build the tallest dam in the world. The cost, $25 million (2012: $336 mil.), was 50% more than the entire flood

52 *Ibid*., 52.

53 Robert Fishman, introduction to *The Fragmented Metropolis: Los Angeles, 1850-1930*, by Robert M. Fogelson (Berkeley: University of California Press, 1993), xvii.

54 Orsi, *Hazardous Metropolis*, 53.

55 Gumprecht, *Los Angeles River*, 187.

56 *Ibid*., 191.

control plan the engineers had proposed in 1915.[57] For this large cost, however, the proposed dam would offer two great benefits. By holding back water rushing down from the mountains and releasing it at a controlled rate, the dam would not only reduce flooding, but would also enable more of this water to be returned to the ground, rather than the sea. In the lead-up to the 1924 bond vote, Reagan proclaimed that:

> The depletion of the underground water supply in Los Angeles is alarming. The present plan of running this very much needed floodwater away to the sea as quickly as possible, in order that the rancher in the lower thirty-five miles of the district may be protected, should be discontinued as quickly as possible.[58]

In addition to the flood control imperatives, a prolonged drought during those years had raised the perceived importance of water conservation among the public, providing the necessary base of political support to pass a bond measure. Unusually rapid population growth in the early 1920s, fueled by the local discovery of oil and the booming motion-picture industry, further emphasized the urgency of the water supply issue, while the larger tax base enabled the city to contemplate projects of a scale previously not feasible. The 1924 bond measure passed in a landslide. Shortly thereafter, however, the San Gabriel Dam project began to unravel.

On March 13, 1928, the St. Francis Dam (completed two years prior under the supervision of Mulholland to store water from the Los Angeles Aqueduct) collapsed, sending a 200-foot-high wall of water and concrete chunks weighing several thousand tons each surging down the Santa Clara River valley below. The wave of destruction (like a tsunami in reverse) killed more than four hundred people before it reached the ocean, 50 miles from where the dam had been.[59] In the aftermath of this tragedy, which remains one of the worst peacetime disasters in American history, public faith in engineering was badly shaken, if only temporarily. An investigation into the dam's catastrophic failure was attributed to the weakness of the underlying rock. This prompted, for the first time, an examination of the geology at the site of the proposed San Gabriel dam, which revealed a similarly hazardous level of instability. A contractor on the project, apparently already aware that the dam was unbuildable, was at the time being paid exorbitant rates to excavate material from the site on the condition that they would later build the dam at cost. A juicy scandal proceeded to unfold in full view of the public, featuring the mysterious disappearance and reappearance of key sections of certain engineering documents, and a

57 Orsi, *Hazardous Metropolis*, 58.

58 Quoted in Gumprecht, *Los Angeles River*, 194.

59 Orsi, *Hazardous Metropolis*, 68; Reisner, *Cadillac Desert*, 97–100.

county supervisor who was eventually sent away to the San Quentin state penitentiary.[60]

The failure of the San Gabriel dam project wrought irreparable damage on the Flood Control District's credibility, seriously impairing its ability to sell the public on future projects, and setting off a downward spiral that culminated in the end of locally-led flood control. Progress on installing protective measures since 1914 had been incomplete at best; less than half of the LA River had been lined with permanent levees, while the rest of its length was held in place only by the insubstantial pile-and-wire fences or by nothing at all.[61] Meanwhile, the assessed value of property in the county had increased twenty-six-fold during this period and growth continued unabated as new subdivisions continued to be built along the city's constantly moving periphery. Not only did these areas now demand flood protection, they contributed to the overall flooding problem by drastically increasing the amount of impervious surface in the watershed. Thus, when a storm hit on New Year's Eve 1933, large areas of the county experienced flood damages. The hardest hit were a string of foothill communities, where 600,000 cubic yards of muddy debris poured down from the mountains and killed at least 49 people.[62]

Even after this disaster, voters refused a bond proposal in 1934 to finance the most urgently needed protection.[63] The Flood Control District, then, found itself in the impossible situation of being unable to slow down or regulate new development that exacerbated the flooding problem with each passing day, and unable to secure the funding necessary to build adequate flood protection. The end was drawing near.

One significant and recurring theme during this era of local flood control was that problems in the legal and administrative structure, specifically with overly rigid restrictions on the way that bonds could be used, served as impediments to effective action. Because bond measures were placed on the ballot for specific amounts of money to finance specific projects, the major design elements had to be determined in advance. Consequently, public input was essentially limited to a "yea" or "nay" to preconceived designs (and not even to individual projects, but rather to bundles of projects).[64] Once funds had been allotted in this way, the law required that they be spent on the specific designs that the voters had ostensibly approved. This limited the Flood Control District's ability to explore alternative designs in response to considerations that arose later in the

60 Orsi, *Hazardous Metropolis*, 61–72.
61 Gumprecht, *Los Angeles River*, 199.
62 *Ibid*., 203.
63 *Ibid*., 205.
64 Orsi, *Hazardous Metropolis*, 48–49, 53.

process; funds could not even be legally used to study alternatives.[65] The District was also prohibited from using funds for what might be called preventative, or non-structural measures, such as disseminating information to the public on which areas faced the greatest flood hazards.[66] Though these restrictions were born out of good intentions, namely to prevent graft and promote the efficient use of funds, they ended up having a crippling effect, continually impeding the very goal of efficiency that they sought to uphold.

1.3.3 The Olmsted Plan | the U.S. Army Corps of Engineers

By the 1930s, a 'perfect storm' was brewing that would soon herald the next major phase in the river's evolution. In 1935, the Flood Control District had grown desperate and beseeched the federal government for assistance, filing a request for WPA funds to implement its 1931 plan. President Roosevelt approved the application, assigning the Army Corps of Engineers to supervise the work, and by the end of that year the Corps had arrived in Los Angeles.[67]

A number of historical circumstances gave additional momentum to the Army Corps' engagement with the LA River. The Flood Control Act passed by Congress in 1936 gave the Army Corps greater prominence nationwide, as they began taking on "improvement" projects on a number of America's major waterways. The geologist Robert Mount observes that in engineering circles, "major surgery on the fluvial system is routinely referred to as 'river improvement,' as if nature just didn't quite get it right the first time."[68] With the nation still in the depths of the Great Depression, there was a desire for projects that would generate employment in large numbers, and what Los Angeles had in mind fit this bill. Within months after the Army Corps' work began, some 17,000 men had been hired from local relief rolls to work on the project.[69] More generally, this era was marked by a widespread faith in technology and engineering as solutions to the social and environmental problems afflicting humanity, in accordance with the beliefs and goals of early 20th century modernism. The Corps' work likely would have proceeded without any further affirmation, but this came nonetheless in the form of another flood in March 1938 (see Figure 1.12). This flood, the worst in the city's history before or since, with 87 deaths and $78 million (2012: $1.27 billion) in damages, silenced most lingering doubts about sealing the river's fate in concrete.[70] And nothing

65 *Ibid.*, 64.
66 *Ibid.*, 89.
67 Gumprecht, *Los Angeles River*, 206.
68 Mount, *California Rivers and Streams*, 292–94.
69 Gumprecht, *Los Angeles River*, 207.
70 *Ibid.*, 216.

Olmsted-Bartholomew

Public Parks-Masterplan for Los Angeles Region

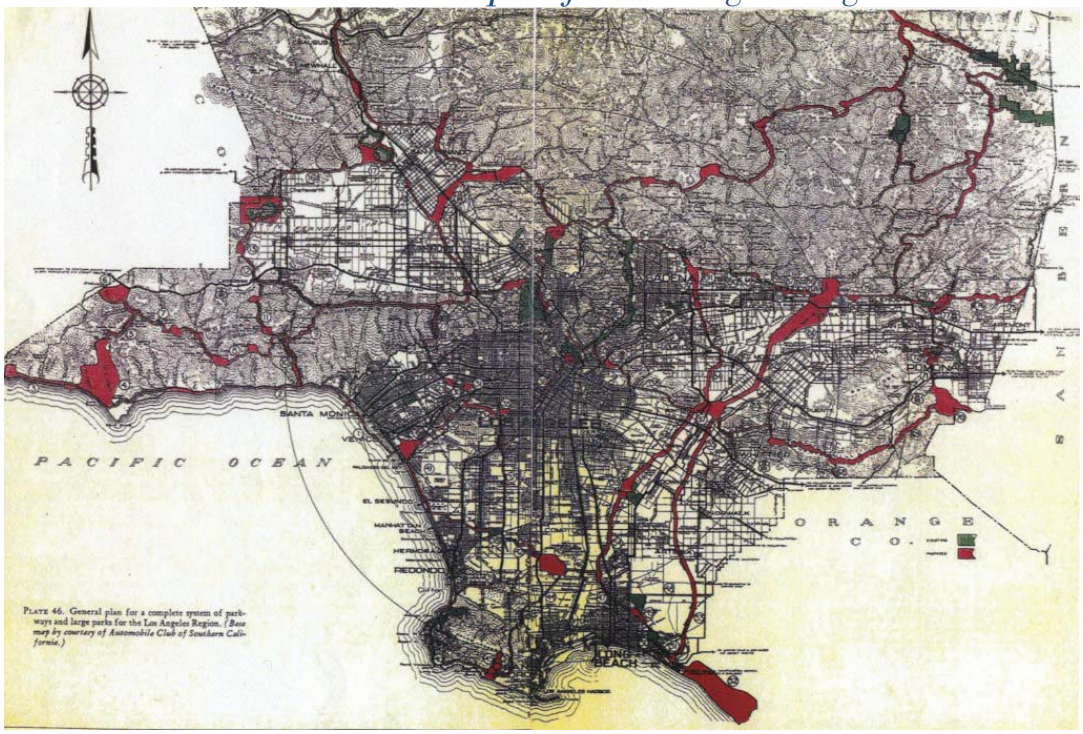


Fig. 1.13 *Olmsted-Bartholomew masterplan for Los Angeles region*

Olmsted-Bartholomew

Parkway Sections

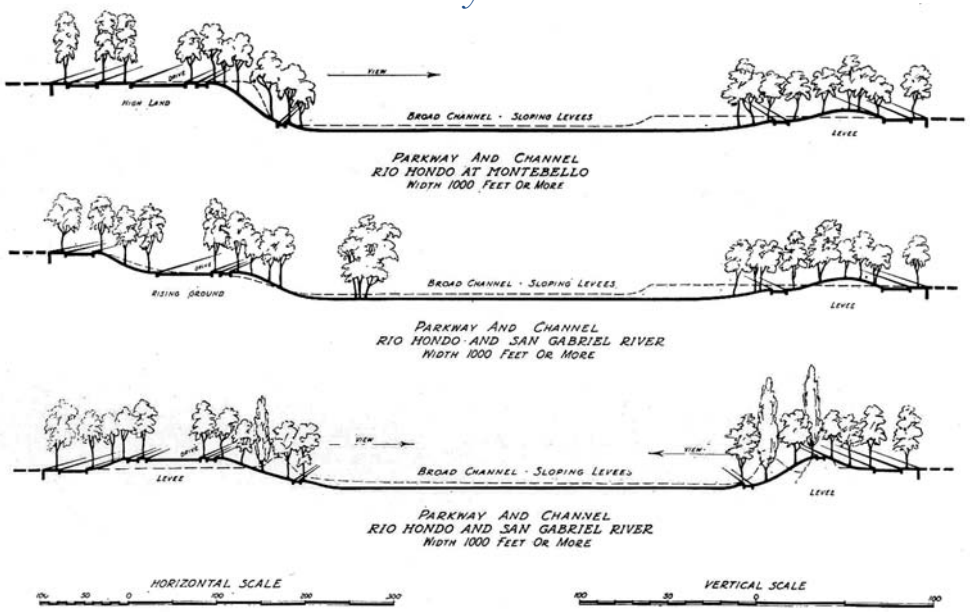


Fig. 1.14 *Olmsted-Bartholomew—parkway sections*

less than concrete would do. Originally, plans had called for unlined channels in the river's lower reaches. But during the 1938 flood, numerous levee failures convinced the Corps' engineers to reevaluate their design. Given the nature of the work that the river would be required to perform, conveying enormous volumes of water at high speeds, the Corps' engineers concluded that it would be necessary to cover both the sides and bottom of the channel in reinforced concrete along virtually the entire length of the river.[71]

Local reaction to the arrival of the Army Corps on the scene was, by and large, quite positive. For most, there was a feeling of relief. After years of bungled work under local leadership, in common perception, the Army Corps' expertise in efficient project management would be the city's salvation. Better still, from now on the money to pay for flood control would be coming from the federal government, rather than local taxpayers; it appeared to be an all-around windfall.[72]

Still, the sentiment was not entirely unanimous. The Municipal League of Los Angeles argued that "engineers think of flood control problems only in terms of mechanics and hydraulics. The biologic factors and the economic and social aspects are every bit as important."[73] They therefore advocated an approach that situated flood control within an integrated regional planning program that included forest and soil conservation, fire prevention, and zoning. Carey McWilliams, writing in 1946 (less than a decade after the Corps' arrival), also critiqued the city's heavy reliance on structural methods of flood control and argued instead for hazard zoning:

> Flood control has, in fact, become a major political setup in Los Angeles, the basis of which is to build more cement causeways so that surface waters may be carried to the ocean as swiftly as possible and with the minimum damage to extensive property holdings which have been built in areas that should have been zoned against occupancy.[74]

Mike Davis made the same point half a century later, in his essay "How Eden Lost Its Garden," tracing the idea back to a plan prepared in 1930 by the firm of Olmsted & Bartholomew.[75] That plan, entitled "Parks, Playgrounds, and Beaches for the Los Angeles Region," (referred to hereafter as the 'Olmsted plan') (see Figure 1.13) proposed setting aside wide buffers along many of the region's rivers and streams. These interconnected

71 *Ibid*., 220–21.

72 *Ibid*., 208.

73 Quoted in Orsi, *Hazardous Metropolis*, 109.

74 McWilliams, *Island on the Land*, 195.

75 Mike Davis, "How Eden Lost Its Garden: A Political History of the Los Angeles Landscape," in *The City: Los Angeles and Urban Theory at the End of the Twentieth Century*, ed. Allen John Scott and Edward W. Soja (Berkeley: University of California Press, 1996), 160–85; Olmsted Brothers and Bartholomew and Associates, Parks, Playgrounds and Beaches for the Los Angeles Region: A Report Submitted to the Citizens' Committee on Parks, Playgrounds, and Beaches (Los Angeles: Citizens' Committee, 1930).

corridors (which the planners gave the whimsical title of "pleasureway parks") (see Figure 1.14) would collectively form a 440-mile-long network of open space extending through greater Los Angeles, connecting the mountains to the sea. Significantly, these parklands would serve the additional purpose of hazard mitigation, allowing the rivers room to expand during high flow conditions without any harm to life or property. Ancillary benefits would include the contribution of these open spaces to groundwater recharge as sites for percolation, and their ability to improve what Kevin Lynch would call the 'imageability' of the LA Basin's vast, repetitive grid, by breaking it up into smaller units.

The network of 'pleasureway parks' envisioned in the plan would include three east-west corridors: one running along the Pacific coast, another running along the base of the San Gabriel Mountains, and a third in the middle connecting several smaller hill ranges. Six north-south corridors would run from mountains to sea, paralleling several of the region's rivers and streams, including three separate segments of the Los Angeles River totaling 17.6 miles. These corridors would range in width from a minimum of 300 feet to a maximum of 1000 feet or more, enough to allow floodwaters to spread beyond the confines of an engineered channel. River banks would be landscaped with native trees, such as cottonwoods, sycamores, willows, and poplars. All told, these linear parks would encompass an area of about 70,000 acres, including 16,000 acres of land then already in public ownership (for comparison, Griffith Park, the largest in Los Angeles, is 4,310 acres). The plan estimated the total cost for this system at $143.9 million (2012: $1.98 billion), of which about two thirds was for acquisition and one third was for improvements.[76]

The Olmsted plan offers a remarkable alternative perspective on the flooding problem in Los Angeles. All previous efforts had focused on treating the problem's symptoms, searching for the most effective way of containing the waters to minimize damage to property, and had addressed this problem in isolation (with the notable exception of efforts to integrate water conservation in the 1920s). The Olmsted plan took a completely different approach, stepping back to consider the underlying causes of the problem, namely the indiscriminate spread of urbanization with no regard for the region's natural systems. With prescient insight, the plan points out how any approach that merely treats the symptoms is self-defeating and eventually bound to fail.

The Olmsted firm had raised the issue of zoning to prevent development in flood-prone areas as early as 1926, in a letter to the county Board of Supervisors:

> In the absence of proper legal control of building operations on such lands,

76 Olmsted and Bartholomew, *Parks, Playgrounds and Beaches*, 95–138.

> it is as certain as anything can be that, partly through ignorance and partly through unscrupulousness, these areas will be largely developed in such a manner that in every period of heavy rainfall not only will streets be submerged but the waters will rise over the floors of houses and other buildings, causing enormous inconvenience and economic loss, creating seriously unsanitary conditions, and tending to produce the most objectionable of slums.[77]

The letter urges that these areas be acquired for recreational purposes, but notes "this can be done at the price of agricultural land if, and only if, speculators are restrained from developing and marketing building lots on low lands."[78] Noting that similarly low-lying areas in Boston had been subject to such regulations for the past 70 years (i.e. since the 1850s), the letters points out "the dangers of uncontrolled private development" on low-lying lands "are much more insidious in the Los Angeles district than in eastern seaboard cities because extreme fluctuations in rainfall here make most of these low lands during dry seasons much less unattractive for building operations than in the East."[79]

A thoughtful analysis of real estate economics was central to the Olmsted plan. The plan explained how the region's critical shortage of open space was the result of unrestrained speculation that had artificially inflated land values. In such a situation, the profits to be made by developing every square foot of land were an irresistible temptation. Faced with such a stacked deck, public parkland didn't stand a chance. The fundamental reason that development had spread even to risky areas, the plan argued, was a misallocation of costs and benefits. Because the cost of protecting these areas from natural hazards "does not fall on the purchaser alone, and scarcely ever on the vendor, but most heavily on the community at large," the most elemental incentive for not building in these areas was removed.[80] The plan goes on to describe how instituting total or partial restrictions on development in hazardous areas such as floodplains would not only lessen the amount of public money spent on building costly protective infrastructure, it would also drive down the market value of these lands, making it far more feasible to acquire them for public use.

The plan was also astute in its political positioning, making the case that a continuation of the status quo posed a grave threat to the region's scenic beauty, widely acknowledged as the very engine driving the whole growth machine. This argument simultaneously appealed to the idealistic sensibilities of civic reformers, and the pragmatic self-interest of developers and other boosters.

77 *Ibid.*, 149.
78 *Ibid.*, 151.
79 *Ibid.*, 151.
80 *Ibid.*, 14.

Unfortunately, once the firm of Olmsted & Bartholomew handed over "Parks, Playgrounds, and Beaches" to the Chamber of Commerce, the plan was quietly shelved.[81] Though some of its recommendations were later realized by virtue of coincidence, the plan as a whole was never implemented. The precise reasons for this can only be guessed at, but Mike Davis blames the plan's silent death on the "selfish, profit-driven presentism [that] ruled Southern California."[82] Davis claims that the plan's vision of "a dramatically enlarged Commons…alarmed guardians of Los Angeles' reputation as the capital of antiradicalism and the open shop."[83] Moreover, he argues, the number of jobs that the Army Corps project would generate had the effect of aligning local labor unions with the conservative guardians of big business, forming an indomitable alliance. Davis also describes how, as far back as 1917 (when the Flood Control District's first bond measure was being debated), large floodplain landholders such as the Southern Pacific Railroad staged a campaign of fearmongering propaganda targeting the working-class homeowners who also lived in flood-prone areas (and still do, particularly south of downtown). The river, claimed this campaign, had the potential to cause "a calamity equal to that of Johnstown or Galveston," unless it were brought under the control of man.[84] Indeed, preying on the public's fears has always been an effective way of building support for the most expedient solution and squelching discussion of any alternatives.

Ironically, the plan's authors actually predicted its fate, observing that

> the rapid growth of population, which makes the rapid expansion of park-system facilities so urgent, also makes its financing particularly difficult, because the capital investment required for the first requirements of a new population, such as buildings, streets, sewers, and water supply, is exceptionally high in proportion to the present population. The benefit of parks bought now will accrue largely in future years… We can get along without them a while longer, anyhow…we would rather use our money to get lots on speculation for personal profit than give it up in taxes for our share of a park system. It is perhaps harder, financially and politically, for Los Angeles to get parks than for any other such community. The real question is, how far will the people…be able to meet the test?[85]

Landscape architect Laurie Olin speculates that the plan was hidden away because it threatened to upset the established power structure, to take away influence from the very group that had commissioned it (the Chamber of Commerce). He says:

81 Greg Hise and William Francis Deverell, *Eden by Design: The 1930 Olmsted-Bartholomew Plan for the Los Angeles Region* (Berkeley: University of California Press, 2000), 1-63.

82 Davis, "How Eden Lost Its Garden," 162.

83 *Ibid*., 164.

84 Quoted in Davis, "How Eden Lost Its Garden," 165.

85 Olmsted and Bartholomew, *Parks, Playgrounds and Beaches*, 6–14.

> It is rather like a proposal we made recently to the University of California in Berkeley, where we said, "Yes, we can do a plan for Berkeley, but only if the University allows us to have direct access to the President and some of the Regents. We have to reorganize how you manage capital projects; otherwise there's no point in it…We made the presentation to middle management, to whom we were essentially saying we're going to go over you, around you, reorganize you. Needless to say, we didn't get the job.[86]

Likewise, it seems as if the clients for the Olmsted plan had expected the landscape architects to produce a simple beautification plan, but ended up getting way more than they had bargained for. Sensing the threat to their own power, their self-preservation instinct kicked in, and they stifled the whole thing, lest the provocative idea leak out and expand beyond their control. The only way around this kind of response, Olin believes, is to take the vision to the public, as they (and not out-of-town landscape architects) are the ones who are in a position to agitate for change. "Only local residents can harangue their government and force them to do these things," says Olin.[87] It is interesting to consider how things might have turned out differently if the Olmsted vision had been widely publicized —if this vision of a potential future had been adopted and advocated for by local citizens.

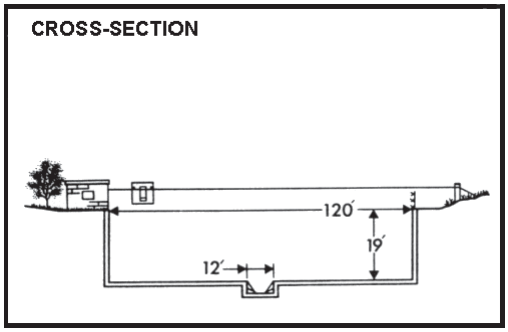
Blake Gumprecht, author of the most comprehensive history of the LA River, seems to rationalize the city's failure to implement the plan, offering a variety of reasons for deeming it unfeasible. He notes that "the huge $230.1 million price tag was seven times the entire budget of the city of Los Angeles in 1930," and that declining property values with the onset of the Great Depression could have made local officials "understandably reluctant to pursue a program that would take perhaps another 100,000 acres off property tax rolls." He contends that the plan "would have increased the cost of flood control because of the high price of real estate in Southern California."[88] However, justifications such as these overlook the plan's central premise, that limiting development in hazardous areas through zoning would have the dual effects of reducing expenditures for structural flood control and making the land more affordable for public acquisition. The issue of financing does raise another interesting prospect, however. It is true that in 1930, the city's finances were largely tapped out, due to the very causes described in the plan, namely the disproportionately high expenditures on streets, aqueducts, and other infrastructure needed to support low-density living in a semi-arid environment. Imagine, though, what if the infusion of federal money that came with the Army Corps had been used to implement the Olmsted plan, instead of building conventional flood control?

86 Laurie Olin, "The Power of Diction," interview by Greg Hise and William Francis Deverell, in *Eden by Design: The 1930 Olmsted- Bartholomew Plan for the Los Angeles Region* (Berkeley: University of California Press, 2000), 288–89.

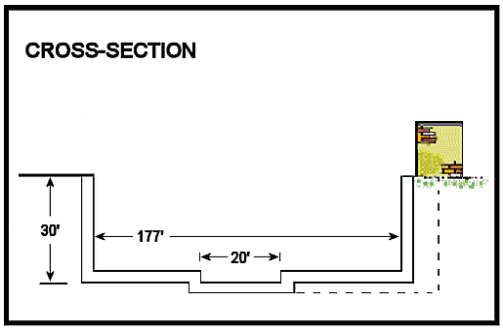
87 Olin, "The Power of Diction," 305.

88 Gumprecht, *Los Angeles River*, 268–70.

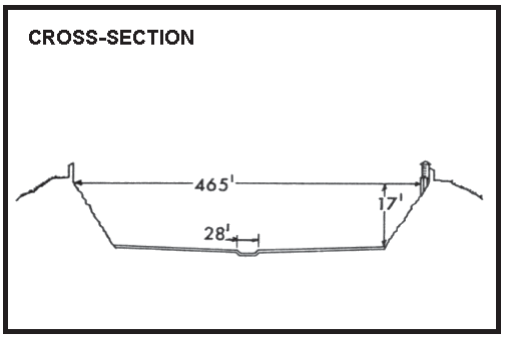
Los Angeles River Channelization
Sections as-built by the Army Corps of Engineers



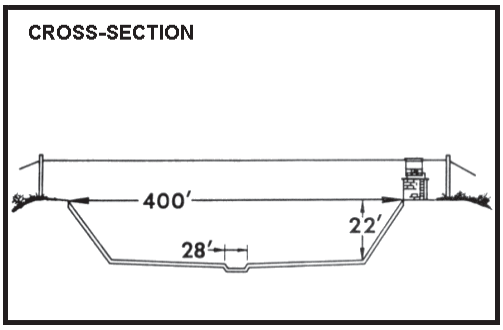
at Tujunga Avenue
drainage area: 401.0 square miles



above Arroyo Seco
drainage area: 511.0 square miles



below Firestone Blvd.
drainage area: 596.0 square miles



below Wardlow River Rd.
drainage area: 815.0 square miles

Fig. 1.15 *Sections as-built by the US Army Corps of Engineers*

Gumprecht also argues that the plan's recommendations "were not true flood control proposals" because they did not include technical specifications, and faults "designers like Olmsted, who too seldom realized that, to reach the engineers, they had to speak their language."[89] In a general respect, there is some validity to this point. However, it is unreasonable to expect a plan for parks and open space, particularly one operating at the scale of a vast region, and one that was commissioned by a decidedly non-technical audience (the Chamber of Commerce), to provide this level of technical detail. This expectation misunderstands the purpose and function of such a planning document, which is more about offering a vision of what could be, an idea compelling enough to galvanize broad political support. If a plan is effective in instigating the public's desire to realize its vision, then engineers (ideally, working in close collaboration with the landscape architects) are quite capable of translating that vision into technical specifics.

The Olmsted plan is noteworthy for both the boldness of its vision and its careful attention to detail. Still, it is not entirely clear that the wide river corridors it proposed would have been feasible even at that relatively early stage in the city's development. Zoning ordinances prohibiting development in the floodplain had in fact been proposed at least once even before the Olmsted plan. These were never adopted, however, because of concerns that they would not withstand legal challenges, and (more importantly) because they contradicted the strongly pro-growth ethos of city leaders.[90] As a result, much of the land along the river had already been developed into a mix of industrial, commercial, and residential districts by the 1930s. Just to acquire a corridor of the minimum possible width, the Flood Control District had to spend large amounts of money buying back land. This included the actual channel of the river, much of which had fallen into private ownership because the river was not considered navigable and only intermittently contained water. Even in places that appeared undeveloped, land had already been subdivided and sold, and plans and permits were already in place. Whether or not it was too late to stop such development from actually being built may be a matter of opinion, but in Gumprecht's view, by the 1930s "the time had long since passed in which the river may have been allowed to flow relatively unhindered through a wider, more natural floodplain."[91]

From this perspective, Olmsted's plan appears less than realistic in its treatment of the rivers, having come just a few years too late. On the other hand, there were instances where constraints less flexible than a desire for open space forced engineers to consider alternatives.

89 *Ibid.*, 270, 349.
90 *Ibid.*, 209.
91 *Ibid.*, 215.

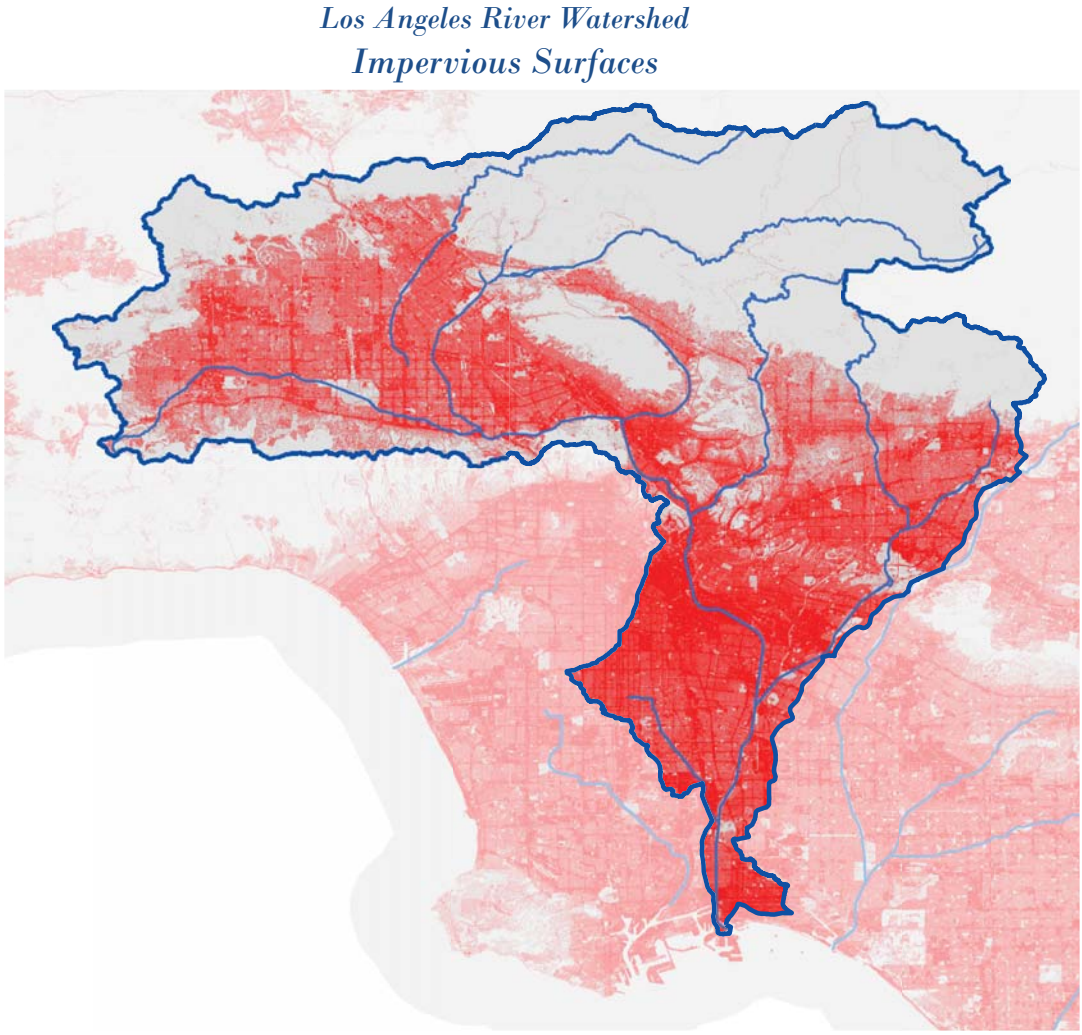


Fig. 1.16 *Los Angeles River watershed—impervious surfaces*

For example, parts of the river channel were so hemmed in by topography (through the Glendale Narrows) or existing development (through downtown) that engineers deemed the cheapest option to be construction of a large flood control reservoir (the Sepulveda Basin) to hold the water upstream, even though this would require acquiring thousands of prime, buildable acres in the San Fernando valley. This proved that almost anything was possible given enough money, and that economic calculations (always based on an invisible set of assumptions and values) ultimately dictated what could or could not be built.

In the section that details recommendations for the individual parkway sections, the Olmsted plan makes occasional reference to designs for flood control channels then under consideration. Referring to one at Ballona Creek, it notes with uncanny prescience that "such a channel if merely walled in is likely to become a very ugly feature in the district,

standing empty and dry most of the year, a receptacle for papers and rubbish"[92] (see Figure 1.15). Unfortunately, this is precisely what happened. After a brief hiatus during World War II, the Army Corps' work on the river proceeded day and night throughout the 1950s. By the time the project was completed in the late 1960s, more than 90 percent of the river bed had been lined in concrete, at a cost of more than $3 billion (in 2015 dollars).[93] The river had also undergone a semantic transformation: from hence forth, it would be officially referred to as the "Los Angeles County Drainage Area" (LACDA).

Looking back at the Army Corps' 'improvements' to the river, there are several points that deserve mentioning. Most significant among these is the Corps' neglect to incorporate water conservation in their flood control program. A report published by the Army Corps in 1938, as it was preparing to begin its 30-year-long project in Los Angeles, does make reference to "the necessity of conserving as much as is possible of the discharging flood waters to replenish the ground water storage, heavily depleted in recent years, and on which the life of much of the region depends."[94] The report claims that the flood control basins the Corps proposed to build would address the conservation issue by "holding the water so that it can be released at a rate which will permit increased percolation into the streambed, thereby conserving much of the run-off which would otherwise waste into the ocean."[95] However, the report does not explain how such percolation could possibly occur when more than 90 percent of that streambed was lined in concrete. Moreover, operational policy dictated that water be released from these flood control basins as quickly as it was possible to do without causing flooding downstream, rather than at the much slower rate necessary for optimal percolation, so that the basins would be empty and ready to accommodate the next storm whenever it hit. It seems clear that conservation was an afterthought, to the extent that it received any consideration at all.

Designs constraints alone cannot account for this neglect, as demonstrated by the emphasis given to conservation in the Flood Control District's 1931 plan, which claimed that its proposed measures could conserve enough water to meet the needs of nearly half a million people.[96] The Flood Control District has, in fact, carried out a conservation program concurrently with the flood control program it manages jointly with the Army Corps. This is accomplished through what are called "spreading grounds", large, shallow basins with highly permeable soils, located adjacent to rivers.

92 Olmsted and Bartholomew, *Parks, Playgrounds and Beaches*, 115.
93 Gumprecht, *Los Angeles River*, 206–07, 222–24. Total is my estimate, based on sum of inflation-adjusted expenditures.
94 U.S. Engineer Office, *Flood Control in the Los Angeles County Drainage Area*, 3.
95 *Ibid.*, 4.
96 Gumprecht, *Los Angeles River*, 202.

During storms, water is diverted into the spreading grounds, where it can percolate into the ground and recharge aquifers. During dry periods, the spreading grounds are filled with treated wastewater and (rather counter-intuitively) with water imported from afar via the system of aqueducts.[97] In this way, the District has managed to conserve an average of 274,982 acre-feet (89.6 billion gallons) per year.[98] However, this system has been operated solely at the initiative of the county. "Because conservation could not be justified on navigational or national defense grounds, it did not fall within the jurisdiction of the Army Corps," explains Orsi.[99] Gumprecht also points out that while the Flood Control Act of 1936 allocated many millions of dollars for the Army Corps' work, upstream conservation measures proposed by the Forest Service and the Soil Conservation Service were given short shrift.[100] Part of the explanation for the declining political will to implement water conservation measures doubtlessly relates to the completion of the Colorado River Aqueduct in 1941. To short-sighted politicians and the public, this signaled (once again) the arrival of unlimited water abundance.

Another trend associated with the Army Corps' takeover of local flood control was the continuation, and indeed the strengthening, of the technocratic regime. No longer reliant on voter-approved bonds, flood control became even more removed from public involvement. One rare exception to this rule occurred in a case where one of the Corps' proposals adversely impacted a well-heeled, well-organized, and well-connected constituency, as was the case in a controversy over the Whittier Narrows Dam in the 1940s. The dam, which formed part of one of the flood control basins proposed by the Corps, threatened to occasionally inundate the town of El Monte. Residents of the town formed a committee to oppose the plan and, using their own funds, hired a team of engineers to design a counter-proposal. Doggedly working their political connections, the citizens of El Monte eventually forced the Corps to accept a compromise design that spared their town.[101] Such cases of active public involvement in shaping flood control policy were exceedingly rare, however.

97 The rationale behind the use of imported water relates to the fact that this water is less expensive during the winter and, once stored in local aquifers, can be pumped out in the summer when demand peaks.

98 "Imported and Recycled Water Delivered in Acre-Feet, Water Year: 2011-2012," Los Angeles County Department of Public Works, http://dpw.lacounty.gov/wrd/spreadingground/watercon/file/Imported%20&%20Reclaimed%20Data%202011–2012.pdf.

1 acre foot ~ 325,851 gallons. Though 89.6 billion gallons may seem like a very large amount, it is only a small fraction of all the precipitation that falls in the watershed, and a small fraction of the region's total water usage. See also Los Angeles & San Gabriel Rivers Watershed Council, Water Augmentation Study, http://www.usbr.gov/lc/socal/reports/LASGwtraugmentation/report.pdf, ES-2; and Los Angeles & San Gabriel Rivers Watershed Council, Ground Water Augmentation Model, http://www.usbr.gov/lc/socal/reports/LASGwtraugmentation/AppC.pdf, 14.

99 Orsi, *Hazardous Metropolis*, 117.

100 Gumprecht, *Los Angeles River*, 207–8.

101 Orsi, *Hazardous Metropolis*, 120–28.

Despite the prevalence of the technocratic approach, the design of flood control works was less scientific than it appeared, and relied to a considerable extent on leaps of faith and trial-and-error. For example, debris basins, which eventually formed an integral part of the overall flood control battalion, were discovered by accident, as related by John McPhee in his essay "Los Angeles Against the Mountains":

> Strung out along the San Gabriel front are at least a hundred and twenty bowl-shaped excavations that resemble football stadiums and often as large. Years ago, when a big storm left back yards and boulevards five feet deep in scree, one neighborhood came through amazingly unscathed, because it happened to surround a gravel pit that had filled up instead. A tungsten filament went on somewhere above Los Angeles.[102]

In designing the components of their flood control program, the Corps faced a double challenge: a lack of historical data on climate and streamflow, and the difficulty of predicting the rate and locations of future urbanization in the region. In 1938, the oldest weather records in all of Los Angeles County only went back 65 years. Streamflow records went back only half as far, at best, and generally had only been collected for the mountainous upper reaches of streams. In the basin, where most of the population lived, data was virtually nonexistent.[103] "In Los Angeles County," stated the Corps' report, "the stream records are so short, the improvement works so recent, the flood peaks so flashy, and the population increasing so rapidly, that 'height' or 'flood stage' has not come to be the criterion that it is in the East or Middle West."[104] Given such a severe paucity of the data normally used as the basis for design, the Corps' engineers resorted to such unconventional sources as the diaries of Mission fathers; ultimately they were forced to make a best guess. Unfortunately, several decades later it would become clear that the assumptions upon which the whole system was founded deviated substantially from the present-day reality.

Though the Army Corps has borne a great deal of the blame for ruining the Los Angeles River, this history shows that by the time they arrived in Los Angeles, the situation had reached a point where they often had few options other than to pave the river. The real culprit here is the close relationship between property developers and local political leadership, which resulted in widespread and problematic development in the floodplain during the city's years of explosive growth.

1.4. Drought, Conservation and an Uncertain Future

102 McPhee, *Control of Nature*, 192.
103 U.S. Engineer Office, *Flood Control in the Los Angeles County Drainage Area*, 21–22.
104 *Ibid.*, 29.

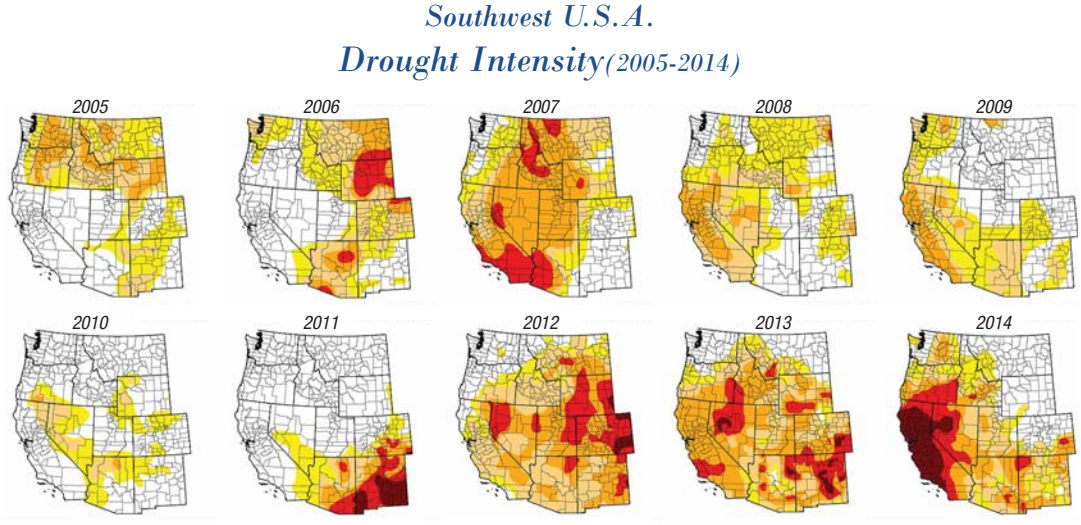


Fig. 1.17 *Southwest USA—drought intensity (2005-2014)*

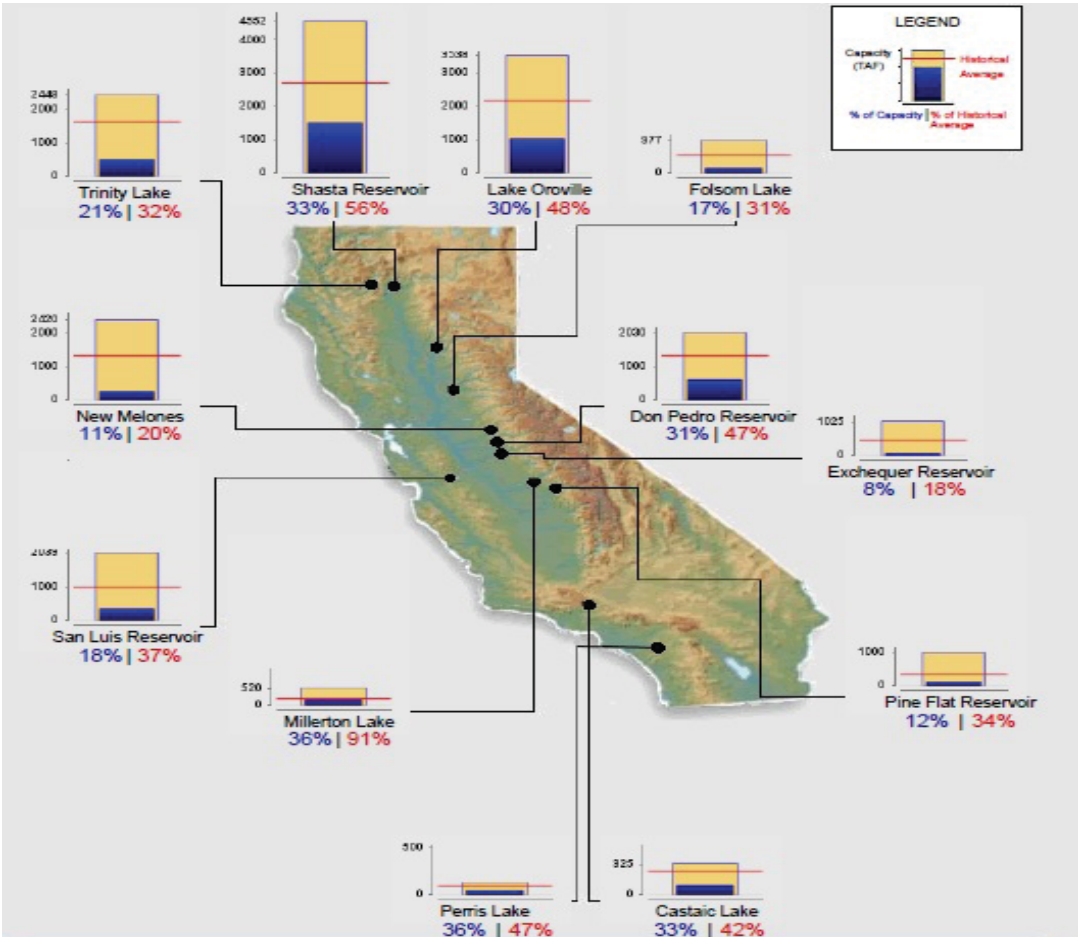


Fig. 1.18 *Reservoir levels in California (2015)*

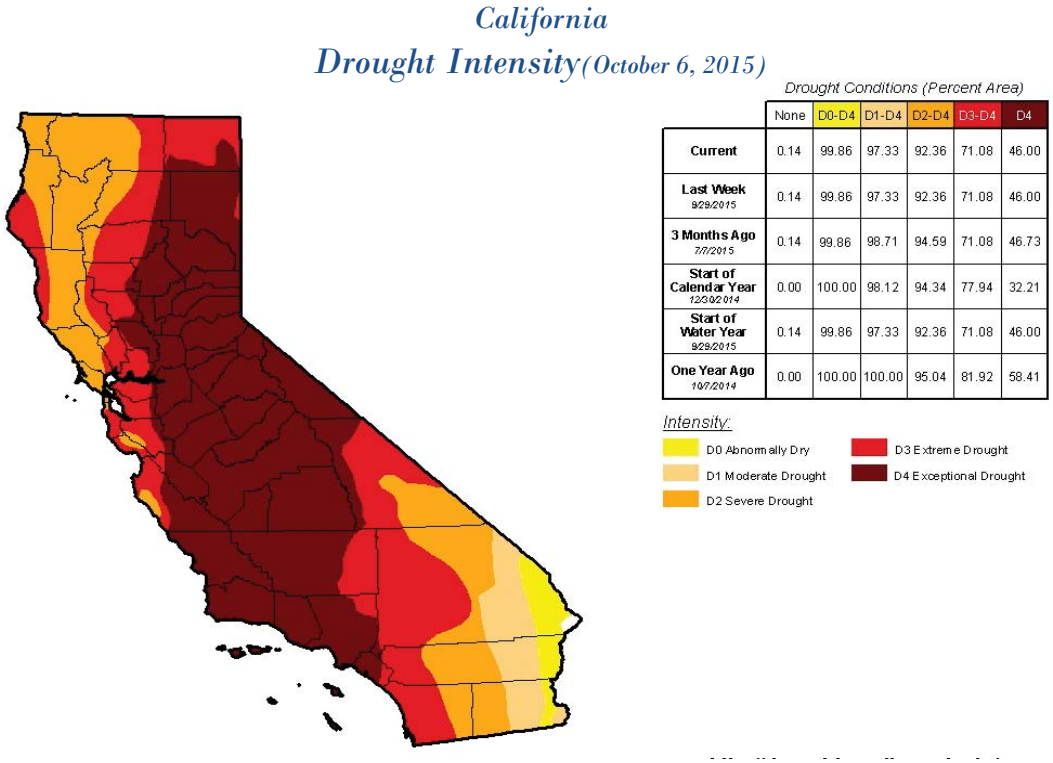


Fig. 1.19 *California—drought intensity (October 6, 2015)*

1.4.1. Drought Today

California has experienced many droughts throughout its recorded history. Its most significant historical state-wide droughts were the six-year drought of 1929-34, the drought of 1976-77, and the six-year event of 1987-92. These were the most notable due to their duration or extreme hydrological conditions. The 1929-34 event occurred within the context of a decades-plus dry period in the 1920s-30s that affected much of central and southwest USA; the proverbial 'dust bowl'. The drought's impacts, however, were relatively small by present-day standards since the level of urban and agricultural development was far less extensive than that of modern times. The 1976-77 drought, although brief in duration, was notable for the severity of its hydrology and the drought of 1987-92 was California's first extended dry period since the 1920s-30s, providing the closest comparison for drought impacts under a contemporary level of development.

The water years of 2012-14 are California's driest three consecutive years in terms of state-wide precipitation (see Figures 1.17 and 1.19). While statistics for the 2014-2015 water year are not yet in, this drought has continued with little foreseeable relief in sight. California's previous drought occurred in 2007-09 and was the first drought for which a state-wide proclamation of emergency was issued. In January 2015, Governor Edmund

Fig. 1.20 *Homes in Rancho Mirage, Calif., in the Coachella Valley*

Fig. 1.21 *A housing development in Cathedral City, near Palm Springs*

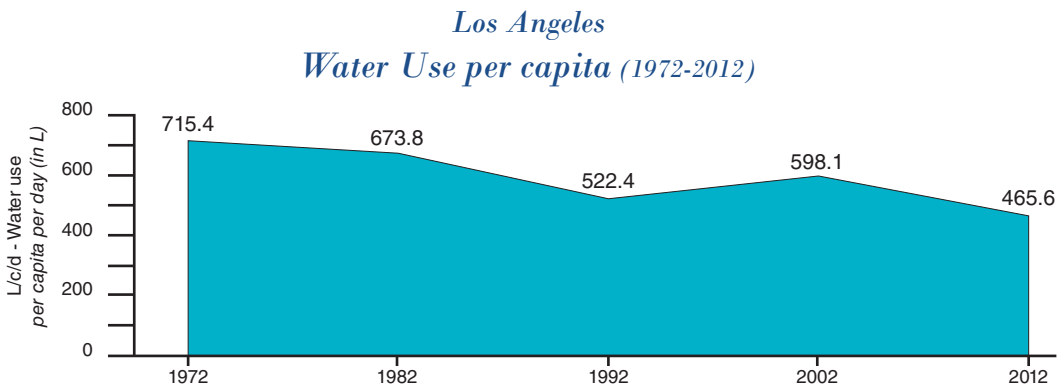


Fig. 1.22 *Los Angeles—water use per capita (1972-2012)*

'Jerry' Brown declared a drought State of Emergency and issued an executive order on April 1, 2015 that directed the State Water Resources Control Board to impose an aggregate 25 percent reduction on the state's 400 water agencies. Each agency will be responsible for the implementation of this reduction and the regulations through which this reduction will be achieved. The 25 percent is a state-wide benchmark, with a range of reduction targets among individual municipalities and water agencies, depending on their water use levels. For example, the city of Arcadia has a 36 percent water reduction mandate, as they were among the municipalities with the highest water use per capita before the executive order.[105]

The drought occurred at a time of record warmth in California, with new climate records set in 2014 for state-wide average temperatures. Records for minimum annual precipitation were set in many communities in calendar year 2013. Calendar year 2014 saw record-low water allocations for State Water Project and federal Central Valley Project contractors. Reduced surface water availability triggered increased groundwater pumping, with groundwater levels in many parts of the state dropping 50 to 100 feet below their previous historical lows. As of October 2015, the majority of the greater Los Angeles area, which includes Los Angeles, Orange, Riverside, San Bernardino and Ventura counties, were characterized as experiencing "D4" or "exceptional" drought conditions.[106]

It is a common public perception that California, and more specifically, Los Angeles, is extremely misguided and wasteful in its water use, boasting vast expanses of suburban landscapes replete with swimming pools, manicured lawns and gardens overflowing with lush foliage—all in the midst of what is, ostensibly, a desert. While there is considerable evidence to support this notion, the truth is much more

105 City of Arcadia, Accessed October 12, 2015, http://www.ci.arcadia.ca.us/home/index.asp.

106 US Drought Monitor Map Archive, Accessed October 23, 2015, http://droughtmonitor.unl.edu/MapsAndData/MapArchive.aspx

Los Angeles
Water Supply

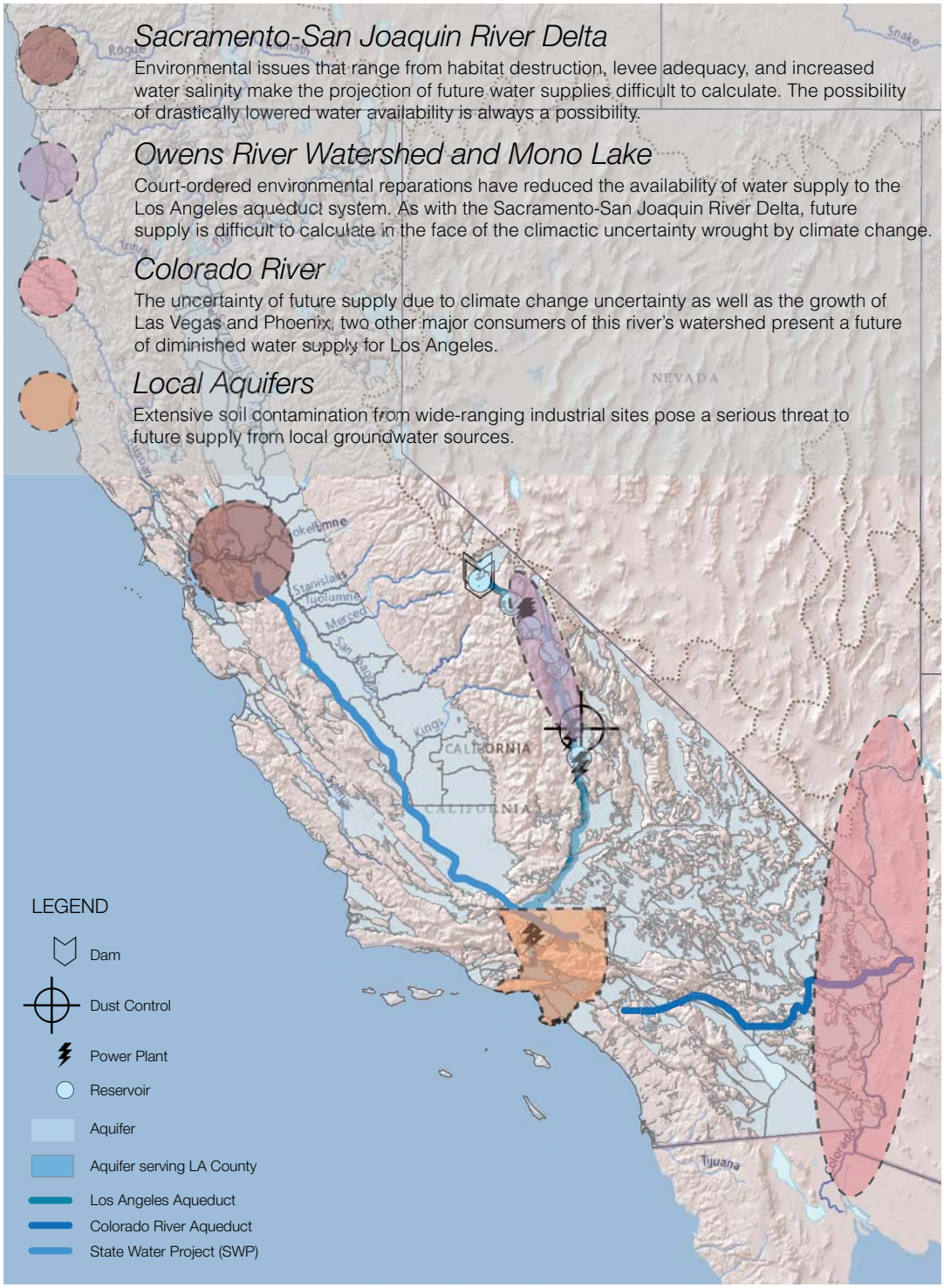


Fig. 1.23 *Map of Los Angeles' water sources*

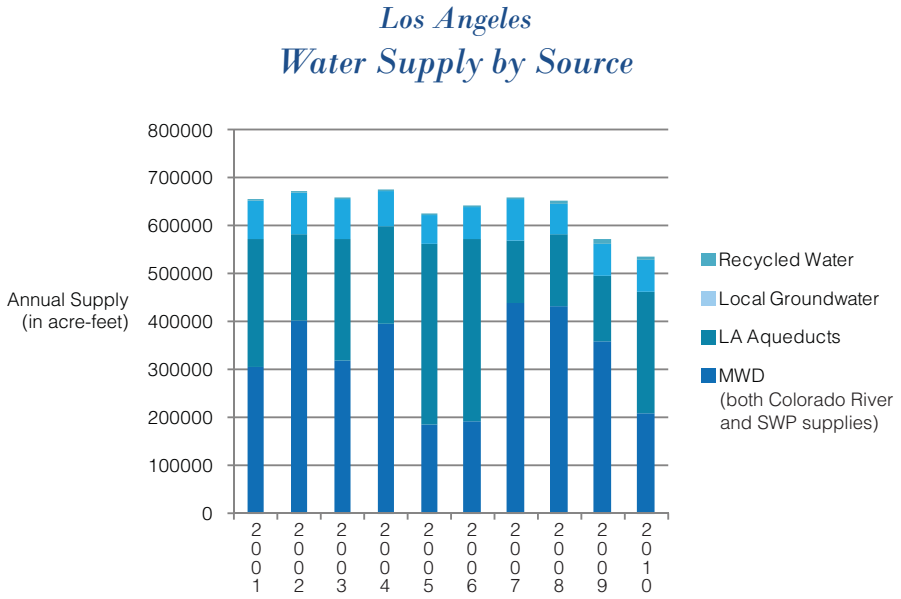


Fig. 1.24 *Los Angeles' water supply volumes by source*

complex and nuanced. This phenomenon is observed largely in higher income neighbourhoods[107], and is, thus, more of an exception, rather than the rule. Also, profligate water use tends to occur mainly in single-family residential land uses (see Figures 120 and 1.21), while larger-scale and public sector landscaping tends to employ a much greater degree of water efficiency and use of recycled water resources.

Los Angeles has also promoted a multitude of water conservation measures since the 1970's, resulting in an aggregate decrease in water use of 34.9 percent since 1972. Per capita water use in 1972 was 715.4 L per capita per day (subsequently referred to as L/c/d), 673.8 L/c/d in 1982, and 522.4 L/c/d in 1992. Water use increased in the next ten years, to 598.1 L/c/d in 2002, then decreased to 465.6 L/c/d in 2012[108] (see Figure 1.21). This decrease can be attributed, in part, to the improved efficiency of household plumbing fixtures, the increased use of recycled water for landscaping and growing public awareness of the importance of water conservation. Another factor that has contributed to declining water use in California over the last few decades is the declining water availability from the Colorado River due to rapid population growth in the southwest USA in cities such as Las Vegas and Phoenix. Until Arizona and Nevada had enough demand

107 Bardach, Anne Louise, "Lifestyles of the Rich and Parched: How the Golden State's one percenters are avoiding the drought," Politico Magazine, August 24, 2014, Accessed July 18, 2015, http://www.politico.com/magazine/story/2014/08/california-drought-lifestyles-of-the-rich-and-parched-110305_full.html#.Vi-2p2v-XOu.

108 "DWP per capita Water Use," Accessed October 19, 2014, https://data.lacity.org/dataset/DWP-Per-Capita-Water-Use/huph-ykwx.

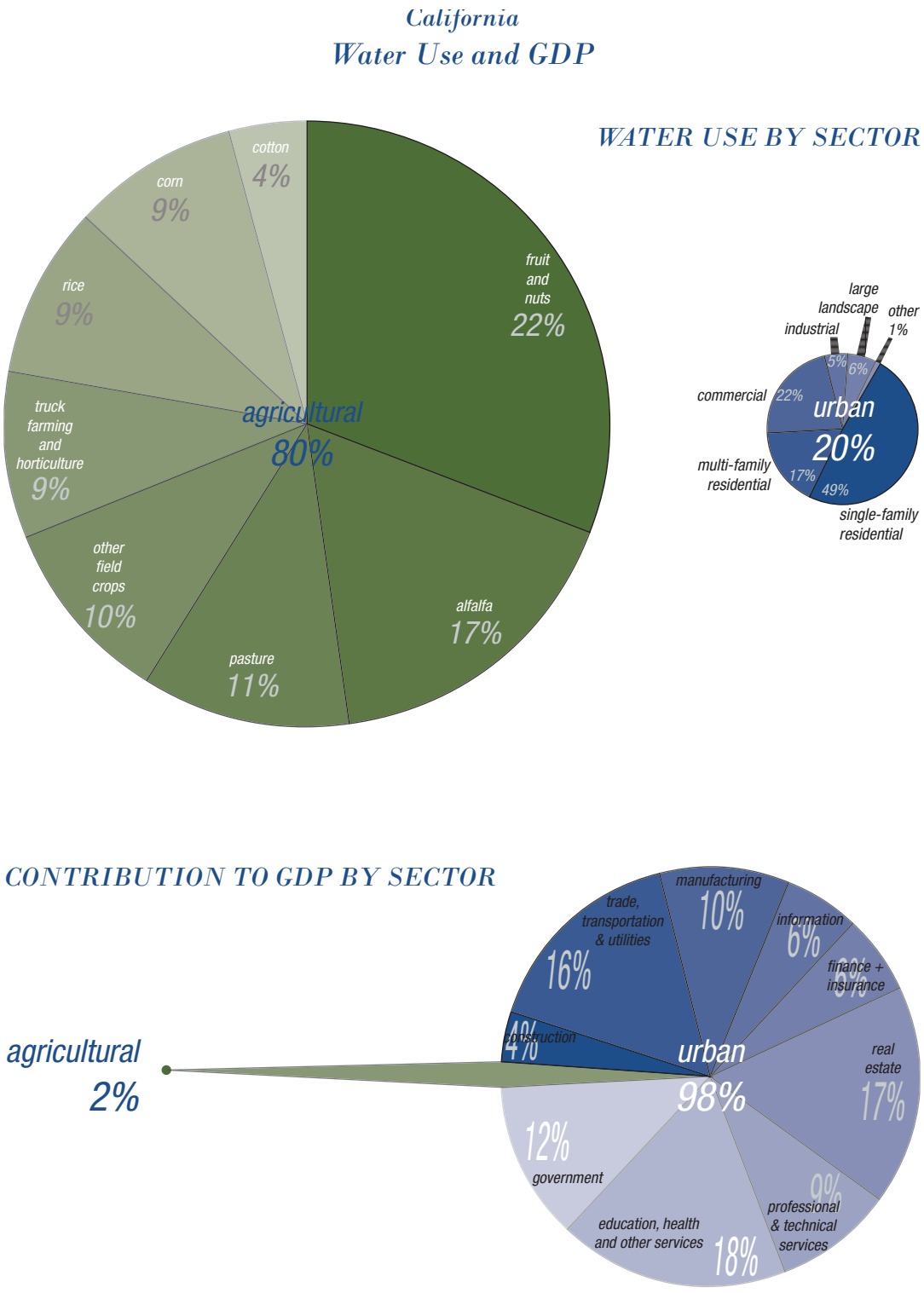


Fig. 1.25 *California—Water use and GDP*

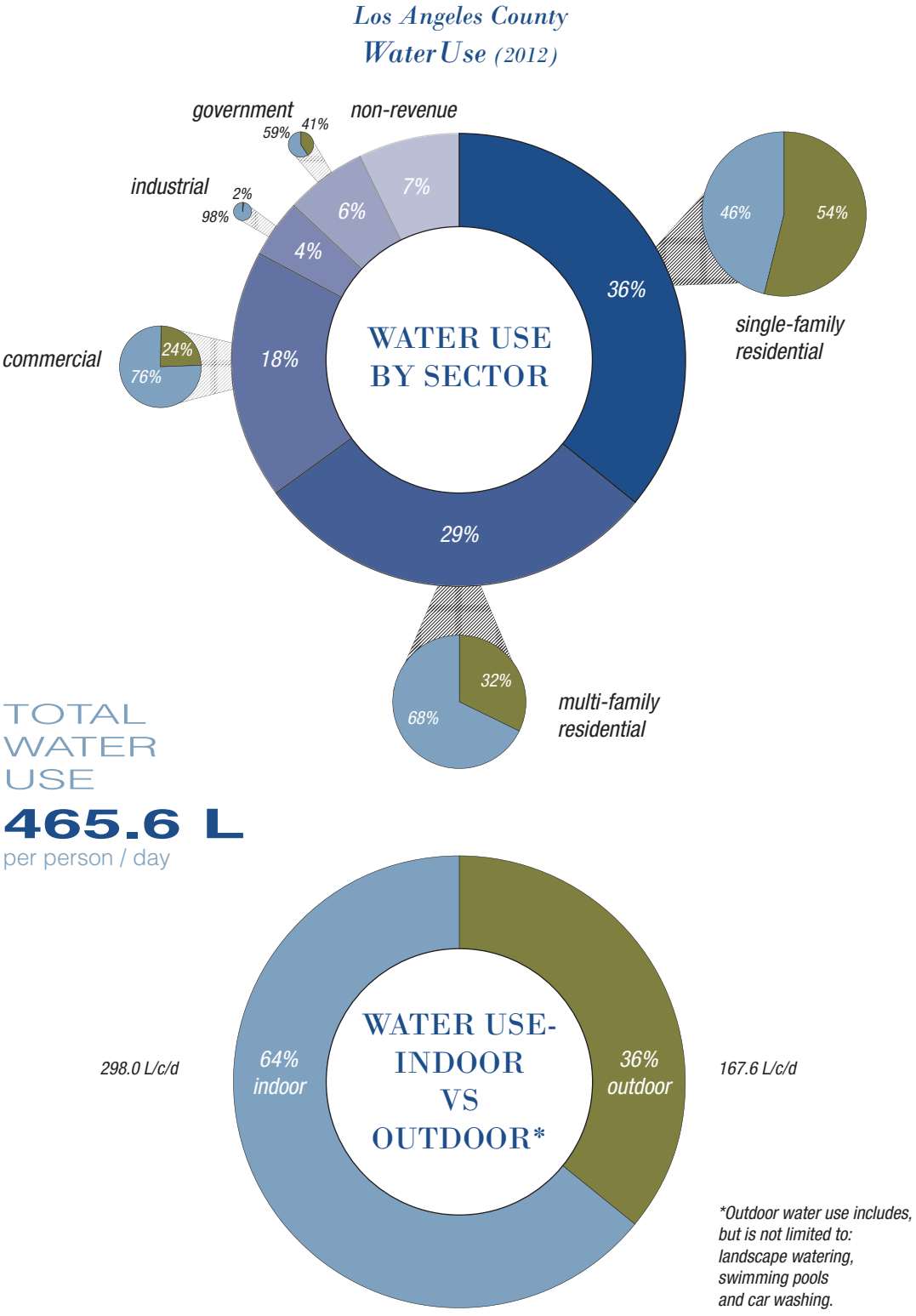


Fig. 1.26 *Los Angeles County water use (2012)*

to claim the water withdrawals allotted to them, California received the unclaimed water.

If Governor Brown's 25 percent state-wide reduction in water use is achieved, water consumption will be decreased to 349.2 L/c/d. These efforts at conservation and decreased water use, however, may be insufficient to address a future in which water supply is subject to a great deal of uncertainty and the only certainty is that there will not be more water available to meet growing demands.

1.4.2. The Urban/Rural Divide in the Drought

A controversy that has emerged during the drought has been the disproportionate water use of the agricultural sector, which accounts for 80% of all human water use in California, but contributes less than 2 percent to the overall GDP of the state.[109] While California's agricultural industry is by far the largest, on a per-state basis, in the USA, its contribution to the overall economy of the state is dwarfed by other high-value economic sectors such as the high-tech, finance, real estate, tourism, and entertainment industries (see Figure 1.25). This is not to suggest that the role of agriculture should only be considered in strictly economic terms—food, obviously, is an essential human need and should not be merely considered a commodity like any other. The current drought, however, has raised relevant questions about the sustainability of the present scale of agricultural operations and the efficiency of its practices, in terms of water use. This issue is complex and critical to the future of California, but is beyond the scope of this thesis, other than a brief examination to illustrate the larger context in which urban water issues in Los Angeles are embedded.

In addition to the imbalance in water use and economic importance between agricultural and urban sectors, the 25 percent reduction in water use mandated by the governor does not apply to the agricultural sector, which has caused a great deal of head-scratching and consternation across the state. However, many farms are receiving little water while others continue to receive their allotted water supply. The laws governing rights to water withdrawal are archaic remnants of the 19th century—basically a first-come, first-served scenario, in terms of historical land ownership. The existence of over 400 water supply districts and agencies in California, with no single agency holding the power to draft and implement comprehensive plans, further complicates already convoluted and inefficient allocation mechanisms. One positive development that one would hope could arise from this current drought is the creation of an independent, state-wide water agency with a mandate strong enough to implement

109 Mechel Paggi, *California Agriculture's Role in the Economy and Water Use Characteristics*, (Fresno, CA: The Center for Agricultural Business, California State University, Fresno, 2011.)

Sierra Nevada Mountains
Snowpack-Sattelite Imagery (2014-2015)

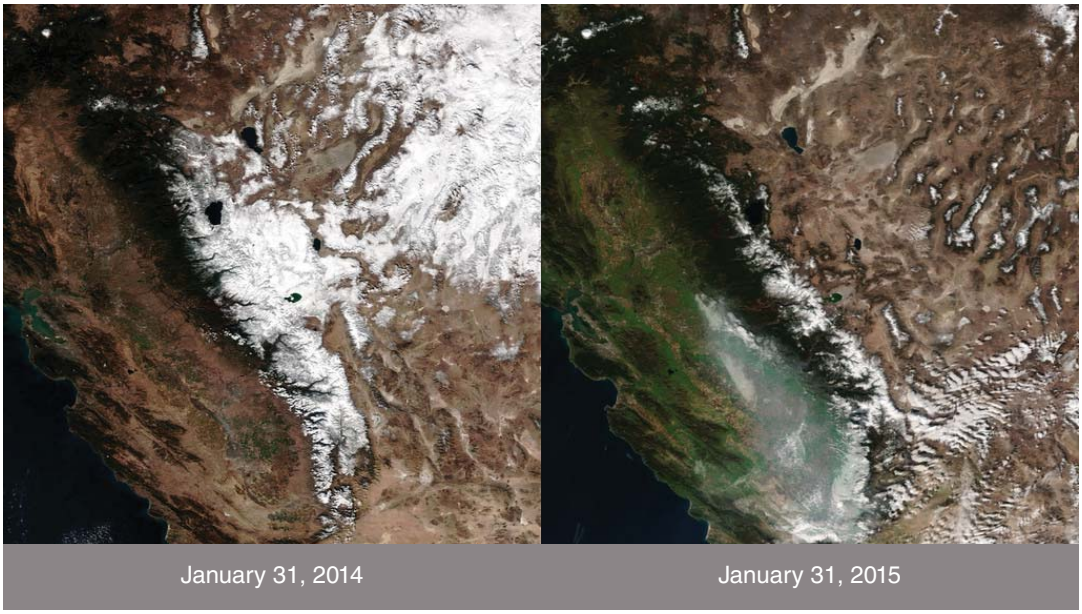


Fig. 1.27 *Satellite imagery of Sierra Nevada snowpack (2014-2015)*

Sierra Nevada Mountains
Snowpack (1966-2015)

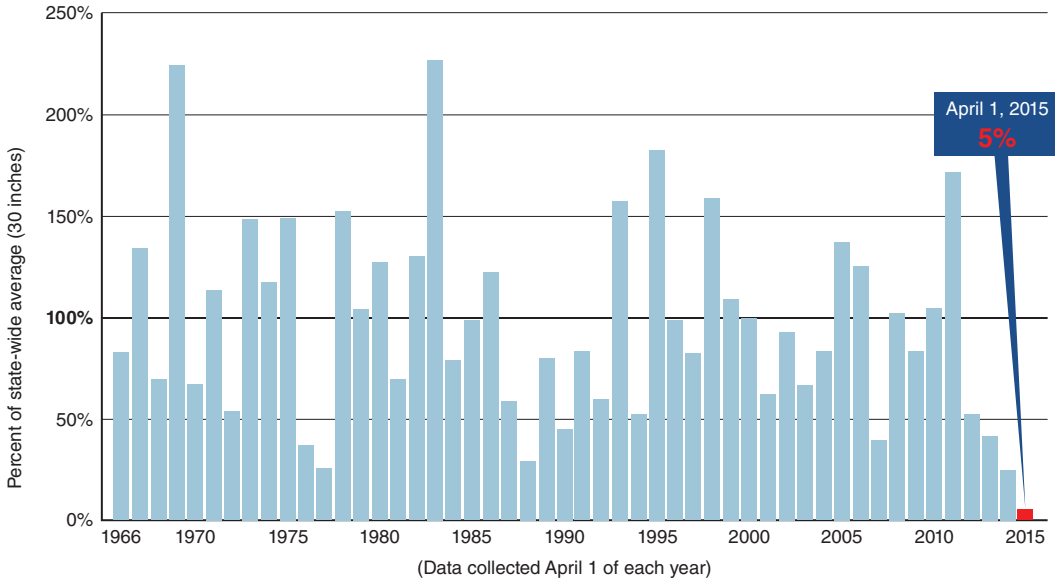


Fig. 1.28 *Sierra Nevada snowpack (1966-2015)*

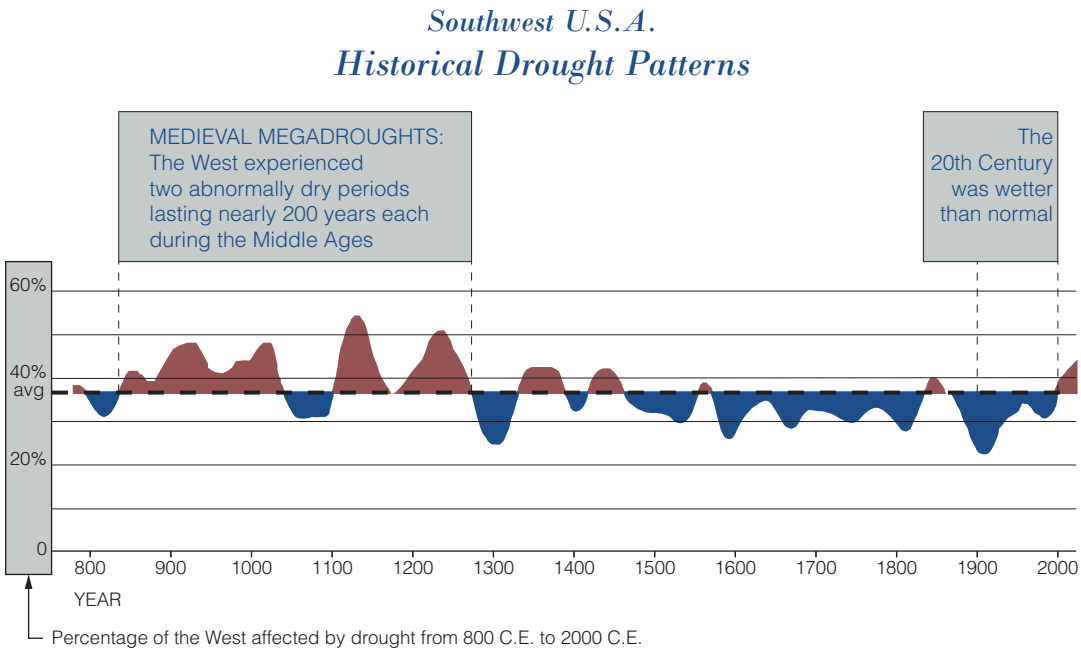


Fig. 1.29 *Southwest USA—historical drought patterns*

and enforce the comprehensive and well-considered plans the state is producing.

1.4.3. Drought, Deep History and Climate Change

The combination of decreased precipitation and higher temperatures has made this drought especially concerning, with each of these factors exacerbating the other. A critical aspect of this current drought is the record low snowpack in the Sierra Mountains. The mountain snowpack serves a crucial function, regulating the inter-year variations in water availability and acting, ostensibly, as a giant reservoir. Water is stored in the form of snow during the traditionally wet months of winter, and is released as snow melt that feeds streamflow, which provides water resources for the dry summer months. This seasonal flow is a crucial component of California's water supply regimen, but the current drought has called the future availability of this water into question. Current snowpack levels are 5 percent of normal—a 500-year low—and have diminished significantly within the last year (see Figures 1.27 and 1.28). In addition, rising temperatures caused by anthropogenic climate change are likely to adversely affect the level of snowpack in the future.

While drought has consistently recurred over the last 150 years, a study published by Edward R. Cook *et al* suggests that, in the southwest USA, drought

conditions may be the norm, not just the trough of a recurrent wet-dry cycle.

The western United States is experiencing a severe multiyear drought that is unprecedented in some hydroclimatic records. Using gridded drought reconstructions that cover most of the western United States over the past 1200 years, the data indicates that this drought pales in comparison to an earlier period of elevated aridity and epic drought in AD 900 to 1300, an interval broadly consistent with the Medieval Warm Period (see Figure 1.29). If elevated aridity in the western United States is a natural response to climate warming, then any trend toward warmer temperatures in the future could lead to a serious long term increase in aridity over western North America.[110]

This research suggests that the 20th century was an abnormally wet period when considered in terms of the extended temporal scale of centuries and millennia represented by paleoclimatological records. Elevated global temperatures in the Middle Ages, as referred to in the above quote, resulted in drought conditions that lasted centuries, not years. While the elevated temperatures expected due to climate change may not produce similar effects, it would be prudent to consider drought conditions of this severity as a distinct possibility.

The future of water management in Los Angeles can no longer be based on the supply-side, government-provided approach favoured in the first half of the 20th century. There are no longer any distant frontiers from which needed water resources can be acquired at a reasonable cost in a reliable, sustainable manner. Similarly, demand-side initiatives that have been the thrust of recent water resource management efforts, such as water-efficient fixtures and government mandated water use reductions, do not hold the solution to Los Angeles' critical water supply issues. They are an essential , but small part of a larger vision for water resource management in which the uncertainty surrounding dwindling water resources and future demand requires a more radical and comprehensive approach that has been dubbed the 'soft path'. This differs from other approaches in that it makes ecological sustainability a central priority, matches water quality to the needs of the end use and adopts long-range planning strategies that go beyond present needs.[111]

110 Cook, Edward R., Connie A. Woodhouse, C. Mark Eakin, David M. Meko and David W. Stahle, "Long-Term Aridity Changes in the Western United States," In *Science* 5 November 2004: Vol. 306 no. 5698, 1015-1018. DOI: 10.1126/science.1102586, 1015.

111 Brandes, Oliver M. and David B. Brooks, "The Soft Path for Water in a Nutshell," (Victoria, B.C., Friends of the Earth Canada and the POLIS Project on Ecological Governance, 2007), 7.

2.0 CAPITALISM | METABOLIC RIFTS

The history of the development of Los Angeles and its problematic relationship with water, both in terms of scarcity and excess, is an instructive example of the successes and limitations of human endeavours in the modern era. The project of modernity—post-Enlightenment techno-science and industrial capitalism—are built upon the conceptual foundations of a reductive, linear rationality that is replicable, scaleable, and in this schema, theoretically universal. This model has been successful in bending the biosphere to human will, enabling an unprecedented level of control over what had been a beneficent, yet capricious and inconsistent nature. Sociologist Jason Moore states "the core of the capitalist project, therefore, from its sixteenth-century origins, was the scientific and symbolic creation of nature in its modern form, as something that could be mapped, abstracted, quantified, and otherwise subjected to linear control."[112] Taming the wild to serve our needs has been the project of humanity for millennia, but the global scale of techno-scientific capitalism in the modern era has enabled a prodigious level of control of nature, resulting in prosperity for many humans, but inequity and scarcity for others as well as a rampant degradation of the biosphere. This has been characterized as the mastery or domination of nature, which geographer Neil Smith refines as the production of nature:

> Instead of the domination of nature, therefore, we must consider the much more complex process of the production of nature. Where the 'domination of nature' argument implies a dismal, one-dimensional, contradiction-free future, the idea of the production of nature implies a historical future that is still to be determined by political events and forces, not technical necessity. But the political events and forces are precisely those that determine the character and structure of the capitalist mode of production.[113]

This distinction between the domination of nature and the production of nature is crucial in that it removes the inevitability of disaster and the demonization of techno-scientific progress from the discourse and enables the critical analysis of contemporary global crises and the genealogy of their emergence. The concept of the centrality of metabolic rifts to capitalism and their role in these crises will be examined.

112 Jason W. Moore, "Toward a Singular Metabolism: Epistemic Rifts and Environment-Making in the Capitalist World Ecology," In *Grounding Metabolism* (New Geographies 06), edited by Daniel Ibañez and Nikos Katsikis (Cambridge, Mass.: Harvard University Press, 2014), 17.

113 Neil Smith, *Uneven Development: Nature, Capital, and the Production of Space* (New York: Blackwell, 1984), 69.

2.1 The Emergence of Metabolic Rifts

> *metabolism*
> The chemical processes that occur within a living organism in order to maintain life: the metabolism of fatty acids in the kidney. Two kinds of metabolism are often distinguished: constructive metabolism, the synthesis of the proteins, carbohydrates, and fats which form tissue and store energy, and destructive metabolism, the breakdown of complex substances and the consequent production of energy and waste matter. ***(Oxford English Dictionary)***
>
> rift
> A crack, split, or break in something: the wind had torn open a rift in the clouds. ***(Oxford English Dictionary)***

Metabolism is a term from the natural sciences whose meaning has expanded beyond its original disciplinary boundaries to encompass all manner of energy and material exchanges between actants within an ecosystem. The term 'metabolism' emerged in the early 19th century to characterize chemical changes within living cells. Its use became widespread in biology to describe processes of organic breakdown and recomposition, both within organisms and between organisms and their environment. Urban political economist David Wachsmuth describes the broader use of the term, which "has lived a dual existence in the natural sciences, referring both to processes by which bodies change and reproduce themselves and to more holistic conceptions of ecosystem relations."[114] In the latter half of the 19th century, this concept was extended to the urban sphere, with special emphasis on circulation as a metaphor of productivity, health and morality as opposed to stagnation, decay and disease. Matthew Gandy, in examining the emergence of large-scale, networked water infrastructure in Paris and London, observed that "the nineteenth-century conception of the city as an assemblage of identifiable organs placed particular emphasis on the circulatory dynamics of urban space."[115] This was a response to the socio-environmental degradation caused by rapid industrialization and urbanization that was experienced in many European and American cities, and felt most keenly in leading-edge cities such as London, Paris and New York. 'Circulation' and 'flow' emerged as key concepts in addressing the unprecedented and overwhelming volumes of sewage—human, animal and industrial—the modern industrial city was generating. This pollution was rapidly overwhelming cities' carrying capacities, contaminating water supplies and creating hazards to public health. Thus, as Daniel

114 David Wachsmuth, "Three Ecologies: Urban Metabolism and the Society-Nature Opposition," *The Sociological Quarterly*, 53 (4) (Sept. 2012): 506. doi: 10.1111/j.1533-8525.2012.01247.x.

115 Matthew Gandy, *The Fabric of Space: Water, Modernity, and the Urban Imagination* (Cambridge: MIT Press, 2014), 10.

Schneider states, "sewage disposal became one of the most taxing problems facing the industrial city"[116] Circulation and flow were essential concepts, as the transport of noxious wastes away from the city as quickly and efficiently as possible was essential for its continued functioning. However, this massive waste flow was routinely dumped into the nearest body of water, such as the Thames River, inaugurating industrial capitalism's *modus operandi* of offloading its wastes downstream, both literally and figuratively.

Circulation also took on a positive association within the discourse of industrial capitalists as a metaphor for the flow of investment, money, growth, goods, and most importantly, profit. The swift and unencumbered movement of capital and accumulation of profit became conceptually linked with the circulation of cleansing water in urban environments. The profitable city and the hygienic city became intrinsically linked in a dialectic that would inform socio-economic discourse for the next century and a half while managing to obscure and marginalize its problematic structural contradictions.

The term 'metabolic rift' expanded upon Karl Marx's notion of the "irreparable rift in the interdependent process of social metabolism"[117] wrought by industrial capitalism, which manifested in the expanding division between the worker and the products of their labour, between city and country, and between humanity and the rest of nature.

The theory of the metabolic rift draws upon the historical development of the term within the natural sciences, as well as how Marx used it to study environmental problems. In the middle of the 19th century it was becoming clear that large-scale agricultural enterprises, located at increasing distances from the urban areas it fed, was creating a problematic imbalance in the transfer of essential nutrients such as nitrogen and phosphorous. Sociologists Brett Clark and Richard York summarize this phenomenon: "In contrast to traditional agricultural production where essential nutrients were returned to the soil, capitalist agriculture transported nutrients essential for replenishing the soil, in the form of food and other crops...to urban areas, where they ended up as waste."[118]

This concept extends Marx's critique of industrial capitalism into a framework that is relevant to contemporary ecological discourses—linking the machinations of capitalism to the myriad social and environmental crises that have become disturbingly commonplace. A metabolic rift not only entails an ecological rupture, but also a systemic division of nature and society. The capitalist system subdivides, commoditizes and subsumes both

116 Daniel Schneider, *Hybrid Nature: Sewage Treatment and the Contradictions of the Industrial Ecosystem* (Cambridge, Mass.: MIT Press, 2011), xx.

117 Karl Marx, *Capital: Volume 3: A Critique of Political Economy* (London: Penguin Classics, 1993), 949.

118 Brett Clark and Richard York, "Carbon Metabolism: Global Capitalism, Climate Change and the Biospheric Rift," *Theory and Society* 34(4) (Aug., 2005): www.jstor.org/stable/4501730, 397-8.

the human and non-human as resource inputs in the process of capital accumulation. "Materials and energy are transformed into new forms." Clark and York state. "In this process, environmental degradation takes place, leading to the accumulation of pollution. Lastly, attempts to remedy metabolic rifts, without systematic change to the current political-economic system, compound the problems associated with rifts between the social metabolism and natural metabolism."[119] Urban theorist Sabine Barles offers a prescient summary of the metabolic processes inherent in techno-scientific global capitalism:

> The present socio-ecological regime is characterized by the linearization of material flows—societies taking resources from the biosphere and returning waste (i.e., transformed materials often incompatible with the receiving area)—and the establishment of biogeochemical cycles. Although the natural functioning of the biosphere features substance cycles (carbon, nitrogen, etc.), anthropogenic activity not only intensifies their flows but also linearizes them, since the materials do not return to their place of origin and therefore accumulate in other parts of the biosphere. If the materials somehow return to their origin, they do so in a different chemical form. Many of the environmental problems encountered today can be attributed to these abundant and linear flows: resource depletion, climate change, eutrophication, proliferation of solid waste, dispersion of toxic material, and loss of biodiversity, just to name a few.[120]

Contemporary examples of capitalism's production of metabolic rifts are numerous and widespread. The global ubiquity of toxic emissions, degraded environments and impaired waterbodies indicate that these rifts are symptomatic of the underlying structure of neoliberal global capitalism, not just isolated anomalies that can be corrected. Massive social inequities between developed and developing countries, as well as between privileged and marginalized populations within every country and region, demonstrate that the impacts of these rifts are not just environmental, but are social as well. The defining crisis of the early 21st century—anthropogenic climate change—is the meta-rift of global capitalism—the result of a massive imbalance in carbon transfers through the burning of fossil fuels that has enabled global industrialization, urbanization and capital accumulation—benefitting a few countries at the nexus of the global capitalist economy, gaining wealth and power "through high fossil fuel consumption and exploitation of the global south. Anthropogenic greenhouse gas emissions, while stemming from localized sources, are distributed throughout the atmosphere and accumulate as waste, which degrades the atmosphere and leads to

119 *Ibid*, 400.

120 Sabine Barles. "Urban Metabolism: Persistent Questions and Current Developments." In *Grounding Metabolism* (New Geographies 06), edited by Daniel Ibañez and Nikos Katsikis, (Cambridge, Mass.: Harvard University Press, 2014), 63.

further alteration of the biosphere, creating a global crisis,"[121] observes Clark and York.

The production of nature at the core of capitalism is inherently flawed by a dissonance between desired results and unintended outcomes in which unintended outcomes are offloaded to the public realm. Geographer David Harvey states that:

> Capital has long preferred to treat the costs of social reproduction as an externality—a cost for which it bears no market responsibility—but the social-democratic movement and the active threat of a communist alternative forced capital to internalize some of those costs, along with some of the externality costs attributable to environmental degradation, up until the 1970's in the advanced capitalist world. The aim of neoliberal policies since 1980 or so has been to dump these costs into the global commons of social reproduction and the environment, creating, as it were, a negative commons in which whole populations are forced now to dwell.[122]

These metabolic rifts in the ecology of capitalism are ubiquitous and critical. It is important to examine whether they are merely anomalies or structurally intrinsic to capitalism.

2.2 Structural Contradictions of Capitalism

David Harvey, in *Seventeen Contradictions and the End of Capitalism* (2014), examines the internal contradictions within capitalism and their role in the emergence of contemporary global crises. He contends that these contradictions have made capitalism flexible and resilient, but contain the seeds of systemic catastrophe. While many of the contradictions are manageable, others are potentially disastrous: the stress on endless compound growth, the necessity to exploit nature to its limits, and its tendency toward universal alienation. Another curious, yet significant contradiction of capitalism lies in the disjunction between the theoretical efficacy of the market and the problem of market externalities. Harvey raises the question of "the pervasive problem of what to do about market failures. These arise because of so-called externality effects, defined as real costs which are not (for some reason) registered in the market. The most obvious field of externalities is pollution, where firms and individuals do not pay for deleterious effects on air, water and land qualities through their actions."[123]

Another critical contradiction of capitalism is the distinction between "use value" and "exchange value". These concepts were introduced by Marx[124] and further elaborated by Harvey. "Use value" refers to the practical aspects of a commodity, service or product, such

121 Brett Clark and Richard York, "Carbon Metabolism: Global Capitalism, Climate Change and the Biospheric Rift," *Theory and Society* 34(4) (Aug., 2005): www.jstor.org/stable/4501730, 414-5.

122 David Harvey. *Rebel Cities: From the Right to the City to the Urban Revolution* (New York: Verso, 2012), 85.

123 David Harvey, *Seventeen Contradictions and the End of Capitalism* (New York: Oxford University Press, 2014), 43.

124 Marx, *ibid.*

as a house or wheat. This is the root of the fundamental justification of capitalism—that human needs are most effectively met by the rational and self-optimizing processes of the market. However, the intersection of surplus capital and the market prioritizes the exchange value of that commodity, service or product above its use value. Tradable currency is a fetish for the value produced by the production of nature, both human and non-human. Maria Kaika extends this basic Marxist tenet into contemporary discourses in political ecology:

> Blurring the socio-environmental process of their production by grounding their character as universally exchangeable for anything else is an amazingly powerful ideological mechanism. Severing materially and symbolically the connection between producing exchange and use values contributes to masking the qualitative social and environmental relations of production. Acquiring exchange value, without revealing at the same time social power relations of their production, permits commodities to be presented as exceptional, as outside and over the thing that really makes them exceptional, i.e., the social metabolism of nature.[125]

This is extends the concept of the metabolic rift into cultural discourse, exemplifying a fundamental disjunction between our collective imaginings and our material practices.

A foundational contradiction of capitalism is the concept of 'primitive accumulation', a term coined by Marx to describe the origins of capital in the era of colonialism. If abundant natural resources are found and are not being exploited, there is a fundamental justification for the violent appropriation of these resources under the law of private property.

> Private property establishes an exclusive ownership right to a thing or a process whether it is being actively used or not. At the root of commodity exchange there lies the presupposition that I do not myself actively want or need the commodity I offer for trade. Indeed, the very definition of a commodity is something that is produced for someone else to use. Private property rights confer the right to trade away (alienate) that which is owned. A difference then emerges between what are called usufructuary rights (rights that pertain to active use) and exclusionary permanent ownership rights. This difference has often been the source of confusion, particularly throughout the history of colonialism. Indigenous populations frequently operate on the basis of usufructuary rights to land, for example (this is the case with shifting agriculture). Colonial powers typically imposed exclusionary ownership rights and this was the source of a great deal of conflict. Populations that moved around from one site to another, following their herds or moving from exhausted land to fresh and more fertile land, suddenly found themselves barred from moving by the existence of fences and barbed wire. They often found themselves prevented from using land that they had traditionally regarded as open for use because someone now owned it in perpetuity even if it was not used. The indigenous population in North America suffered greatly from this.[126]

The foundational projects of capitalism have been demonstrated to be violent,

125 Maria Kaika, *City of Flows: Modernity, Nature, and the City* (New York: Routledge, 2005), 31.

126 David Harvey, *Seventeen Contradictions and the End of Capitalism* (New York: Oxford University Press, 2014), 46.

practically criminal enterprises, operating under a banner of the freedom and progress represented by private property rights. This is the essence of 'primitive accumulation' as the genesis of industrial capitalism. The processes of primitive accumulation continue to this day as countries and territories are subsumed by investment flows operating within the global network of neoliberal capitalist regimes.

Sociologist Saskia Sassen characterizes the devastating effects of global neoliberal capitalism as 'expulsions', a vacating of both the human and the non-human from life-spaces as these territories are mined, both literally and figuratively, as capital flows in, expands and departs. In the socio-economic sphere we are witnessing "a formidable problem in our global political economy: the emergence of new logics of expulsion. The past two decades have seen a sharp growth in the number of people, enterprises, and places expelled from the core social and economic orders of our time."[127]

It is clear that capitalism, in the course of its daily operations, creates metabolic rifts throughout all of the territory it occupies. These rifts are environmental, social, and economic, calling into question the entire structure of capitalism and its foundational theories. The conceptual fissures of neoliberal global capitalism and their spatial implications will be examined in the next chapter, Uneven Development.

127 Saskia Sassen, *Expulsions: Brutality and Complexity in the Global Economy* (Cambridge, Mass.: Harvard University Press, 2015), 8.

3.0 UNEVEN DEVELOPMENT

> Contemporary urban space is characterised by landscapes of neglect interspersed with intense foci of capital accumulation and elite consumption.[128]
> ***Matthew Gandy***

> Capital creates a geographical landscape that meets its needs at one point in time only to have to destroy it at a later point in time to facilitate capital's further expansion and qualitative transformation. Capital unleashes the powers of 'creative destruction' upon the land. Some factions benefit from the creativity, while others suffer the brunt of the destruction. Invariably, this involves a class disparity.[129]
> ***David Harvey***

In the previous chapter, the tendency of capitalism to produce metabolic rifts was discussed—the term 'uneven development' describes the processes through which these rifts are manifested spatially. Economist Donald J. Harris states that "one of the most striking characteristics of the general process of capitalist development is the phenomenon of uneven development, defined as persistent differences in levels and rates of economic development between different sectors of the economy."[130] This definition, in situating the locus of uneven development between different economic sectors, is much narrower in scale than the pervasive global ubiquity of uneven development, but is a good place to begin tracing this phenomenon. To make profits and accumulate capital, companies seek to increase revenue and decrease costs, with growth as the primary goal: "the outcome of a process which is driven by active agents, not by exogenous factors. In particular, in the context of the capitalist economy, growth is the outcome of the self-directed and self-organizing activity of firms, each seeking to expand and to improve its competitive position in relation to the rest."[131] This incessant drive for growth and capital accumulation requires constant innovation and the expansion of territories at expanding spatial and temporal scales. This creates an aggregation of effects as the assemblages of economic actors expand their activities and influence into every corner of the world, rendering their structural differentiations globally spatialized. The problems of the firm become the problems of the world.

128 Matthew Gandy, "Urban Flux," *Architectural Design* 79. (Sept. 2009): 12-17. doi: 10.1002/ad.943, 15.

129 David Harvey, *Seventeen Contradictions and the End of Capitalism* (New York: Oxford University Press, 2014), 135.

130 Donald J. Harris, "Uneven Development," *The New Palgrave Dictionary of Economics*, 2nd Edition,. Steven N. Durlauf and Lawrence E. Blume, editors, (London: Palgrave Macmillan, 2008)

131 *Ibid*.

An instructive example of this phenomenon began in the 1970's in a transfer of a wide range of industrial activities from the United States to Asia, where weaker environmental regulations and substantially lower wage rates offered a significantly preferential environment for capital accumulation. This resulted in widespread socio-economic devastation in the formerly prosperous industrial regions of the north-east United States and rapid economic development combined with rampant ecological degradation in many regions of China and other newly industrializing countries in Asia.

Uneven development, while being a central aspect of the production of space under capitalism, does have some roots in the extant predispositions of human socio-economic activity. Certain natural conditions favour certain types of economic development—coastal regions specializing in fishing and shipping ports, for example. At the local urban scale, the phenomenon of 'hills and valleys', in which elites live on the hills and everybody else lives in the valleys, has been a consistent distribution of urban space since the dawn of recorded history. The industrial revolution inaugurated the privileging of the west side of a city over the east side, as prevailing winds moved the noxious fumes produced by industrial activity eastward. The distinction inherent in global industrial capitalism, however, is one of scale and systematic distribution—both spatially and temporally. Economic activity can shift to regions thousands of kilometers away in relatively short time spans, rendering entire regions functionally dead or booming, irrespective of natural conditions. This phenomenon reflects what Harvey refers to as the "spatial fix"[132] of capitalism which overcomes localized crises of under- or over-accumulation by continually shifting capital across global networks. "Capital flows from time to time get redirected from one space to another. The capitalist system remains relatively stable as a whole, even though the parts experience periodic difficulties...Capital never has to address its systemic failings because it moves them around geographically."[133] Capitalism can extract value from populations and ecosystems to the point of exhaustion and diminishing returns, pick up its stakes, and mobilize the accumulated capital to new territories ripe for exploitation.

3.1 Uneven development in the emergence of the USA

While uneven development is a globally ubiquitous, integral aspect of capitalism, the manner in which it manifests is highly individualized, expressing extant socio-economic conditions and cultural tendencies within the territories of capital accumulation. Negative

132 David Harvey, "Globalization and the spatial fix," Geographische revue 2, no. 3 (2001): 23-31.

133 *Ibid.*, *Seventeen Contradictions and the End of Capitalism* (New York: Oxford University Press, 2014), 151.

aspects of uneven development occur where populations and/or ecologies are deemed exploitable, disposable, or any other variation of concepts of 'the other'. Defenders of capitalism would suggest that this phenomenon is the result of human prejudices and that the ideal mechanisms of the market, if left unfettered, would deliver benefits to all. However, surplus value does not create itself, and must be produced through the exploitation of something—whether it is a natural ecology, a human population, or some combination of both. An abstract, ideal 'market' has never existed that has not been defined and delineated by human practices. In fact, these practices have often acted as limiting factors, through laws and regulations that have restrained the most destructive drives of capital accumulation. Alternatively, socio-cultural predispositions have been the mechanism by which the precarity, degradation and exploitation engendered by capitalism is assigned.

The United States grew from a sparsely populated British colony to a dominant world power through violent processes of primitive accumulation—seizing land and resources from Native American peoples and appropriating the bodies of slaves and their labours to build out a burgeoning frontier economy. While this process is similar to economic growth through acts of war practiced by humans for millennia, it is a precursor to the phenomenon David Harvey calls "accumulation by dispossession"[134]. Harvey's term refers to contemporary practices of neoliberalism such as privatization and financialization in which governments and their attendant powers are co-opted to facilitate capital accumulation by dispossessing public resources and dismantling the foundations of the social contracts upon which nations are built. Its similarity to the aforementioned historical practices is in the ideological and legal dimension, in which acts of war, violence, and exclusion are legitimized through supposedly higher-order concepts such as 'freedom', the 'will of God', 'the invisible hand of the market", 'illegal immigrant', 'eminent domain', 'highest and best use', 'savages', 'inferior races', *etcetera*.

3.2 The Geography of Exclusion

Private property rights, a linchpin of post-Enlightenment humanist values upon which the United States was founded, was inaugurated through the systematic dispossession of indigenous lands and the bodies of the slave population. From these morally questionable beginnings, however, this foundational ethos enabled unprecedented levels of prosperity and security for many working-class Americans through home ownership. The percentage of the population who lived in owner-occupied dwellings rose from 46.5 percent in

134 *Ibid.*, "The "New" Imperialism: Accumulation by Dispossession," *Socialist Register* 40, 63-87.

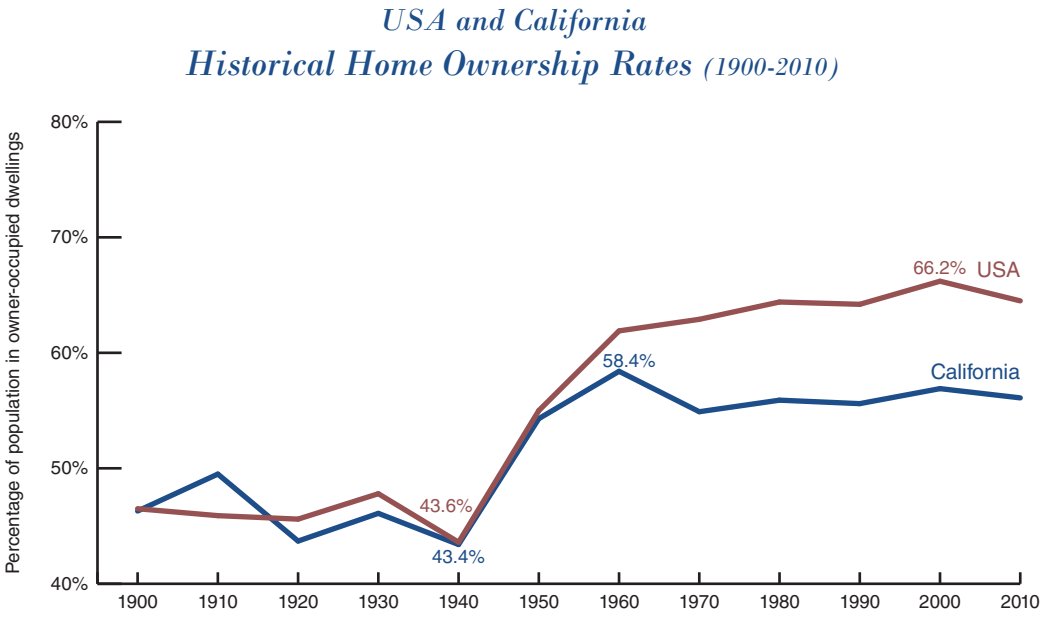


Fig. 3.01 *USA and California—historical home ownership rates (1900-2010)*

1900 to a peak of 66.2 percent in 2000.[135] California lagged behind the US average throughout this time, beginning roughly the same—46.3 percent in 1900, but peaking at 58.4 percent in 1960. (see Figure 3.01) In 2014, the US average was 64.5 percent while 54.2 percent of California's population lived in owner-occupied dwellings.[136]

While individual home ownership was a foundational component of the 20th century American project of expansive prosperity, the extent to which this has been achieved is far from universal. In comparing the most recent statistics on home ownership rates, the US ranks 38th in the world, lagging behind countries such as Romania (96.1 percent)[137], Singapore (90.3 percent)[138], Norway (84.4 percent)[139] and Mexico (80 percent)[140]. Even the correlation between home ownership rates and economic health and prosperity is called into question as countries with severe economic crises such as Spain (78.8 percent) and Greece (74.0 percent) rank

135 United States Census Bureau, "Historical Census of Housing Tables," Last updated October 31, 2011, http://www.census.gov/hhes/www/housing/census/historic/owner.html.

136 United States Census Bureau, "Housing Vacancies and Homeownership (CPS/HVS): Annual Statistics: 2014 (Including Historical Data by State and MSA)," Last updated February 21, 2014, http://www.census.gov/housing/hvs/data/ann14ind.html.

137 Eurostat, "Distribution of population by tenure status, type of household and income group," Last modified November 17, 2015, http://appsso.eurostat.ec.europa.eu/nui/show.do.

138 Singapore Statistics, "Home Ownership Rate of Resident Households," Last updated February 16, 2015, http://www.singstat.gov.sg/statistics/visualising-data/charts/home-ownership-rate-of-resident-households.

139 Eurostat, Ibid.

140 Marco A. López-Silva, Raúl Abreu-Lastra, Alberto Saracho-Martínez, Agustín Paulín-Hutmacher, "Housing Finance in Mexico: Current State and Future Sustainability," Inter-American Development Bank, (November, 2011), 9, Accessed November 4, 2015, https://publications.iadb.org/handle/11319/5353.

ahead of the US in this key economic indicator, while a country with a relatively healthy economy, Germany (52.5 percent), is near the bottom of this list.[141]

Single-family home ownership, the cornerstone of the 'American Dream', has been a gate to security and prosperity, but access to this space has been systematically denied to people of colour and people of 'foreign' cultures.

3.2.1 Racially Restrictive Covenants

Residential segregation was a historically common and widespread phenomenon in the United States. This was not merely a result of disparity in housing location and quality due to differences in the income levels of various socio-economic groups and the tendency for these groups to cluster together in close-knit communities, but was an intrinsic disposition of both private industry and state and local governments. In the early 20th century racial segregation was mandated by municipal zoning ordinances that were upheld by many state governments until a 1917 Supreme Court ruling, Buchanan v. Warley, which declared municipally mandated racial zoning unconstitutional.[142] This decision did not, however, end the practice of residential segregation, as the emergence of racially restrictive covenants continued this systematic exclusion of African-Americans from most housing markets.

A covenant is a legally enforceable contract contained in the deed to a property, is attached to said property in perpetuity, and is legally enforceable on future buyers of the property. Owners who violate the terms of the covenant risk forfeiting the property. Racially restrictive covenants refer to contractual agreements that prohibit the purchase, lease, or occupation of a property by a particular group of people, usually African Americans. Racially restrictive covenants operated at a variety of scales; from mutual agreements between property owners in a particular neighbourhood to part of a wider set of practices enforced through the cooperation of real estate boards and neighbourhood associations. A typical covenant included the following:

> hereafter no part of said property or any portion thereof shall be…occupied by any person not of the Caucasian race, it being intended hereby to restrict the use of said property…against occupancy as owners or tenants of any portion of said property for resident or other purposes by people of the Negro or Mongolian race.[143]

The widespread practice of using racial covenants became so socially

141 Eurostat, *Ibid*.
142 U.S. Commission on Civil Rights, "Understanding Fair Housing," Publication 42, February 1973, 4.
143 *Ibid*.

acceptable that "in 1937 a leading magazine of nationwide circulation awarded 10 communities a 'shield of honor' for an umbrella of restrictions against the 'wrong kind of people'."[144] This practice was so commonplace that by 1940, 80% of property in Los Angeles carried restrictive covenants barring black families.[145]

It is at this point, again, where a defender of capitalism would point to human prejudice, not the machinations of the free market, as the locus of this injustice. This characterization is partially true, but the fact that the provision of housing is a commoditized, capital-intensive and profit-driven enterprise renders racial inclusion/exclusion, through its perceived influence on property values, an integral component of the real estate market. This realization is reflected, as recently as 1950, in the National Association of Real Estate Brokers' (NAREB) code of ethics, which stated:

> The realtor should not be instrumental in introducing into a neighborhood a character of property or occupancy, members of any race or nationality or any individual whose presence will clearly be detrimental to property values in the neighborhood.[146]

This marks the early stages of a process of uneven development in the urban fabric of Los Angeles in which unequal housing conditions are not only the result of an inequitable distribution of economic opportunity, but become what Aldo Rossi termed a "pathological permanence"[147]. This is a concrete manifestation of the social relations inherent in this inequity that congeal into urban artefacts that continue to exert their own agency in an ongoing socio-spatial dialectic. In simpler terms, the inequity creates the slums, and the slums continue to create inequity. This is a common and ubiquitous phenomenon among cities around the world under capitalism, but Los Angeles manifests it in a way particular to its particular history, culture, landscape and topography.

3.2.2 Redlining

In 1933, Congress created the Home Owners' Loan Corporation (HOLC), a New Deal initiative championed by President Franklin Roosevelt to help stem the urban foreclosure crisis during the Great Depression. Over the next three years, the federal agency refinanced more than a million homes. It issued low-interest, long-term loans to new homeowners across the nation, spurring a dramatic increase in home-ownership rates over the following

144 *Ibid.*
145 *Ibid.*
146 *Ibid.*, 3.
147 Aldo Rossi, *The Architecture of the City*, translated by Diane Ghirardo and Joan Ockman, (Cambridge, Mass.: The M.I.T. Press, 1982)

decades. In 1934, as a companion initiative to the HOLC, Congress created the Federal Housing Administration. The FHA insured private mortgages, causing a drop in interest rates and reducing the size of the down payment required to buy a house. This was another major New Deal initiative aimed at reducing the economic inequities ravaging the USA during the Great Depression, and bringing the vast ranks of the unemployed and destitute back into the fold of the American economy. These large-scale initiatives of re-inclusion into American economic life, however, had a glaring mechanism of exclusion at its core—racially-based 'redlining', a practice summarized below:

> The FHA had adopted a system of maps that rated neighborhoods according to their perceived stability. On the maps, green areas, rated 'A,' indicated 'in demand' neighborhoods that, as one appraiser put it, lacked 'a single foreigner or Negro.' These neighborhoods were considered excellent prospects for insurance. Neighborhoods where black people lived were rated 'D' and were usually considered ineligible for FHA backing. They were colored in red. Neither the percentage of black people living there nor their social class mattered. Black people were viewed as a contagion. Redlining went beyond FHA-backed loans and spread to the entire mortgage industry, which was already rife with racism, excluding black people from most legitimate means of obtaining a mortgage.[148]

There were two other categories in the FHA underwriting maps, 'B', or blue areas, which denoted neighbourhoods that were still desirable, but had reached their peak and were expected to remain stable for many years to come. 'C', or yellow areas, that were in decline. These areas were typically bordered by 'D', or redlined neighbourhoods with substantial black and/or low income populations (see Figure 3.02). An interesting subtext in these neighbourhood classifications is the spatio-temporal aspect, in which any rating below an 'A' reflects an assessment of the process of decline as development moves outward from central cities and inner-ring suburbs. This suggests an institutional tendency towards privileging new development and expanding suburbanization over the care for and maintenance of existing neighbourhoods and housing stock. While there was still a plenitude of undeveloped land to colonize, there was little incentive to prioritize existing areas of the city other than well-established business districts and affluent residential neighbourhoods.

These racially-based exclusionary tendencies are not a post-facto analysis of subtle institutional inclinations, but are an overt system of practices codified

148 Ta-Nehisi Coates, "The Case for Reparations," *The Atlantic*, June 2014, Accessed November 4, 2015, http://www.theatlantic.com/magazine/archive/2014/06/the-case-for-reparations/361631/.

Los Angeles and Vicinity
FHA "Residential Security Map"

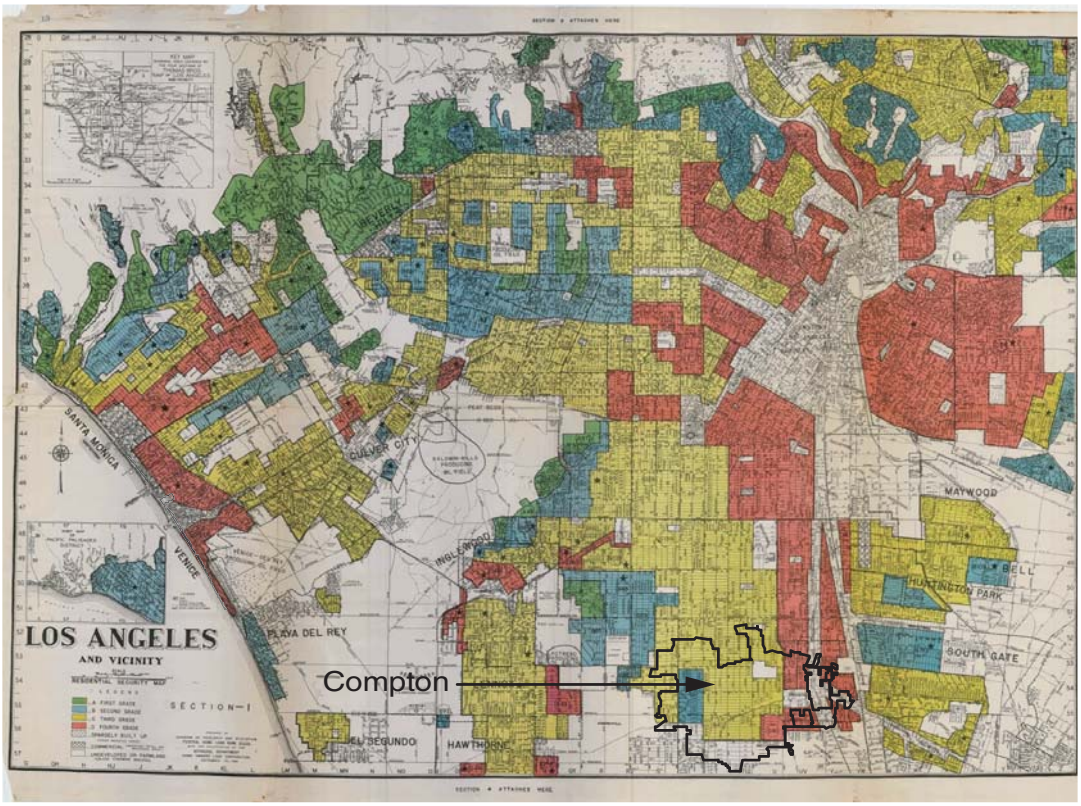


Fig. 3.02 *Los Angeles and vicinity—residential security map (1936)*

in the institution's own documents. A section of the FHA's underwriting guidelines conflates noxious environmental conditions with race and nationality:

> Protection against adverse influences is obtained by the existence and enforcement of proper zoning regulations and appropriate deed restrictions. Important among adverse influences are the following: infiltration of inharmonious racial or nationality groups; the presence of smoke, odors, fog, etc.[149]

The systematic exclusion of African-American people from the US's 20th century home ownership boom was nearly absolute. According to the 1940 Housing Census, fewer than 25,000 of more than one million homes refinanced by HOLC were owned by people of non-white ethnicities. This left an enduring pattern of disinvestment and decline on the urban fabric of Los Angeles:

149 "Underwriting Manual: Underwriting and Valuation Procedure Under Title II of the National Housing Act," U.S. Federal Housing Administration, Rev. April 1, 1936. Part II-Risk Rating Instructions, paragraphs 309, 310.

> Locked out of the greatest mass-based opportunity for wealth accumulation in American history, African Americans who desired and were able to afford home ownership found themselves consigned to central-city communities where their investments were affected by the 'self-fulfilling prophecies' of the FHA appraisers: cut off from sources of new investment, their homes and communities deteriorated and lost value in comparison to those homes and communities that FHA appraisers deemed desirable."[150]

In the dominant development model of outward expansion to increasingly distant suburban areas, existing neighbourhoods inexorably declined as housing stock decayed and housing styles went out of fashion. Property values declined and these neighbourhoods underwent significant demographic changes as lower income groups and marginalized ethnic groups such as African-Americans shut out from other housing opportunities moved in. This phenomenon has been widely dubbed 'white flight', but this term is problematic in that it suggests that the dominant white population were fleeing a dangerous, disempowering situation. It is more accurate to characterize the process of American suburbanization as a complex assemblage of factors that included increased mobility enabled by advances in transportation technology and infrastructure such as commuter trains and the automobile, cheaper land prices and the subsidization of new infrastructure by existing central cities that drove development outward from the city. It is more a movement towards a perceived utopia than an escape from a perceived dystopia. Thus, the process of suburbanization is not a diaspora, but a pilgrimage, and only the chosen were welcome on the journey.

3.2.3 The Subprime Mortgage Crisis

The global economic crisis of 2008 was predominantly driven by the collapse of a 'house of cards' of complex speculative financial instruments based, in theory, on the financing of integral sectors of the global economy. In reality, global financial markets created convoluted chains of financial instruments that are only conceptually connected to actual economic activity. Saskia Sassen summarizes this reckless and increasingly hegemonic practice well:

> Finance needs to be distinguished from traditional banking. Traditional banks sell money in their possession. Financial firms sell something they do not have, and therein lies the push to be far more innovative and invasive than traditional banking. In this regard finance can be thought of as a capability to securitize

150 Melvin L. Oliver and Thomas M. Shapiro, Black Wealth/White Wealth in "The Case for Reparations," *The Atlantic*, June 2014, Ta-Nehisi Coates, Accessed November 4, 2015, http://www.theatlantic.com/magazine/archive/2014/06/the-case-for-reparations/361631/.

Los Angeles
Distribution of Subprime Mortgages

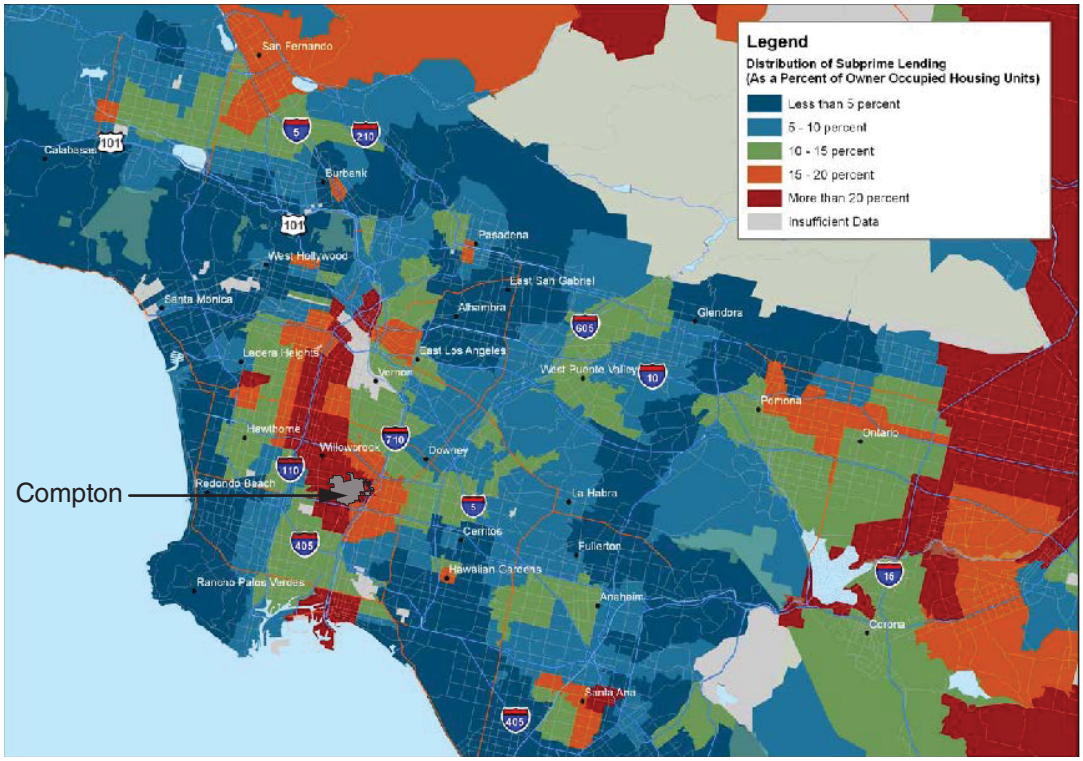


Fig. 3.03 *Los Angeles—distribution of subprime mortgages (2007)*

> just about everything in an economy and, in doing so, subject economies and governments to its own criteria for measuring success. Securitization involves the relocation of a building, good, or debt, into a financial circuit where it becomes mobile and can be bought and sold over and over in markets near and far. In the past two decades finance has invented often very complex instruments to securitize extreme instances of familiar items—not just high-grade debt but also used-car loans and modest municipal government debt. Once an input is securitized, financial engineering can keep on building long chains of increasingly speculative instruments that all rest on the alleged stability of that first step. This is, then, a very special, distinctive, and often dangerous capability.[151]

The cornerstone of this practice that resulted in cascading failures in the USA and the rest of the world was the subprime mortgage, an alternative to mainstream (or 'prime') mortgage products that were typically offered to borrowers with low credit ratings, usually 600 or below. These mortgages also required minimal, if any,

151 Saskia Sassen, *Expulsions: Brutality and Complexity in the Global Economy* (Cambridge, Mass.: Harvard University Press, 2015), 26.

down payments. The higher default risk associated with subprime mortgages resulted in very high interest rates. A common type of subprime mortgages was an adjustable rate mortgage (ARM), a 30-year mortgage that charged a low rate for the first two or three years, then reset at a rate based on the currently prevailing benchmark rate like the London Interbank Offered Rate (LIBOR). This reset rate was often higher than the initial rate, causing additional difficulty for some borrowers, who frequently found themselves unable to afford the new higher rate, and ended up defaulting on the mortgage. This is one of the factors that lead to the subprime crisis in 2008.

These financial instruments were constructed in a manner that paid handsome dividends to the issuing institutions and their loan officers upon closing the deal, regardless of whether or not this loan was paid off. This was a volume sale enterprise—the amount to be made from each transaction wasn't particularly substantial, but the ease and speed with which these deals could be extended to all made it like a 'Black Friday' sale.

Subprime mortgages were disproportionately targeted towards low-income and minority populations that had been traditionally excluded from access to mainstream banking resources, so it is not surprising that there was an outpouring of demand for these financial products (see Figure 3.03).

In 2006, the percentage of black borrowers that received a subprime loan was three times higher than for white borrowers, and the percentage for Hispanic borrowers was two and half times higher than for white borrowers. In 2007, the percentage of black borrowers that obtained subprime loans was seven times that for white borrowers.[152] It has been argued that this was not a discriminatory practice of the banking industry, but simply a function of the lower income and credit worthiness of subprime borrowers, which tended to be unequally skewed towards minority populations. There is some merit to this assertion, but a substantial percentage of subprime loans were made to borrowers who could have qualified for lower-cost prime loans. "More than 1 in 5 Black and Hispanic borrowers with FICO scores above 720 received a higher priced loan, compared to 1 in 20 white and Asian borrowers."[153]

The subprime mortgage crisis resulted in economic devastation at all scales—from the

152 Gould Ellen, Ingrid and Josiah Madar, "The High Cost of Segregation: Exploring the Relationship Between Racial Segregation and Subprime Lending," Furman Center for Real Estate & Urban Policy, New York University, Policy Brief, November 2009, http://furmancenter.org/research/publications/eyJyZXN1bHRfcGFnZSI6InJlc2VhcmNoXC9wdWJsaWNhdGlvbnMiLCJjYXRlZ29yeTphcmVhIjoiNjgiLCJ5ZWFyIjoiMjAwOSIsIm9yZGVyYnlfc29ydCI6Imxvd19zZWFyY2hfc2NvcmV8ZGVzYyIsIngiOiIyMCIsInkiOiIxMSJ9.

153 Carolina Reid and Elizabeth Laderman, "The Untold Costs of Subprime Lending: Examining the Links among Higher-Priced Lending, Foreclosures and Race in California," Paper presented at "Challenges and Opportunities for Homeownership in a Changing Financial Environment," sponsored by the Federal Reserve Bank of San Francisco in cooperation with The Greenlining Institute, May 6, 2009, Accessed November 5, 2015, https://www.academia.edu/7673135.

Los Angeles
Distribution of Subprime Mortgage Foreclosures

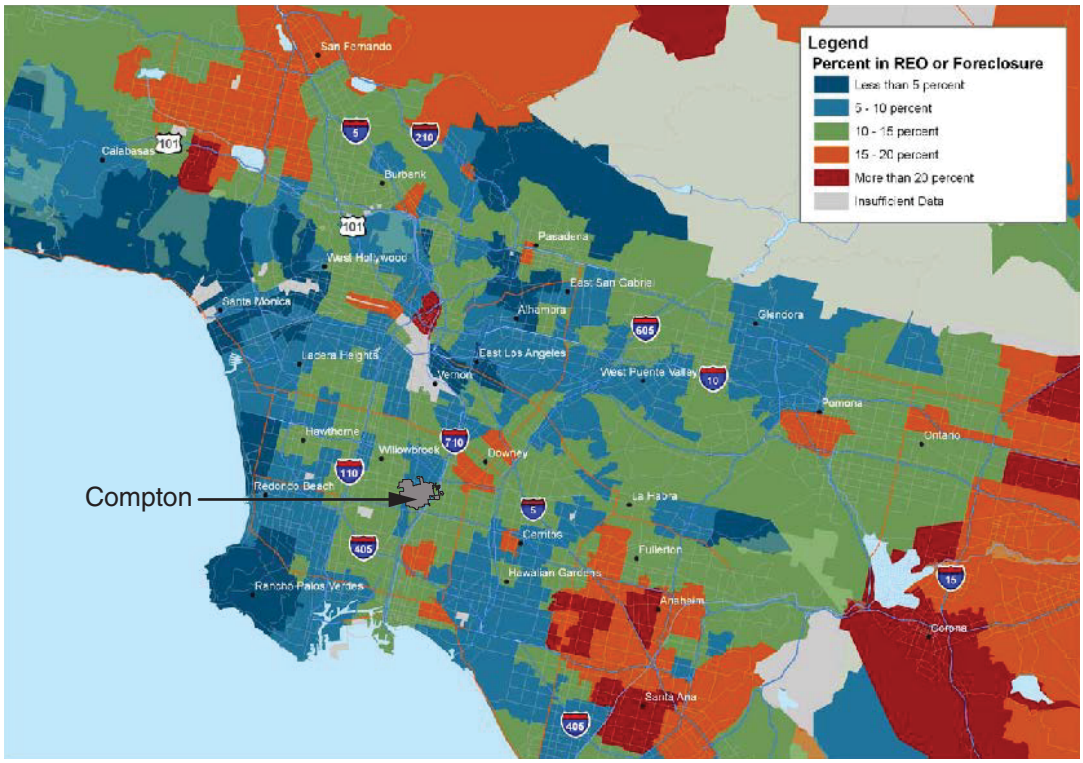


Fig. 3.04 *Los Angeles-distribution of subprime mortgage foreclosures (2007)*

global to the local. Globally, the perpetrators of this crisis prospered while the public realm was left to bear the costs. Government bailouts and IMF-sanctioned austerity measures registered the costs of this catastrophic failure to the public realm while many in the banking and financial industries walked away from this disaster substantially wealthier.

On a local scale, entire neighbourhoods experienced significant devaluations to their hard-earned property values. In Los Angeles, areas that were traditionally low income with low property values were driven even further down. Not surprisingly, these areas were the same neighbourhoods abandoned by the HOLC and FHA (see Figure 3.04). Foreclosures were rampant, resulting in substantial portions of neighbourhoods sitting vacant, awaiting occupancy, while other areas of the city recovered from the subprime mortgage crisis and were undergoing robust growth in development and property values.

> Research shows that subprime loans are more likely to result in foreclosure, even when individual borrower characteristics and other factors that influence the probability of foreclosure are taken into account. If black and Hispanic borrowers are more likely than white borrowers to receive such loans, then blacks and

> Hispanics will disproportionately suffer the consequences of foreclosures. Black and Hispanic families will be more likely than white families to lose the savings they put into the down payment or into maintenance and improvements, to be displaced from their homes and neighbourhoods, and to suffer damaged credit ratings and other consequences of foreclosure. Neighbourhoods with higher percentages of black and Hispanic residents will be disproportionately likely to suffer vacant and abandoned properties, as well as increases in crime and decreases in property values, which have been found to result from foreclosure activity.[154]

It is a foundational problem when substantial economic gain can be extracted from economic devastation. Greed, unethical and criminal practices in the banking and finance industry, combined with the global reach and enormous influence of this sector have created a profoundly unjust and unsustainable distribution of power. We cannot continue to treat extreme global financialization as a legitimate economic system. It is violence by algorithm in which profits are privatized and losses are socialized.

3.3 Spatial Distribution of Environmental Vulnerability

Vulnerability to environmental hazards and stressors tends to be unevenly distributed, with lower income and marginalized populations bearing a disproportionate proportion of the risk. Los Angeles is no exception to this phenomenon. A branch of the California Environmental Protection Agency, the Office of Environmental Health Hazard Assessment, is devoted to the study of environmental health hazards and the "health risks posed by environmental contaminants. OEHHA's mission is to protect human health and the environment through scientific evaluation of risks posed by hazardous substances."[155] The OEHHA completed a state-wide study of a variety of environmental health hazards at the census tract level and created CalEnviroScreen, a GIS-based "screening methodology that can be used to identify California communities that are disproportionately burdened by multiple sources of pollution."[156]

CalEnviroScreen profiles multiple indicators that, when aggregated, constitute an overall ***Pollution Burden***. These indicators are:

-Air quality: ozone

-Air quality: PM 2.5 (fine particulate matter pollution)

-Diesel particulate matter

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154 Gould and Madar, *Ibid*.

155 Office of Environmental Health Hazard Assessment, "OEHHA Department Description", Accessed March 18, 2015, http://oehha.ca.gov/about/description.html.

156 Office of Environmental Health Hazard Assessment, "CalEnviroScreen 2.0", Last updated November 12, 2014, http://oehha.ca.gov/ej/ces2.html.

-Drinking water contamination

-Pesticide use

-Toxic release from facilities

-Traffic density

-Cleanup sites

-Groundwater threats

-Hazardous waste generators and facilities

-Impaired waterbodies

-Solid waste sites and facilities

Secondly, CalEnviroScreen profiles population characteristics that could result in a higher vulnerability to environmental health hazards; ***Sensitive Population*** and ***Socioeconomic Factor*** indicators. These are:

Sensitive Population

-Age: children and elderly

-Asthma

-Low birth weight infants

Socioeconomic Factor Indicators

-Educational attainment

-Linguistic isolation

-Poverty

-Unemployment

These socio-environmental vulnerabilities are explored here through a series of maps created from CalEnviroScreen raw GIS data, separating Los Angeles County from the state-wide data, profiling each of these indicators, aggregating them and drawing comparisons to median income, median home values, and population density by census tract (see Figures 3.05-3.19). Vulnerability to environmental health hazards are shown to be correlated to income, with low- to middle-income census tracts exposed the highest levels of environmental hazards, with medium/high- to high-income census tracts experiencing very little exposure to environmental health hazards.

The locus of these environmental hazards and the population characteristics that bear a disproportionate sensitivity to them is in the region of Los Angeles known as 'South Central'; the area in the middle of the county in the floodplain of the Los Angeles River that has been the home to many of Los Angeles' African-American and Hispanic communities.

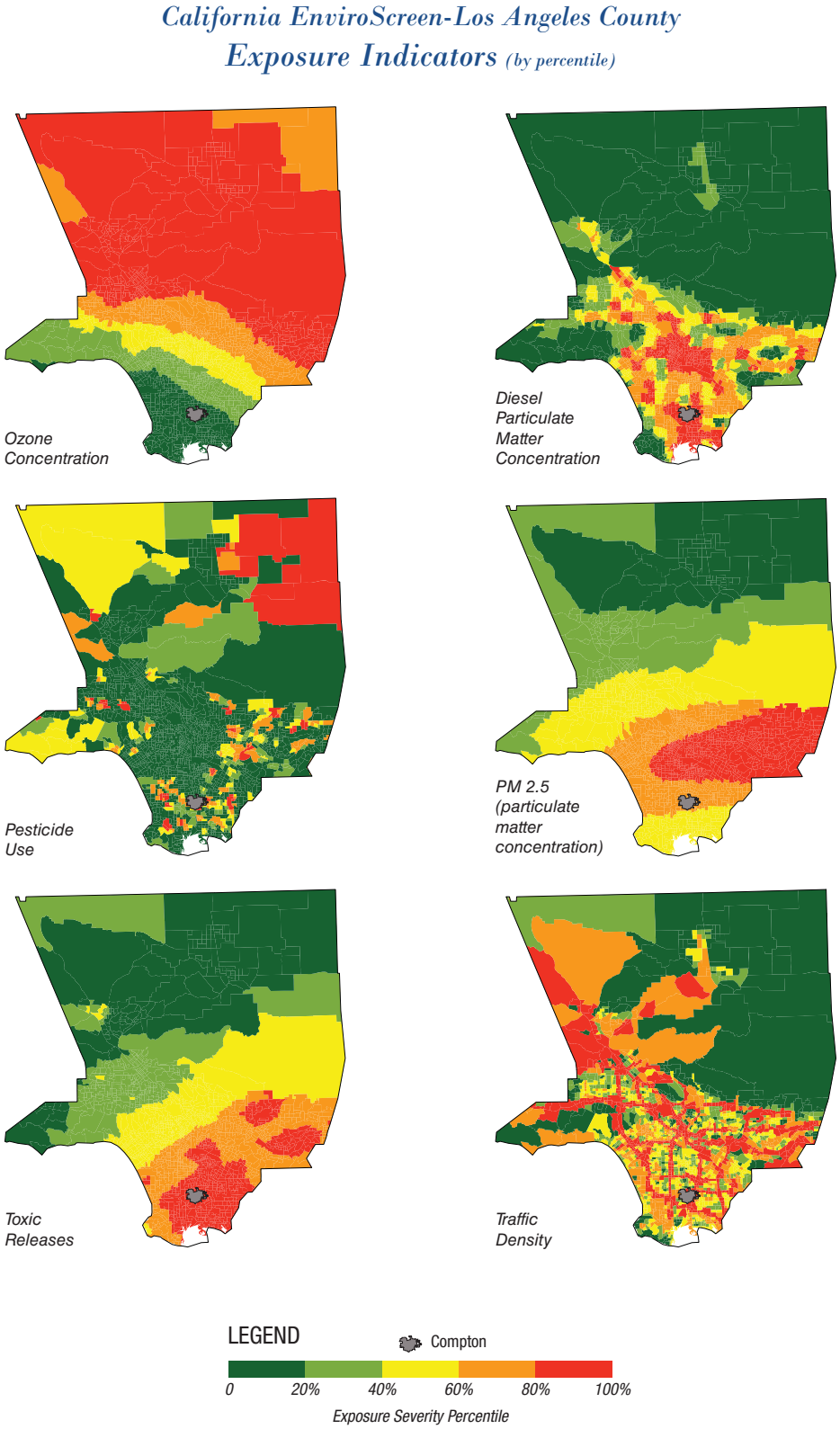


Fig. 3.05 *California EnviroScreen—Los Angeles County-exposure indicators (by percentile)*

Fig. 3.06 *California EnviroScreen—Los Angeles County-environmental effects indicators (by percentile)*

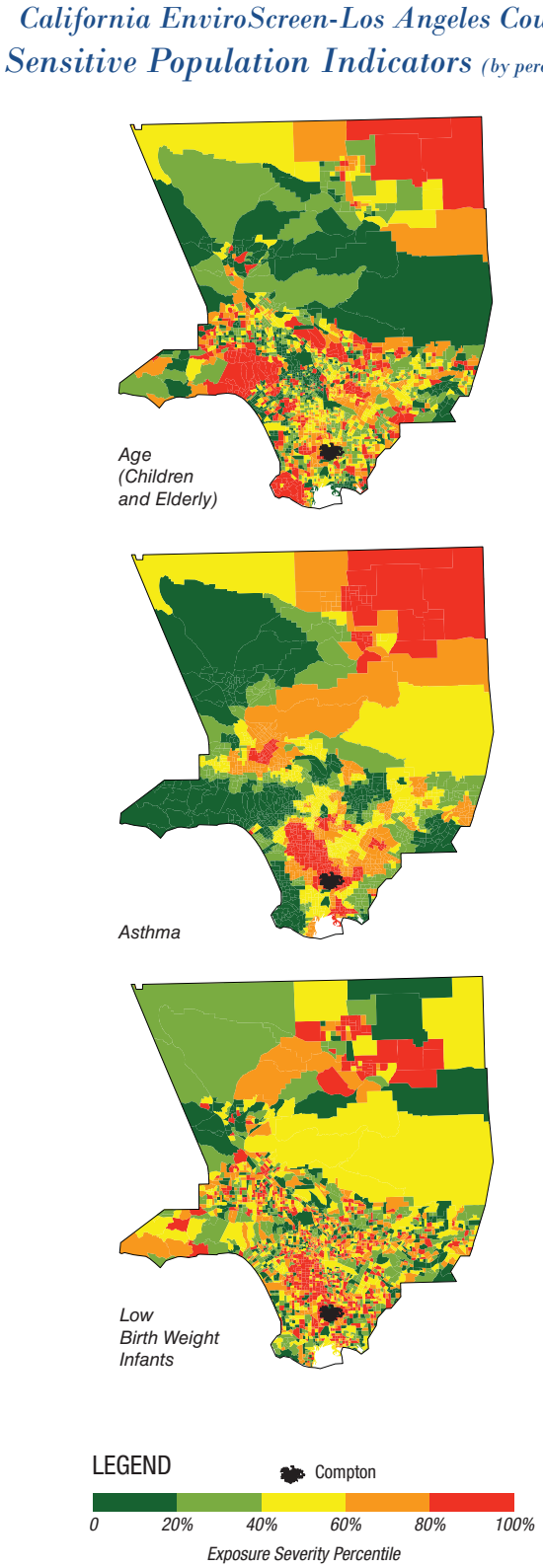


Fig. 3.07 *California EnviroScreen-Los Angeles County—sensitive population indicators (by percentile)*

California EnviroScreen-Los Angeles County
Socioeconomic Factor Indicators (by percentile)

Fig. 3.08 *California EnviroScreen-Los Angeles County—socioeconomic factor indicators (by percentile)*

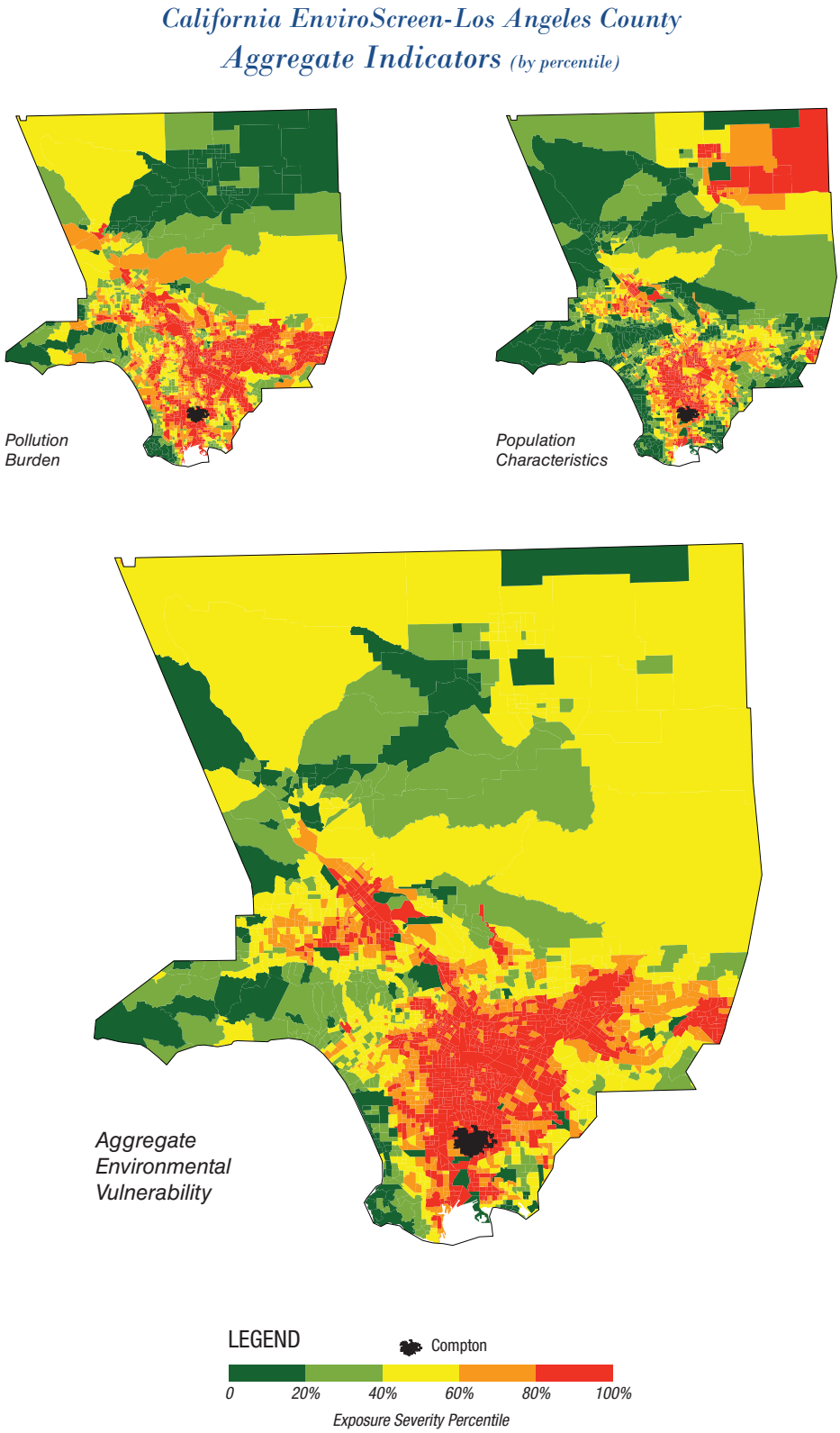


Fig. 3.09 *California EnviroScreen-Los Angeles County—aggregate indicators (by percentile)*

Los Angeles County

Median Household Income by Census Tract (2014)

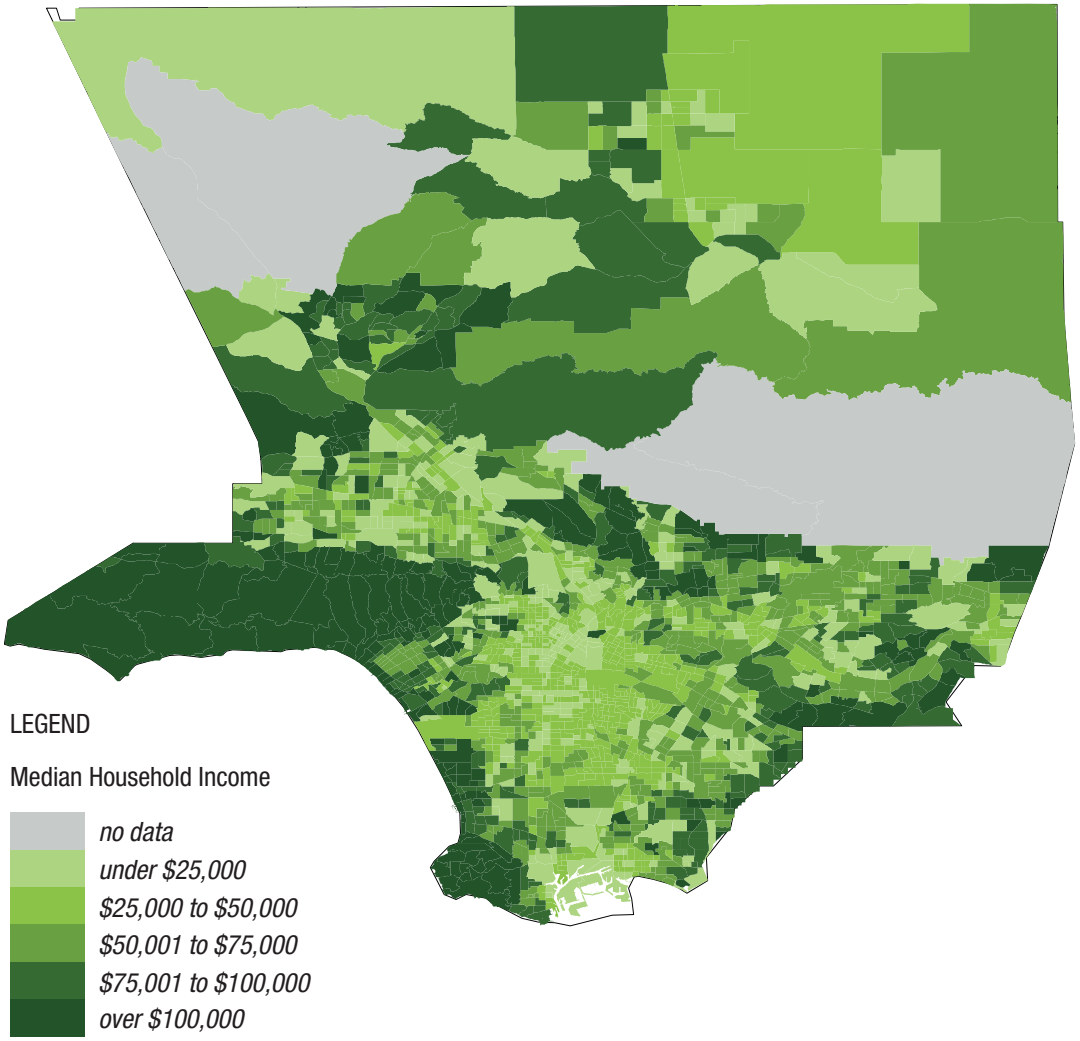


Fig. 3.10 *Los Angeles County—median household income by census tract (2014)*

Los Angeles County

Median Home Value by Census Tract (2014)

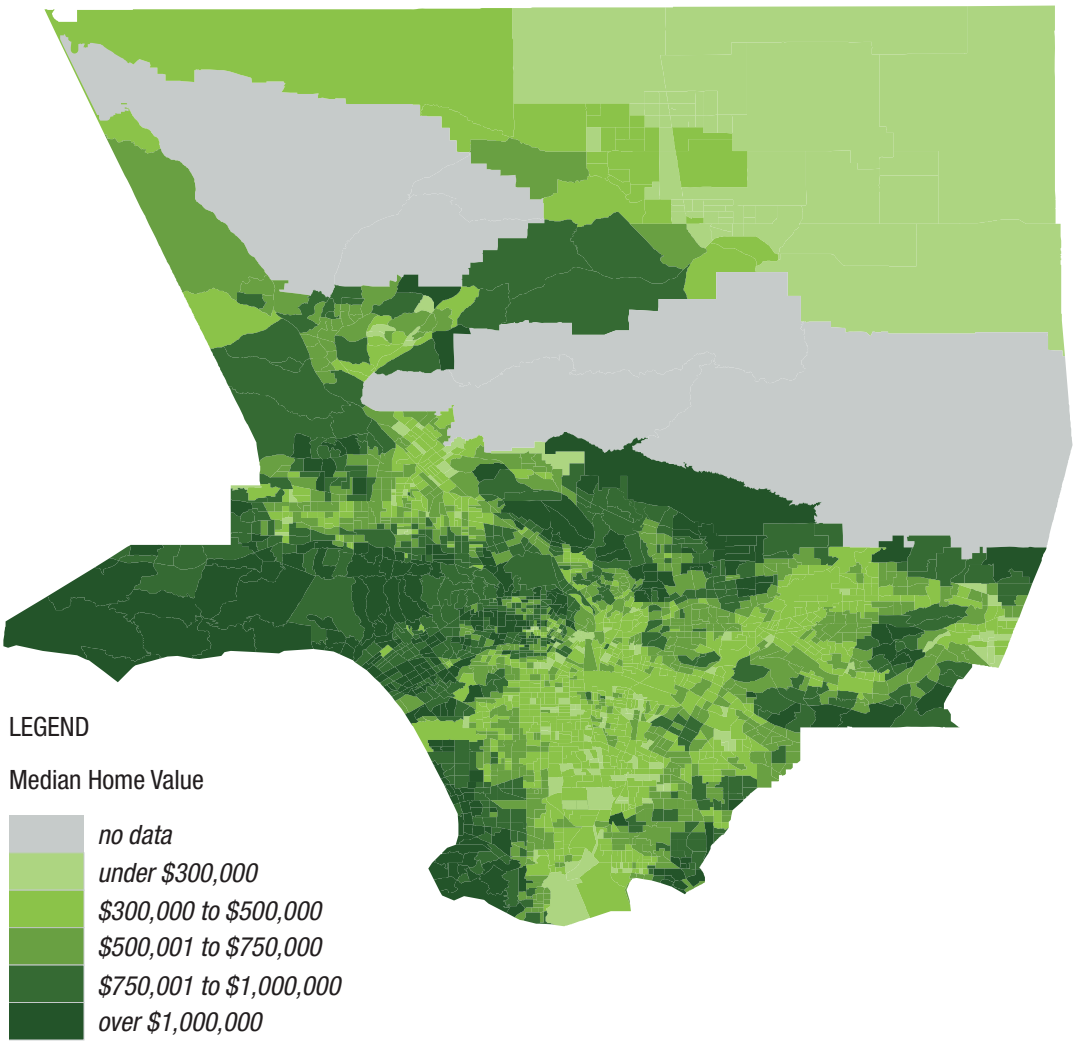


Fig. 3.11 *Los Angeles County—median home value by census tract (2014)*

Los Angeles County
Population Density by Census Tract (2014)

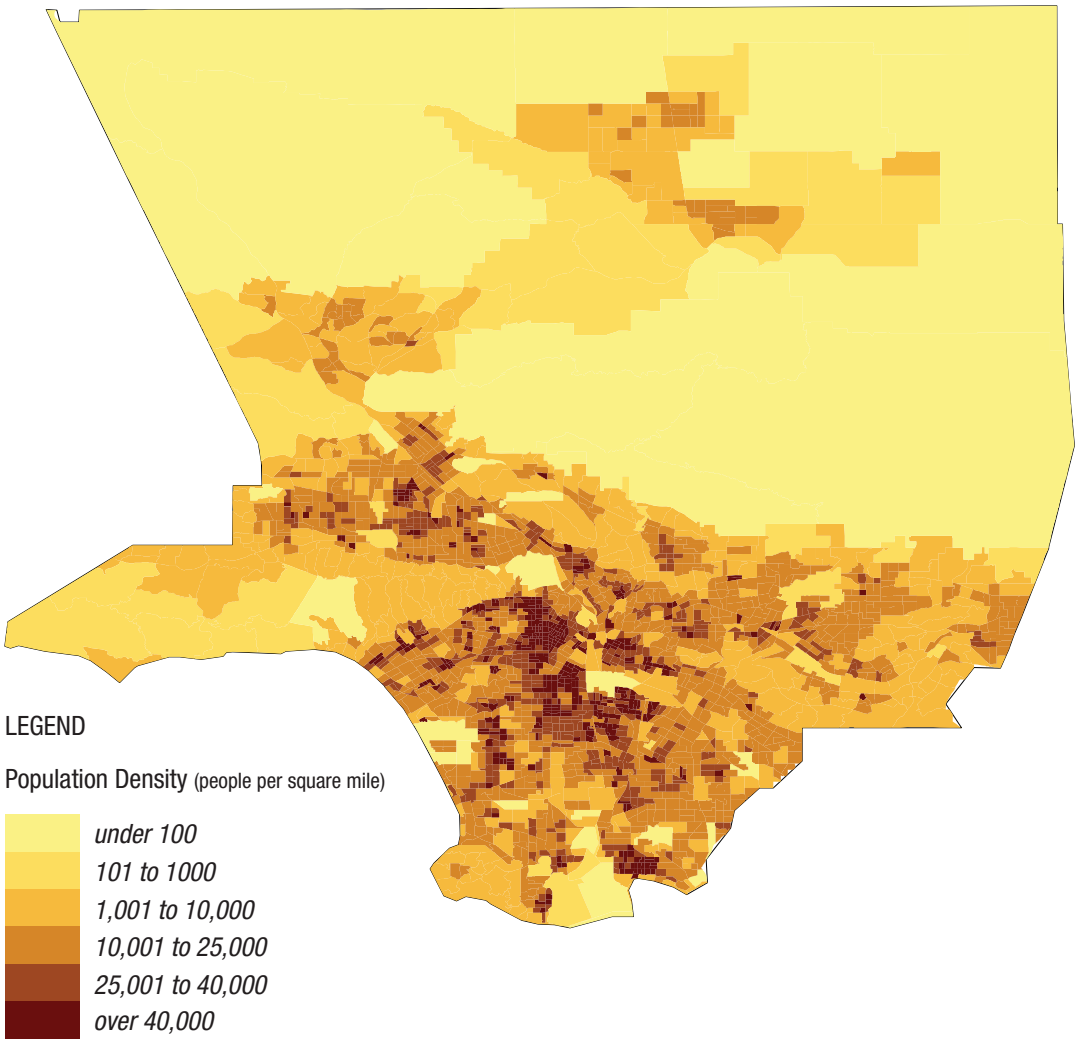


Fig. 3.12 *Los Angeles County—population density by census tract (2014)*

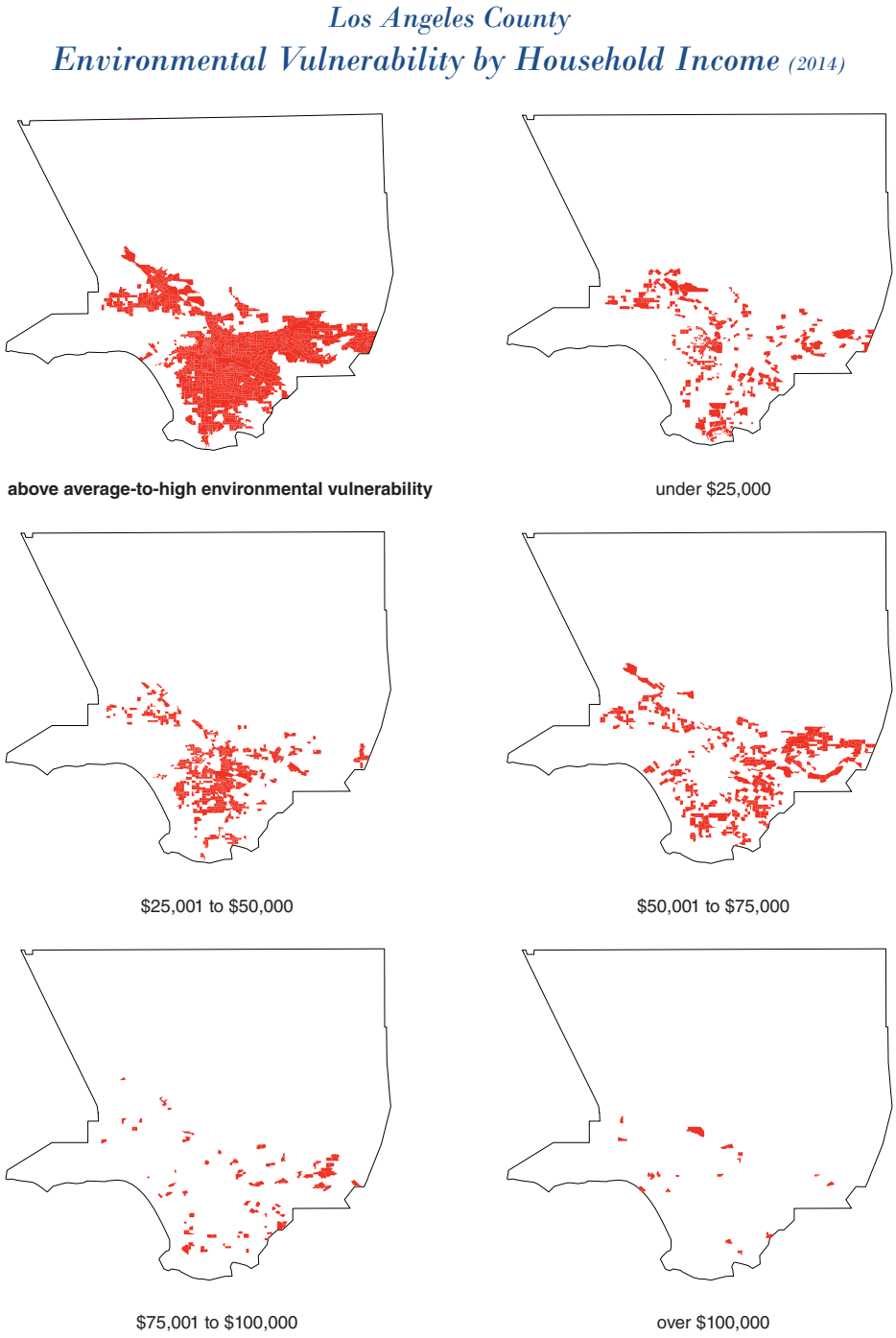


Fig. 3.13 *California EnviroScreen-Los Angeles County—environmental vulnerability by household income (2014)*

3.4 Parks and Public Space in LA County: Scarcity and Uneven Access

Los Angeles operates in an enthralling and problematic relationship with its environment. It has always sold itself as a bucolic land of opportunity, good climate, and picturesque landscapes. "Imagining Los Angeles has been, to a greater extent than with other U.S. and European cities," states William McClung, "a process of aligning a model of a hoped-for Utopian future with one of an allegedly Arcadian past that cries out to be redeemed."[157]

Arcadia is defined as "an image or idea of life in the countryside that is believed to be perfect."[158] This notion has been instrumental in driving suburban and exurban development since the days of the Roman Empire. The country villas of the Roman elites were a place to escape the rigours of the city to enjoy a leisure-oriented experience of a tamed and constructed nature. In this conception of the rural landscape, the productivity of agricultural activities is vacated, replaced with a cosmopolitan, urban hedonism. This conception of nature/culture and city/not-city has persisted through time and became a central tenet of suburban expansion from the 19th century onwards.

This Arcadian origin myth has proven to be a robust and productive development mythology for Los Angeles, supported by utopian projects of massive public infrastructure initiatives. This has engendered a rampant development centred upon suburban detached single-family dwellings in a vast, expanding network of homogenous, monocultural, auto-dependent urbanisms that rely both on the myth of Los Angeles' Arcadia and the constructed domestication of nature through massive, publicly funded utopian infrastructural projects like aqueducts, dams and sewage treatment plants. This dialectic constructs a potentially infinite field based upon the replication of the basic unit of the urban fabric of Los Angeles—the detached, single-family home. Civic identity and built form here does not stem from the collective body politic of a discrete city, but from an aggregation of individuals whose allegiance is owed primarily to themselves and their family unit. Maria Kaika characterizes this idea as foundational to Western notions of freedom: "Individual freedom became the sacred principle of the modernizing Western world, and the individualized space of the private house became its sacred space. Through this social process, the house (a material construction, an edifice) was turned into the home (a place imbued with cultural and ideological meaning)."[159] The locus of the urban environment in Los Angeles is neither

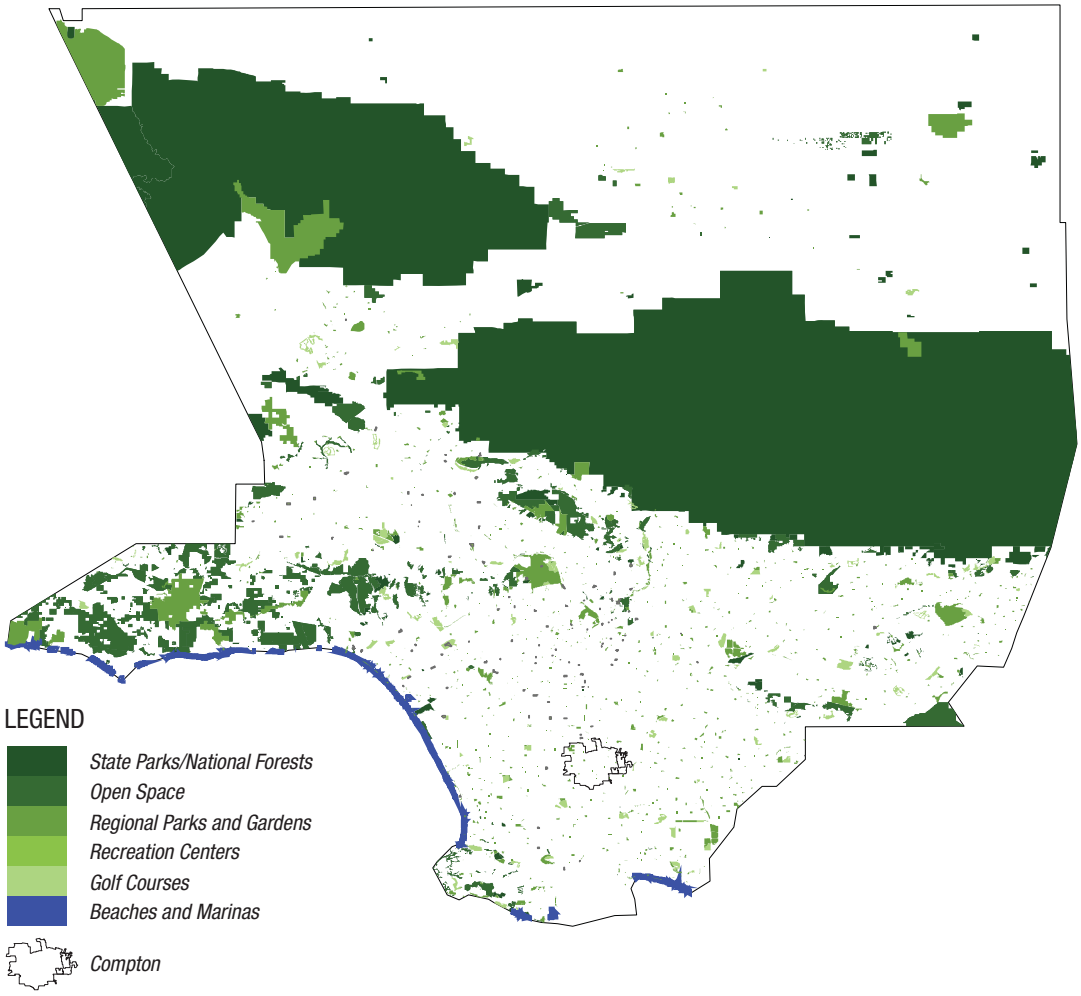
157 William A. McClung, *Landscapes of Desire: Anglo Mythologies of Los Angeles* (Berkeley: University of California Press, 2000,) 13.

158 *Cambridge Dictionary Online*, "Arcadia," http://dictionary.cambridge.org/dictionary/english/arcadia.

159 Maria Kaika, *City of Flows: Modernity, Nature, and the City* (New York: Routledge, 2005), 52.

Los Angeles County

Parks and Recreation Areas



Park Score (out of 100 points)	Rank (out of 60 US cities)
46	51

Acreage (out of 40 points)	Investment (out of 20 points)	Facilities (out of 20 points)	Access (out of 40 points)
24	7	6	18
Median Park Size 4.5 acres 9 out of 20 points Park Land Percentage 14.2% 15 out of 20 points	$67.62 per capita	Basketball Hoops 0.8 / 20 Dog Parks 0.3 / 20 Playgrounds 1 / 20 Senior Citizens 1.1 / 20	55% of population served

Fig. 3.14 *Los Angeles County—parks and recreation areas*

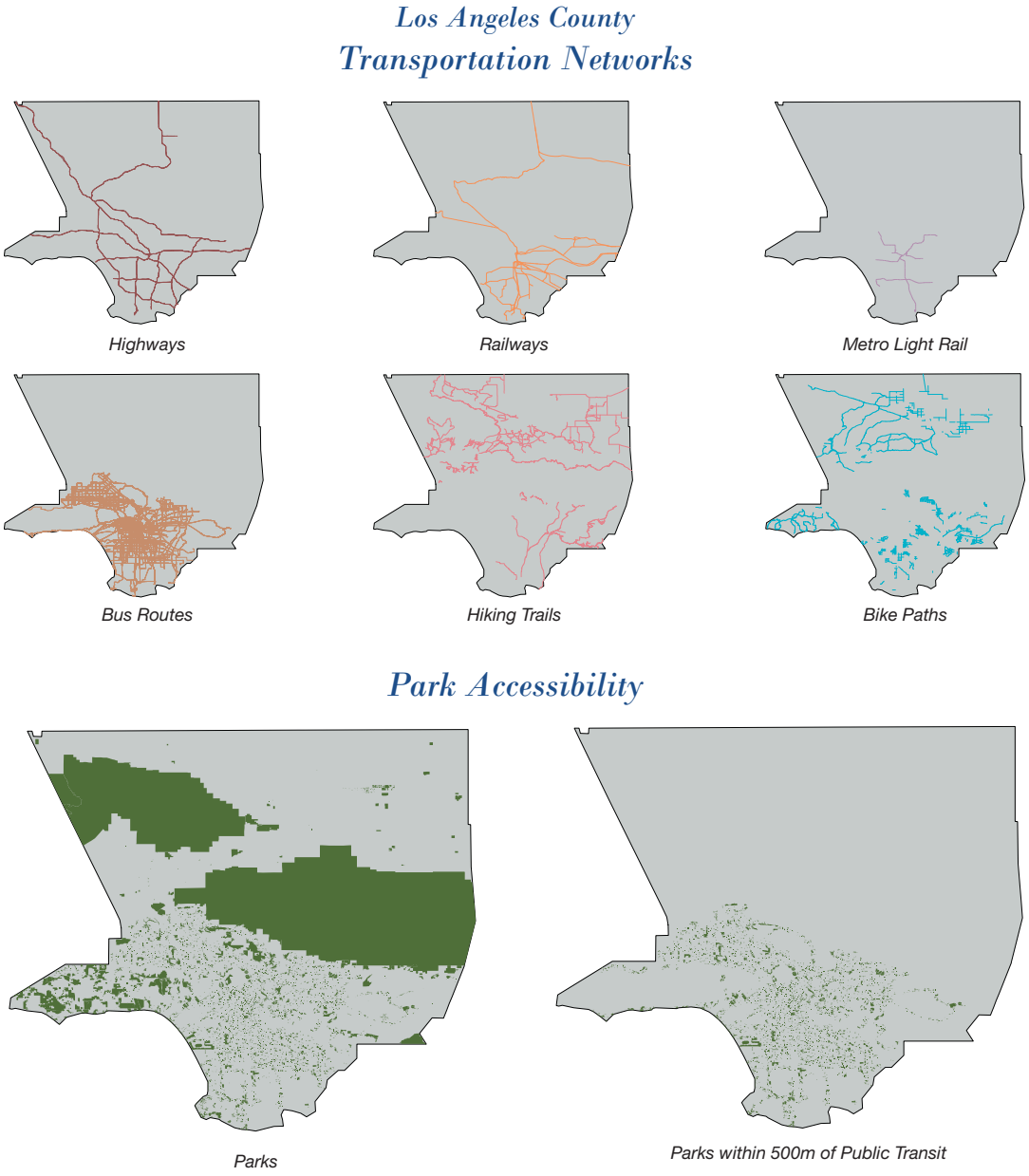


Fig. 3.15 *Los Angeles County—transportation networks and park accessibility*

a civic square nor an ensemble of iconic historic edifices, but the generically symbolic detached, single-family home with a lawn and a car in the driveway. Here we find "the characteristic L.A. promise that in buying a part, one will buy into the whole—a promise often heard from communities that are selling the intangibles of climate and other 'found' amenities."[160] This suburban model of the built environment is not unique

160 McClung, *Ibid.*, 33-4.

to Los Angeles, but it is here that this phenomenon is the most pervasive and acute.

The Arcadia engendered by the natural beauty and landscape amenities of Los Angeles is conceived as privately owned—one's own piece of paradise. In this scenario, there is no need for public space—everyone has it in their own backyard. This foundational ethos of suburbanization and the econo-political machine that produced it *en masse* is described well by urban historian Dolores Hayden:

> The Hoover era established a national pattern of urbanization based on federal subsidies to stimulate the consumption of houses, cars, and consumer goods by white, male-headed households. The visions of the 'growth machines' never included public space.[161]

The individualistic ethos of America has indeed produced a robust vehicle for the 'pursuit of happiness' but, unlike its rhetoric of 'equality for all', its public realm is only the aggregation of the private territories of the dominant class. The relative scarcity of parks and public space in Los Angeles (see Figures 3.14 and 3.15), especially in low-income minority neighbourhoods, attests to this.

3.5 Income Inequality

Americans today live in a starkly unequal society. Inequality is greater now than it has been at any time in the last century, and the gaps in wages, income, and wealth are wider in the US than they are in any other democratic and developed economy. The dimensions of that inequality are both familiar and disheartening. A smaller share of national income is flowing to wages and earnings, and—more important—inequality within that labour share is widening. As a result, wage growth has flatlined for a generation. Middle-income workers make no more now than they did in the late 1970s; those in the lower wage cohort have lost ground over that span. The current inequality of labour income in the United States, as Thomas Piketty concludes, "is probably higher than in any other society at any time in the past, anywhere in the world, including societies in which skill disparities were extremely large."[162]

The growing gap in income (including non-wage income like returns on investment or capital gains) is even starker. Between 1979 and 2007, the real incomes of the richest one percent almost tripled, while the real incomes of the median household inched up only about 25 percent—and that

161 Dolores Hayden, "Building the American Way," in *The Politics of Public Space*, Edited by Setha Low and Neil Smith, (New York: Routledge, 2006), 4

162 Thomas Piketty, *Capital in the 21st Century* (Cambridge, Mass.: Belknap Press, 2014), 265.

Los Angeles
Income Inequality

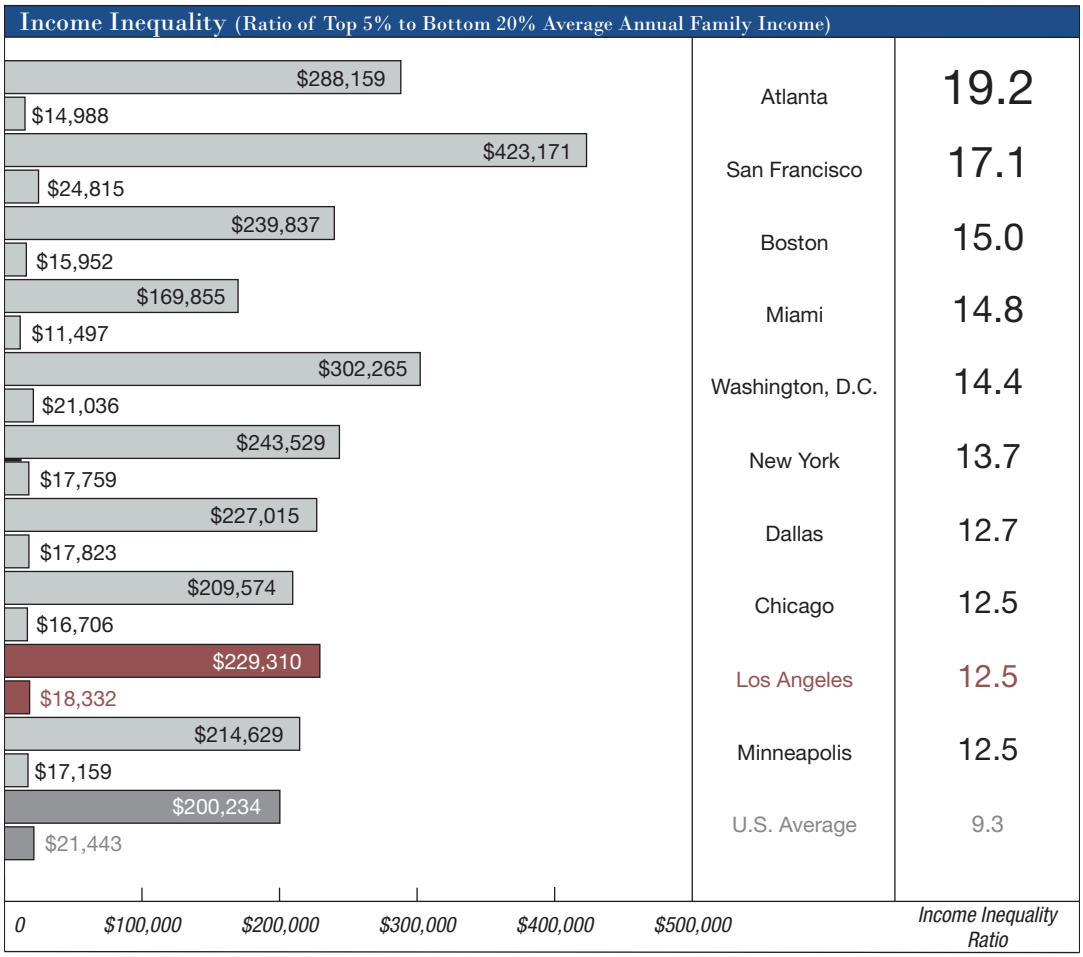


Fig. 3.16 *Income inequality—Los Angeles and other major US cities*

almost all due to an increase in labor force participation and hours worked .

Inequality in wealth (the sum total of household savings, home equity, investments, and debts) is starker still. The richest 1 percent claims about a third of the nation's wealth; the top 5 percent claim over 60 percent. These shares have grown steadily over the last generation. The recession took a big bite out of middle-class wealth (much of which is vested in home equity). And the gains of the recovery have flowed almost exclusively to the richest Americans.

For all the staggering comparisons—between rich and poor, between then and now, between the United States and other nations—we lack a clear and compelling account of how and why we arrived at this point. Our current economic troubles

have aimed a spotlight at our inequality problem, but they did not create it.

What did? Conventional explanations generally posit one or both of two scenarios. The first: somebody took the money. This version stresses Wall Street greed and the Bush-era tax cuts and features a plutocracy determined to claim more than its share of private wealth and shoulder less than its share of public goods. The second: something happened to the economy. This version has a backstory in the inexorable march of globalization and technological change, and a more recent plot twist: the recession that began in 2007 and—for most of us—has not yet ended.

These accounts are not so much wrong as they are misleadingly incomplete, inattentive to longer-term historical trends and to the political choices made across that history. A fuller explanation starts to come into focus when we consider the political and economic conditions that prevailed right after the Second World War. At that historical moment, the United States displayed much narrower gaps between the rich and poor than we do now. The gains of economic growth back then were much more broadly distributed. And working families (at least white working families) enjoyed much greater economic security.

This was no accident or lucky combination of circumstances. It was the outcome of political struggle and policy choices that erected a foundation and a structure for shared prosperity. The inequality of the 20th century's early years actually began closing before economic growth took off in the 1940s, as a consequence of the political response to the Great Depression. Thanks to this response, federal support for collective bargaining rights sustained a surge in labor organization that dramatically improving the bargaining power of America's workers. Other political innovations of the New Deal—ranging from Social Security to the minimum wage—secured a floor for working-class incomes. Postwar social movements, especially civil rights and second-wave feminism, then girded that floor by closing off avenues for discrimination.

The nation's tax system and new regulatory obstacles to speculative finance erected something of a ceiling for higher incomes. Substantial public investments—the GI Bill support for access to higher education, mortgage subsidies for veterans, housing projects, the interstate highway system, and the Cold War—kept the rest of the structure in intact.

Since then, that structure has essentially collapsed. This collapse is often recounted as an unfortunate but necessary response to changing economic conditions: the world has become a leaner, meaner, more competitive place. As a result, the policies of the New Deal—and the costs they imposed on business—had to go. But there is little evidence to actually support this account. Indeed, the initial handwringing over American

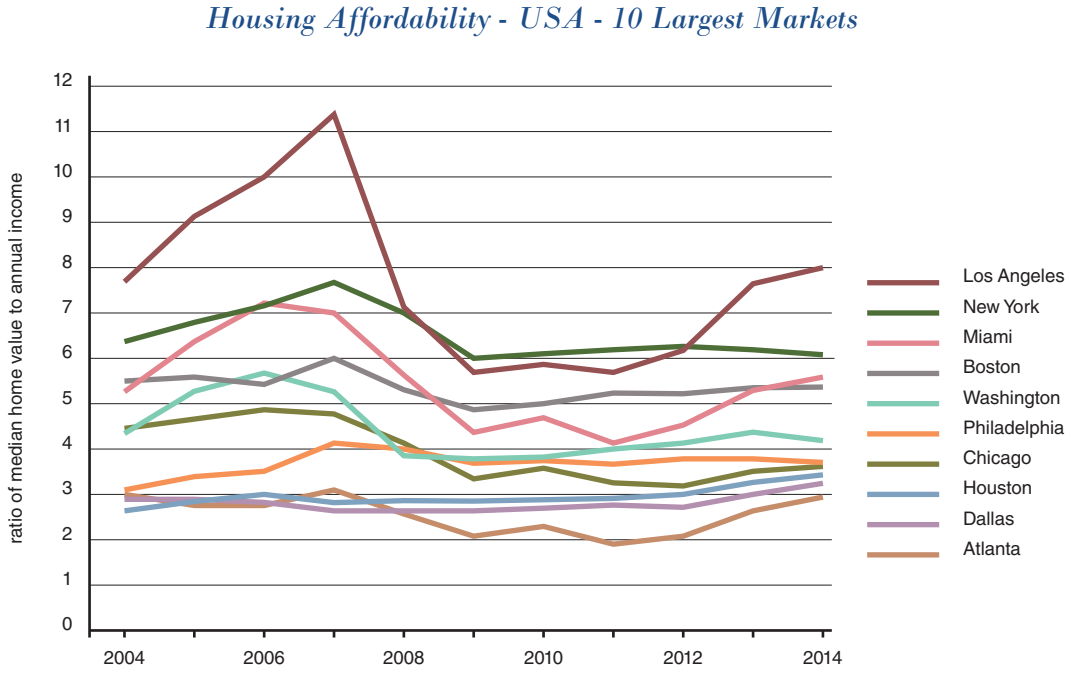


Fig. 3.17 *Housing affordability—USA 10 largest markets*

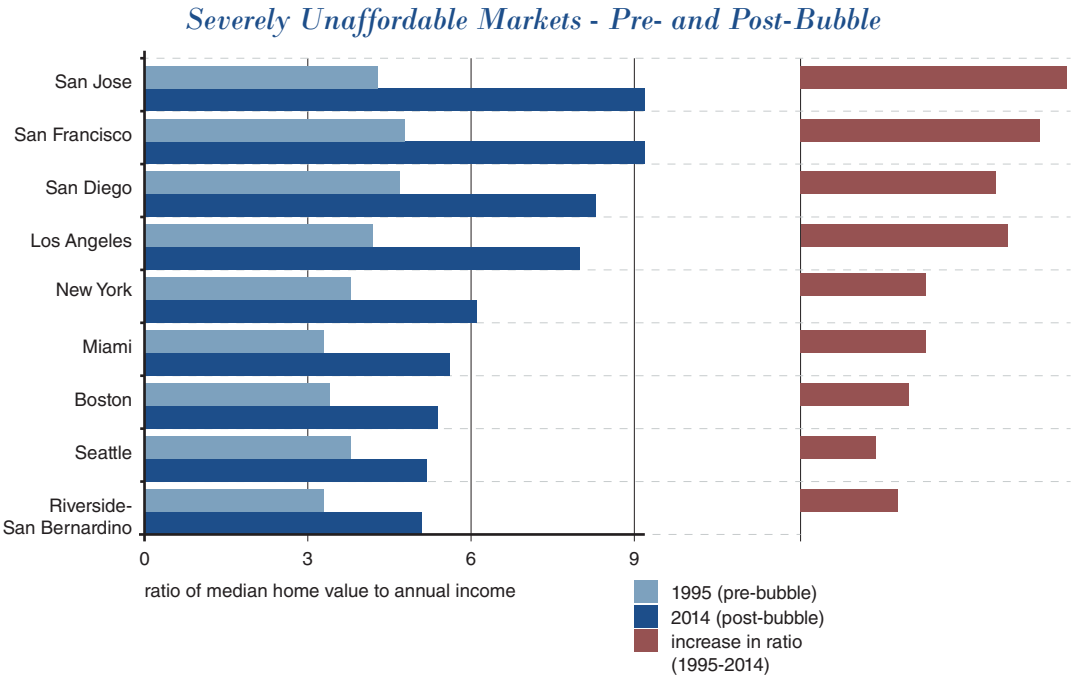


Fig. 3.18 *Severely unaffordable markets—pre- and post- bubble*

economic decline came at a time when our principal competitors, Japan and Germany, boasted both higher wages and more expansive social programs than the United States.

This inequality, in the view of many neo-conservative economists, is not just the toll we pay for free markets, but an essential incentive within a market economy. This argument continues with the notion that people work hard to avoid poverty and even harder to get rich. Thus, any pursuit of 'equal outcomes' would stifle this initiative and the economic growth on which we all depend. The central premise of this argument asserts that the poor will find themselves much better off with a thin slice of a growing pie than with a thicker slice of a small one.

There is little evidence—historical or economic—to substantiate this assertion. The 'market incentives' argument holds water only as long as hard work is reliably rewarded in the short term (with wages) and in the long term (with economic mobility)—a prospect that has diminished in the last thirty years. The economy does not need inequality to grow. In fact, nearly the reverse is true. In the US's recent history, sustained economic growth is closely associated with a relatively equitable distribution of economic rewards

Stark and sustained inequality discourages those at the bottom of the income distribution ladder (whose hard work goes unrewarded), and encourages those at the top to engage in short-sighted speculation—much of which (predatory lending and usurious credit card rates) exploits the poor and widens the gap. Inequality matters, most obviously and directly, to those whom it leaves behind. This includes the very poor—the 'underclass' or 'the truly disadvantaged'—who have long been cordoned off from the rewards and opportunities enjoyed by most Americans, but also the broad middle class, for whom growing inequality has begun to erode wealth, incomes, living standards, and opportunities. Inequality in society at large affects the well-being and prosperity of all who live within it and, ultimately, diminishes economic growth.

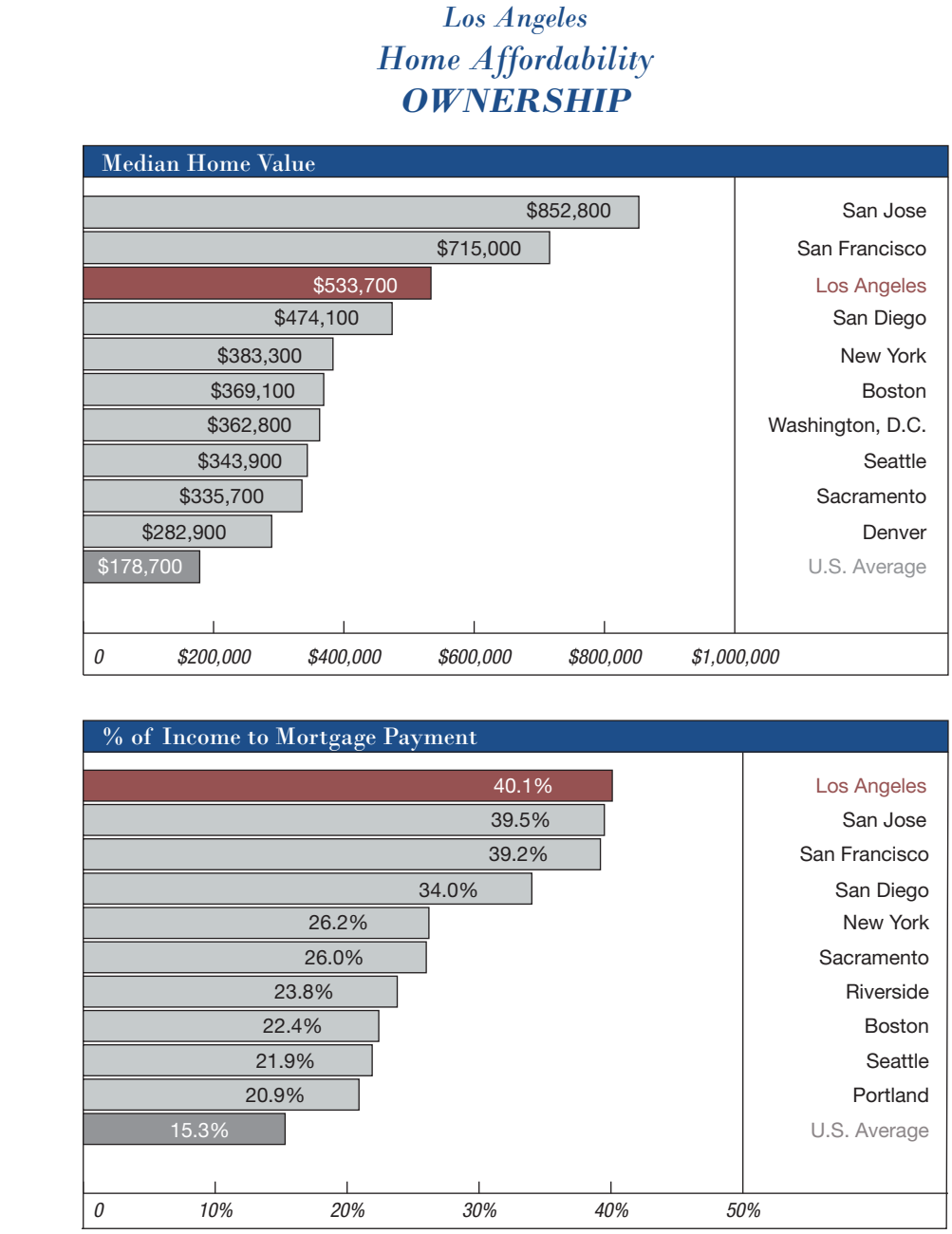


Fig. 3.19 *Los Angeles—home affordability: ownership*

Los Angeles
Home Affordability
RENTING

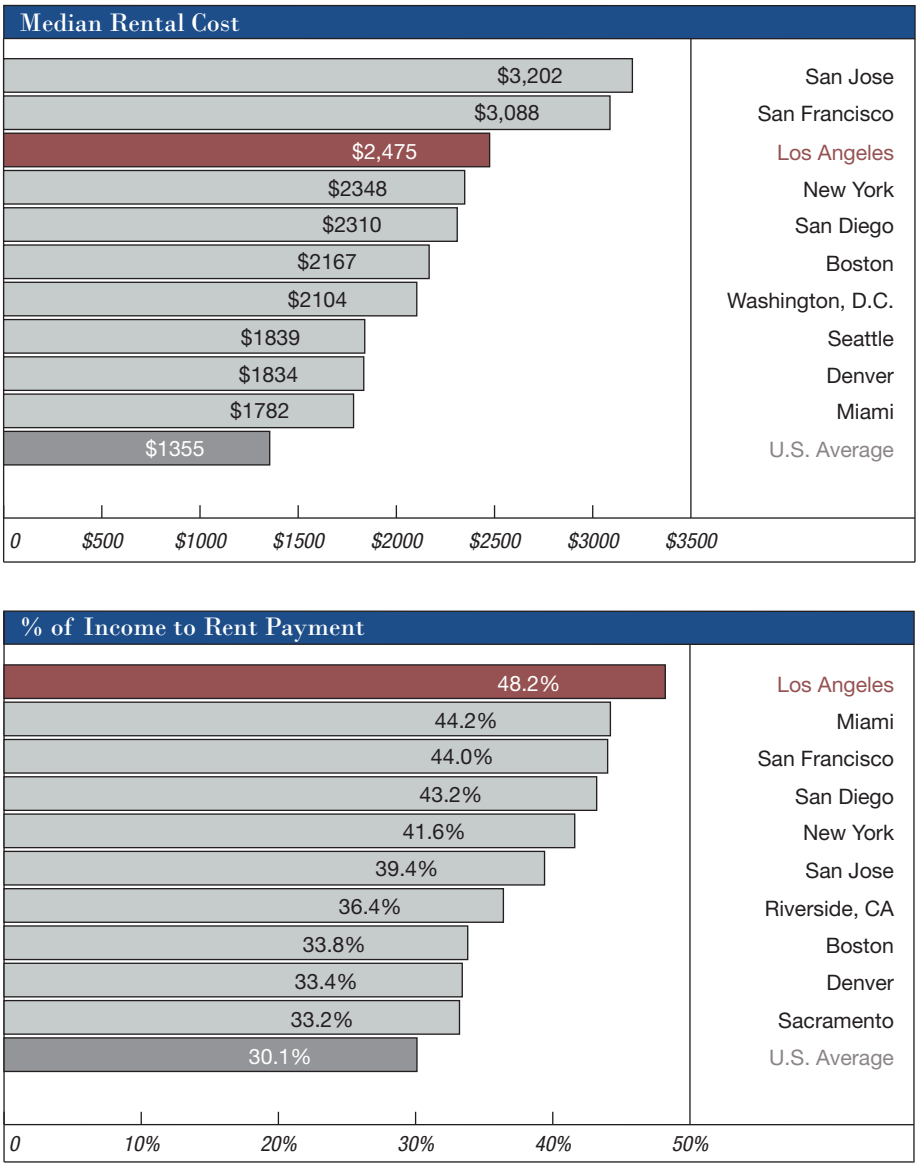


Fig. 3.20 *Los Angeles—home affordability: renting*

Los Angeles

Home Affordability

NEW HOUSING UNITS

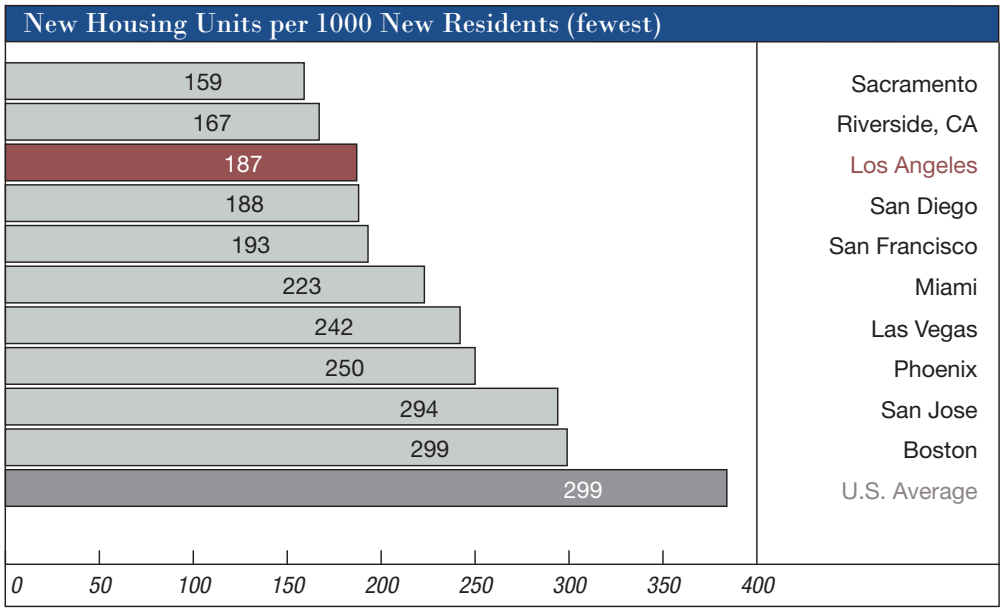


Fig. 3.21 *Los Angeles—home affordability: new housing units*

Ellis Act Evictions

RENT-CONTROLLED UNITS WITHDRAWN

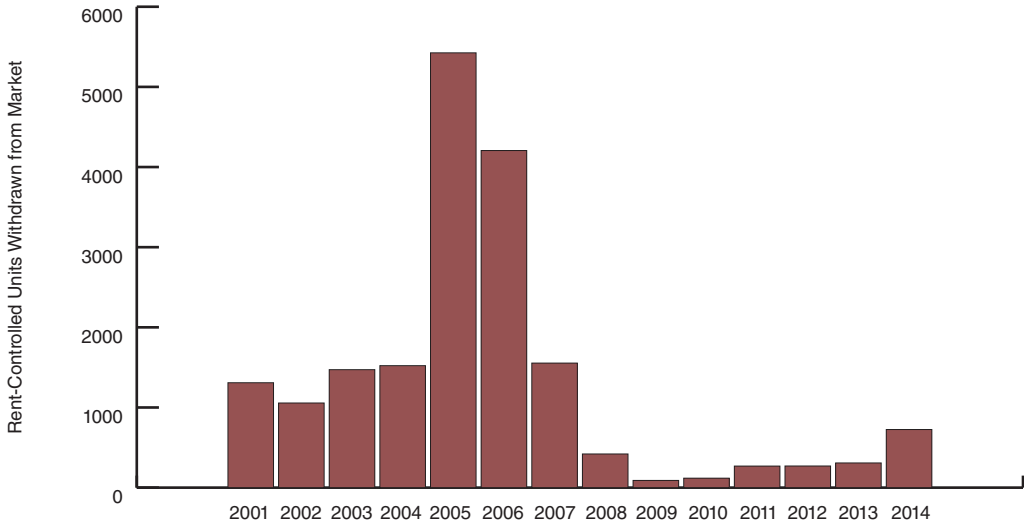
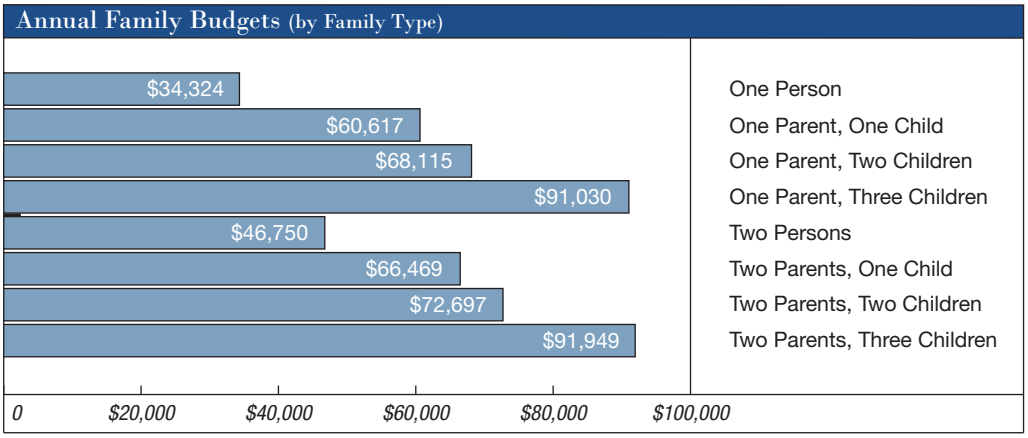
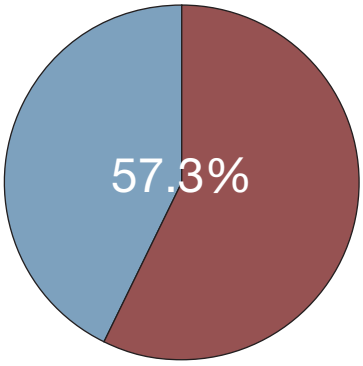


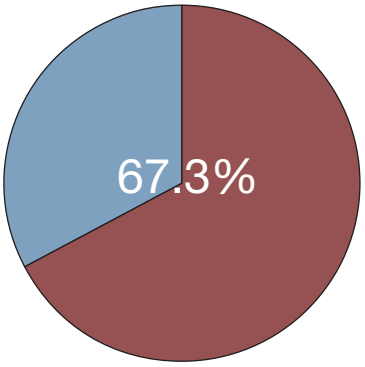
Fig. 3.22 *Los Angeles-Ellis Act Evictions—rent-controlled units withdrawn from market*

Los Angeles
Income Sufficiency





percentage of people in Los Angeles living below income sufficiency line



percentage of children in Los Angeles living below income sufficiency line

Fig. 3.23 *Los Angeles—income sufficiency*

4.0 THE RIGHT TO THE CITY / EXCAVATING THE COMMONS

4.1. The Right to the City

> More and more, the spaces of the modern city are being produced for us rather than by us.[163]
> ***Don Mitchell***

> The right to the city manifests itself as a superior form of rights: right to freedom, to individualization in socialization, to habitat and to inhabit. The right to the ouvre, to participation and appropriation, are implied in the right to the city.[164]
> ***Henri Lefebvre***

> The right to the city is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. It is, moreover, a common rather than an individual right since this transformation inevitably depends upon the exercise of a collective power to reshape the processes of urbanization. The freedom to make and remake our cities and ourselves is, I want to argue, one of the most precious yet most neglected of our human rights.[165]
> ***David Harvey***

The concept of the 'right to the city' was introduced by sociologist and philosopher Henri Lefebvre in his work *La Droit de la Ville* (*The Right to the City*) in 1968. He posited that all urban dwellers, regardless of citizenship, ethnicity, ability, gender, etcetera, had the right to participate in shaping the city. Those who had been excluded and marginalized had an inherent right to be part of the production of the urban space for their needs and aspirations, in addition to those actors already included within the generative body politic of the city.

Lefebvre's work marks an important moment in what has been dubbed the 'spatial turn', in which the perspectives of geography, architecture, and other spatially-oriented disciplines have risen to the fore to complement the study of history, politics and economics; as these disciplines have traditionally treated space as an abstract and passive field upon which the dialectical forces of human activity have been inscribed. The 'spatial turn' has ascribed an agency to spatial relations in which history, society and the production of space all interact in a generative

163 Don Mitchell, *The Right to the City: Social Justice and the Fight for Public Space* (New York: Guilford Press, 2003), 18.
164 Henri Lefebvre, "The Right to the City," In *Writing on Cities*, edited and translated by E. Kofman and E. Lebas, 63-181, (Oxford: Blackwell, 1996), 174. Originally published as Le Droit a la Ville. Paris: Anthropos, 1968.
165 David Harvey, "The Right to the City," In *New Left Review* 53, September-October 2008, 23-40, http://newleftreview.org/II/53/david-harvey-the-right-to-the-city, 23.

trialectic. Thinkers such as Lefbvre, Guy Debord, David Harvey, Edward Soja, Erik Swyngedouw and Don Mitchell have made major contributions to the emergence of this approach, which is now embedded in contemporary discourse and is fundamental to emerging fields such as political ecology. The 'spatial turn' has also concretized the study of justice and human rights, informing fields such as environmental justice.

The right to the city has become a robust platform for a wide range of grassroots movements, as it can bring together a diverse range of interests under a conceptual umbrella that aligns a multitude of environmental and social justice issues. In its platform statement, the non-governmental organization *The Right to the City* asserts these points:

> *-Land for People vs. Land for Speculation*
> The right to land and housing that is free from market speculation and that serves the interests of community building, sustainable economies, and cultural and political space.
> *-Land Ownership*
> The right to permanent ownership of urban territories for public use.
> *-Economic Justice*
> The right of working class communities of color, women, queer and transgender people to an economy that serves their interests.
> *-Indigenous Justice*
> The right of First Nation indigenous people to their ancestral lands that have historical or spiritual significance, regardless of state borders and urban or rural settings.
> *-Environmental Justice*
> The right to sustainable and healthy neighborhoods & workplaces, healing, quality health care, and reparations for the legacy of toxic abuses such as brown fields, cancer clusters, and superfund sites.
> *-Freedom from Police & State Harassment*
> The right to safe neighborhoods and protection from police, INS/ICE, and vigilante repression, which has historically targeted communities of color, women, queer and transgender people.
> *-Immigrant Justice*
> The right of equal access to housing, employment, and public services regardless of race, ethnicity, and immigration status and without the threat of deportation by landlords, ICE, or employers.
> *-Services and Community Institutions*
> The right of working class communities of color to transportation, infrastructure and services that reflect and support their cultural and social integrity.
> *-Democracy and Participation*
> The right of community control and decision making over the planning and governance of the cities where we live and work, with full transparency and

accountability, including the right to public information without interrogation.
-Reparations
The right of working class communities of color to economic reciprocity and restoration from all local, nation and transnational institutions that have exploited and/or displaced the local economy.
-Internationalism
The right to support and build solidarity between cities across national boundaries, without state intervention.
-Rural Justice
The right of rural people to economically healthy and stable communities that are protected from environmental degradation and economic pressures that force migration to urban areas.[166]

The right to the city, therefore, extends beyond the right to access to basic life needs, like food, water and housing. While this is an essential and foundational component, Mitchell states that "simply guaranteeing the right to housing may not be sufficient to guaranteeing a right to the city, but it is a necessary step toward guaranteeing that right."[167] The right to the city can be more accurately described as a right to participate in shaping the urban space as both an individual and as a community, and the right for all to contest the appropriation of the city in a "critique of human geography whereby individuals and communities must construct places and events commensurate with the appropriation not just of their labor, but of their total history"[168] This is an inherently political process, as the rights to competing uses and ideals are contested, and the frictions of these struggles are not easily and simply resolved. The logic of capitalism however, is relatively straightforward and friction-free, in that the highest and best (most profitable) use is privileged and should, necessarily, be the inevitable outcome of processes in the production of space.

4.2. Capital Accumulation and the Appropriation of the City

The city, as well as wider-ranging processes of urbanization, has been progressively subsumed into the capitalist system. Development continues to be predominantly driven by the optimization of conditions and processes favourable to capital accumulation. The right to the city, therefore, fundamentally challenges the spatial relations and strategies of the capitalist system and the resultant power structures that drive urban development and the production of urban space. David Harvey asserts that "if the capitalist form of urbanization is so completely embedded in and foundational for the

166 *The Right to the City*, "Mission & History," Accessed April 17, 2015, http://righttothecity.org/about/mission-history/.
167 Mitchell, *Ibid.*, 19.
168 Guy Debord, *The Society of the Spectacle* (New York: Zone Books, 1994), 126.

reproduction of capitalism, then it also follows that alternative forms of urbanization must necessarily become central to any pursuit of an anti-capitalist alternative."[169]

Mitchell extends this critique of capitalism, and the foundational private property rights upon which they are based, into an ontological argument in which:

> a world defined by private property, then, public space (as the space for representation) takes on exceptional importance…in a society where all property is private, those who own none (or whose interests aren't otherwise protected by a right to access private property) simply cannot be, because they would have no place to be."[170]

This argument offers powerful justification for the right to the city being as intrinsic to basic human rights as the right to life, liberty and security of person.[171]

Neoliberal capitalism has come to dominate the global socio-economic order to such a degree that it is difficult to imagine a world without it, but the city may be the place where we can see a past before it and imagine a future beyond it. The city is an enduring social construction that has seen a multitude of economic and political orders come and go, as well as the stage upon which we can witness and participate in its democratizing processes, Saskia Sassen states:

> Large cities have long been complex and incomplete. This has enabled the incorporation of diverse people, logics, politics. A large, mixed city is a frontier zone where actors from different worlds can have an encounter for which there are no established rules of engagement, and where the powerless and the powerful can actually meet… Such a mix of complexity and incompleteness ensures a capacity to shape an urban subject and an urban subjectivity. It can partly override the religious subject, the ethnic subject, the racialised subject and, in certain settings, also the differences of class. There are moments in the routines of a city when we all become urban subjects – rush hour is one such mix of time and space. But today, rather than a space for including people from many diverse backgrounds and cultures, our global cities are expelling people and diversity. Their new owners, often part-time inhabitants, are very international – but that does not mean they represent many diverse cultures and traditions. Instead, they represent the new global culture of the successful – and they are astoundingly homogeneous, no matter how diverse their countries of birth and languages. This is not the urban subject that our large, mixed cities have historically produced. This is, above all, a global "corporate" subject.[172]

169 David Harvey, *Rebel Cities: From the Right to the City to the Urban Revolution* (New York: Verso, 2012), 65.

170 Mitchell, *Ibid.*, 34.

171 UN General Assembly. Universal Declaration of Human Rights. Article 3, December 10, 1948, 217 A (III). Accessed November 17, 2015. http://www.un.org/en/universal-declaration-human-rights/index.html.

172 Saskia Sassen, "Who owns our cities – and why this urban takeover should concern us all," *The Guardian Cities*, November 24, 2015, http://www.theguardian.com/cities/2015/nov/24/who-owns-our-cities-and-why-this-urban-takeover-should-concern-us

The primary locus of global capitalism in the urban realm is large-scale, and often predatory, investment in and manipulation of the real estate market. Sassen refers, in the above passage, to investment appropriation by large-scale corporate developments, financed by international capital networks. This phenomenon also occurs at the neighbourhood level in the process known as gentrification, in which those, according to David Harvey, "who create an interesting and stimulating everyday neighborhood life lose it to the predatory practices of the real estate entrepreneurs, the financiers and upper class consumers bereft of any urban social imagination. The better the common qualities a social group creates, the more likely it is to be raided and appropriated by private profit-maximizing interests."[173] This is frequently, however, not neighbourhood renewal, but a top-down process that abstracts and fetishizes community resources into 'brands' like 'art district', financializes them and then moves this capital back into larger networks of investment and accumulation in a "highly localized process that articulates broader politico-economic forces like globalization."[174]

The process of gentrification points to a larger phenomenon of appropriation of the unique cultural heritage of cities such as London, Paris, Istanbul or New York, into a process of cultural 'branding' that enhances these places' value and their ability to extract what David Harvey refers to as "monopoly rents"[175], the enhanced economic value of a place relative to others due to its uniqueness. A Las Vegas hotel can construct an Eiffel Tower, a Venetian canal or an Egyptian pyramid, but it doesn't hold the same caché or economic value of the original, in which "claims to uniqueness, authenticity, particularity, and specialty underlie the ability to capture monopoly rents."[176] This extraction of monopoly rents finds its clearest expression in the tourism industry, but is also a substantial foundation of the development boom and rising real estate values in global cities whose cultural *caché* is an appealing amenity to the global economic elite. A rapidly increasing share of global economic activity is being channeled to these major global cities and the financial markets of which they are the central nodes.

The right to the city is fundamental to contemporary urban life, but the forces of neoliberal capitalism have greatly eroded this right. Increasingly becoming the territory of an emergent global elite class, the world's greatest cities have progressively vacated citizens' participation in determining their collective futures.

173 Harvey, *Ibid.*, 78.

174 Jason Hackworth, *The Neoliberal City: Governance, Ideology, and Development in American Urbanism* (Ithaca, N.Y.: Cornell University Press, 2007), 123.

175 Harvey, *Ibid.*, 103.

176 Ibid.

How we begin to reclaim agency in shaping the future of the city, and in doing so, reclaim agency in shaping our collective lives, is a fundamental question.

4.3. Excavating the Commons

> Any anticapitalism has to begin with a reconstruction of our understanding of capitalism itself, in particular an understanding that views capitalism as a porous system that can be exploited at the edges, rather than a monolith that must be attacked with force.[177]
> ***Jason Hackworth***

> We are so used to thinking of the capitalist market and government as the only two means of organizing economic life that we overlook the other organizing model in our midst that we depend on daily to deliver a range of goods and services that neither market nor government provides. The Commons predates both the capitalist market and representative government and is the oldest form of institutionalized, self-managed activity in the world.[178]
> ***Jeremy Rifkin***

The term 'commons' is derived from the traditional English legal term of common land; referred to as "The Commons". While this common land might have been individually or collectively owned, the use of this land and its resources were available to all (usufructuary rights), but was subject to regulation of types of uses allowed, such as grazing of livestock, hunting, fishing, and foraging. In contemporary parlance, the 'commons' has come to refer to the cultural and natural resources accessible to all members of society, such as air, water, and language. Economist Raj Patel refers to the commons as a "resource, most often land, [which] refers both to the territory and to the ways people allocate the goods that come from that land. The commons has traditionally provided food, fuel, water, and medicinal plants for those who used it—it was the poorest people's life-support system."[179]

One of the historical trends in the emergence of capitalism can be traced to the phenomenon known as the 'enclosure of the commons'. This was a consolidation of commonly held lands in England into larger, privately owned tracts. This process began with private transactions, but was greatly enlarged in scope through a series of parliamentary acts.

The rapid increase of enclosure between approximately 1750 to 1850, often effected by Parliamentary acts rather than private transactions, made it a highly

177 Jason Hackworth, *The Neoliberal City: Governance, Ideology, and Development in American Urbanism* (Ithaca, N.Y.: Cornell University Press, 2007), 196.

178 Jeremy Rifkin, *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism* (New York: Palgrave MacMillan, 2014), 31.

179 Raj Patel, *The Value of Nothing* (New York: Harper Collins, 2009), 92.

visible and controversial practice. The passage of the Inclosure (Consolidation) Act of 1801, reflected the recognition of the accelerated pace of enclosure. While commoners were compensated for their losses, they were generally given smaller and less arable parcels of land or allowed to remain only on the condition that they take on the prohibitive expense of fencing their allotment. Approximately 4,000 parliamentary acts were passed in this period, leaving virtually no common land.[180]

This is a foundational example of the increasing commodification and privatization of resources which have reached a critical point in the era of late neoliberal capitalism. Resources, fundamental to life itself such as water, seeds and DNA, to name only a few, are now subject to varying levels of private ownership and control. This encroachment of capital into the deepest realms of life and matter is highly problematic and contentious, but is, however, triggering a productive discourse into the nature of private versus collective ownership rights and the limits of capitalism and its commodification of the biosphere.

One of the defining crises of contemporary life is the unfettered growth of market values as a way to govern resources and ourselves. This has resulted in the privatization and commodification or 'enclosure' of the commons. Resources that belong to everyone, morally or legally, are being increasingly subsumed by capital markets, shifting ownership and control to private companies. The market efficiencies touted by their proponents can be misleading and illusory, however, because they often depend upon unacknowledged subsidies from the commons (for example, discount access to public resources) and the displacement of costs to the common realm (pollution, social disruption, and harm to future generations). Enclosure does not add value nor maximize the benefit of all; it merely privatizes benefit at the expense of the common wealth.

'The commons' is a useful term for contemporary political discourse and practice because it provides a new framework for re-situating market processes in a social, political, and ecological context. It is a robust discursive model for determining the resources which should not be privatized for market activity and capital accumulation, but should remain non-commoditized and 'owned' (in a broadly democratic and civil sense) by everyone. The commons model maintains the right to remove resources, bodies and ecologies from the shackles of enclosure and commodification. It would, therefore, be fundamentally wrong to express the value of an endangered species, a worker's life, or an aquifer as a dollar sum in a cost-benefit analysis. It can be argued that it is as equally morally repugnant

180 Ellen Rosenman, "On Enclosure Acts and the Commons." BRANCH: Britain, Representation and Nineteenth-Century History. Ed. Dino Franco Felluga. (Extension of Romanticism and Victorianism on the Net. Accessed January 11, 2016. http://www.branchcollective.org/?ps_articles=ellen-rosenman-on-enclosure-acts-and-the-commons,) 2.

to sell off the democratic processes of our highest public institutions through corporate campaign contributions as it would be to allow people to sell their bodies, babies, or genes. These extreme examples give a cogent illustration of the dire, yet logical conclusions of the processes of the market and capital accumulation. In counterpoint, the discourse engendered by the commons framework gives us a language for talking about extra-market values and their importance. The commons, for example, allows us to talk about the human necessities of life such as food, water, transportation, housing, education, and medicine, to name a few, that may otherwise be seen solely as market commodities.

Representational democratic governance has, traditionally, been the mechanism through which the destructive excesses of capitalism have been resisted and the benefits it has accrued have been more equitably distributed. The power, scope and efficacy of these institutions have been eroded in the last few decades, resulting in a crisis of confidence and a growing disparity between economic elites and the rest of humanity. The commons model does not propose to supplant top-down representational democratic governance, but to bolster its resistance to unfettered capital accumulation and renew the democratic process through a multitude of grassroots, bottom-up initiatives that can more effectively represent the concerns and serve the needs of a vast and complex array of communities that constitute our contemporary global milieu. The governance of resources and human activity which has been defined by the private-public dialectic has reached an impasse where the private sphere of global capital networks is asserting its dominance. A more equitable and sustainable governance can be revived through the emergence of a third pillar of governance—the commons.

The commons, the market and the public sector organize human activity and create value in distinctly different ways, but they do not necessarily operate in separate, distinct, and oppositional territories. They are interdependent processes with inherent strengths and benefits when deployed appropriately. The goal is to negotiate a continually evolving balance between the three so that the value-creating capacities of each can be optimized.

It is important to recognize that the commons model is not only a definition of which resources should be de-commoditized and returned to the shared ownership and stewardship of all, but is also an array of active processes and a set of protocols to govern these processes. David Bollier offers a prescient summary of this foundational notion where:

> the commons certainly include physical and intangible resources of all sorts, but they are more accurately defined as paradigms that combine a distinct community with a set of social practices, values and norms that are used to

> manage a resource. Put another way, a commons is a resource + a community + a set of social protocols. The three are an integrated, interdependent whole."[181]

Thus, the commons is not just a noun, but is also a verb. 'Commoning' is the active process by which communities can mobilize to not only protect their resources but to equitably and sustainably manage these resources for the benefit of all in perpetuity.

Deploying 'the commons' as a discursive model and a set of practices fosters our efforts to re-frame the terms of discussion of a wide range of issues and bolster our personal stake in protecting shared public resources. It helps draw new linkages among disparate issues, and in this sense, fosters the development of a shared language, a set of practices and an emergence of alliances between a diverse array of public-interest constituencies. Similarly, the discourse of the commons validates a number of specific governance models—civic institutions, stakeholder trusts, legal mechanisms, social customs and norms—that can help us protect and manage our common resources effectively. The emerging commons sector won't supplant markets and corporations, but will complement their ability to generate positive economic activity while protecting us from many of their destructive tendencies.

Achieving the right to the city in the face of intensifying pressures of capitalism and the declining capacity of all levels of government to provide physical and social infrastructure is a challenging proposition. The commons model, however, has the potential to offer a path forward. It can unite a disparate array of dissenting voices, mobilize political action, and lead the charge for the re-establishment of spaces that are truly public. Beyond this, its most effective potential, in my estimation, is the transfer of property from the inventory of capital markets into the hands of the communities that will be occupying it. Property is transformed into place when it is occupied by communities of people that are intimately invested in every aspect of its success for today and future generations.

181 David Bollier, *Think Like a Commoner: A Short Introduction to the Life of the Commons* (Gabriola Island, BC: New Society Publishers, 2014), 27.

5.0 COMPTON COMMONS

This thesis has explored a wide range of contemporary global issues with an emphasis on how they are manifested in the socio-economic and built fabric of Los Angeles. It has identified the systemic operations of global techno-scientific capitalism and its perpetual production of crises as the locus of these issues. The challenge that emerges, in this thesis, and its contribution to the broader discourse in which it is embedded, is how to begin to establish an equitable, productive, and ecologically responsible approach to all aspects of how we live.

To address the primary issues investigated in this thesis—water scarcity and spatially manifested socio-economic inequity in Los Angeles—a design-based masterplan is proposed. This masterplan, while predominantly spatial in nature, is comprised of many elements that provide a legal and economic framework.

This thesis makes no claim to universality or a comprehensive solution. This design proposal attempts to craft a nuanced, locally-scaled response to these issues in a manner that can provide a built environment that fosters the prosperity and civic engagement of a diverse and resilient community that manages its resources equitably and sustainably. The ambition of this proposal is to design a masterplan with a varied and engaging array of public spaces and modest, yet dynamic architecture that supports the community in a generous, yet fiscally prudent manner. In addition to landscape and architecture, it will be designed to accommodate a wide range of grassroots community initiatives and small-scale entrepreneurial opportunities. The overarching ambition of the design proposal is to remove the economic activity and fundamental needs of the local community—whether it is housing, employment, recreation, or culture—from being located exclusively in the territory of capitalism, or being provided in a top-down manner from government bureaucracies, and return them to local control. To achieve these ambitions, a strategic declaration for Compton Commons is detailed below.

5.1. Compton Commons: Strategic declaration for the equitable city

These points are held to be operative truths—principles that define the vision for Compton Commons—and the practices that will form the path to their realization.

1. **Access to, and the management of, our common resources is the right of all people.**

   Air, water, language, culture,…belong to everyone.

In Compton Commons, shared resources are held, managed and enjoyed by the community.

2. **Water is an essential common resource.**
   It should be stewarded with judicious care and experienced joyously.
   Compton Commons is founded on the practice of radical conservation in a closed-loop system of safe, continuous water re-use in a built environment that celebrates the importance of water in our lives.
3. **Make capitalism work for people, not the other way around.**
   Proponents of free-market capitalism claim that the market, left to operate unfettered, will produce at maximum efficiency, thereby generating optimal benefit for all. Experience has shown this article of faith to be fundamentally flawed, and, instead of universal benefit, we have received systemic inequity and ecological devastation. Capitalism is a tool, not a cosmology, and should be deployed only in appropriate circumstances.
   Compton Commons will 'hack' capitalism by acquiring two adjacent medium-scale strip malls for the site of its development. Property will be transferred from private ownership to community ownership through the legal framework of a Community Land Trust (CLT). Here, the shopping mall will be supplanted as the central social institution of contemporary society and shopping itself will be demoted from the primary social activity to only one of many activities that comprise the social life of the community. A single-purpose capitalist institution will be subsumed into a diverse, community-based urbanism.
4. **Affordable housing is a prerequisite to the exercise of all human rights.**
   It is problematic, if not impossible, to assert the right to be without a place to live.
   A central aspect of Compton Commons is the provision of housing to a wide range of household types and sizes, from single people to extended families. It is designed to be affordable in perpetuity through the aforementioned land tenure model of the CLT, and located within a supportive community where a wide range of urban amenities are within easy walking distance.
5. **Independent micro-enterprise is essential to community development.** .
   Returning the basis of economic activity to local communities strengthens other aspects of community life and reclaims power and self-determination from abstract and impersonal global financial markets. True economic value resides in people's labour and the judicious stewardship of resources in providing for actual needs, not in limitless exploitation and abstract financial markets with a questionable relationship

to actual economic activity.

Compton Commons will provide a supportive venue for all manner of productive economic activity and entrepreneurial opportunities. An emphasis will be placed on the provision of infrastructures, both physical and social, that foster microretail ventures, craft enterprises, and small-scale firms engaged in the development of web, app, and digital media content and platforms. These economic ventures will be supported by community-based and peer-to-peer education, training, and skills development.

6. **Urban design is focused on 'place-making', not only form and function.**

The modern capitalist city is predominantly a commodity exchange infrastructure where function reigns supreme and form is a signifier of the hierarchy of the disposition of these functions. The right to remake the city into the image of collective desires will be asserted—an interconnected network of neighbourhoods, places and spaces that affirm our humanity and serve our needs.

Compton Commons will be designed as an interconnected series of public spaces of varying scales, enlivened by water-based landscapes, gardens planted with native and drought-resistant plants, and open, hardscaped plazas that offer flexible, unprogrammed spaces for a wide variety of planned and spontaneous community uses. The architecture will support these public spaces, defining their edges and creating outdoor 'rooms'. The process of urbanization will be reversed and the civic sphere will be re-invigorated by the renewed practice of city-building.

5.2. Compton-Background and Context

Known as the 'Hub City' because of its location in the geographical center of Los Angeles County, Compton is one of the oldest cities in the county. The area was settled in 1867, by a band of pioneering families, led by Griffith Dickenson Compton. The settlement became known as Compton in 1869 and was officially incorporated on May 11, 1888.[182]

Compton had a total population of 96,455 in the 2010 US Census, with an estimated population in 2014 of 98,597. The population of Compton is 65.00% Hispanic/Latino, 32.90% Black/African American; with all other ethnicities comprising 2.1% of the population (see Figure 5.2.). "Compton went from being majority white in the 1950s to majority African American in the 1970s to majority Latino in the 1990s. These shifts occurred in tandem with the town's progressive

182 City of Compton, "History of the City," Accessed February 11, 2015, http://www.comptoncity.org/visitors/history.asp.

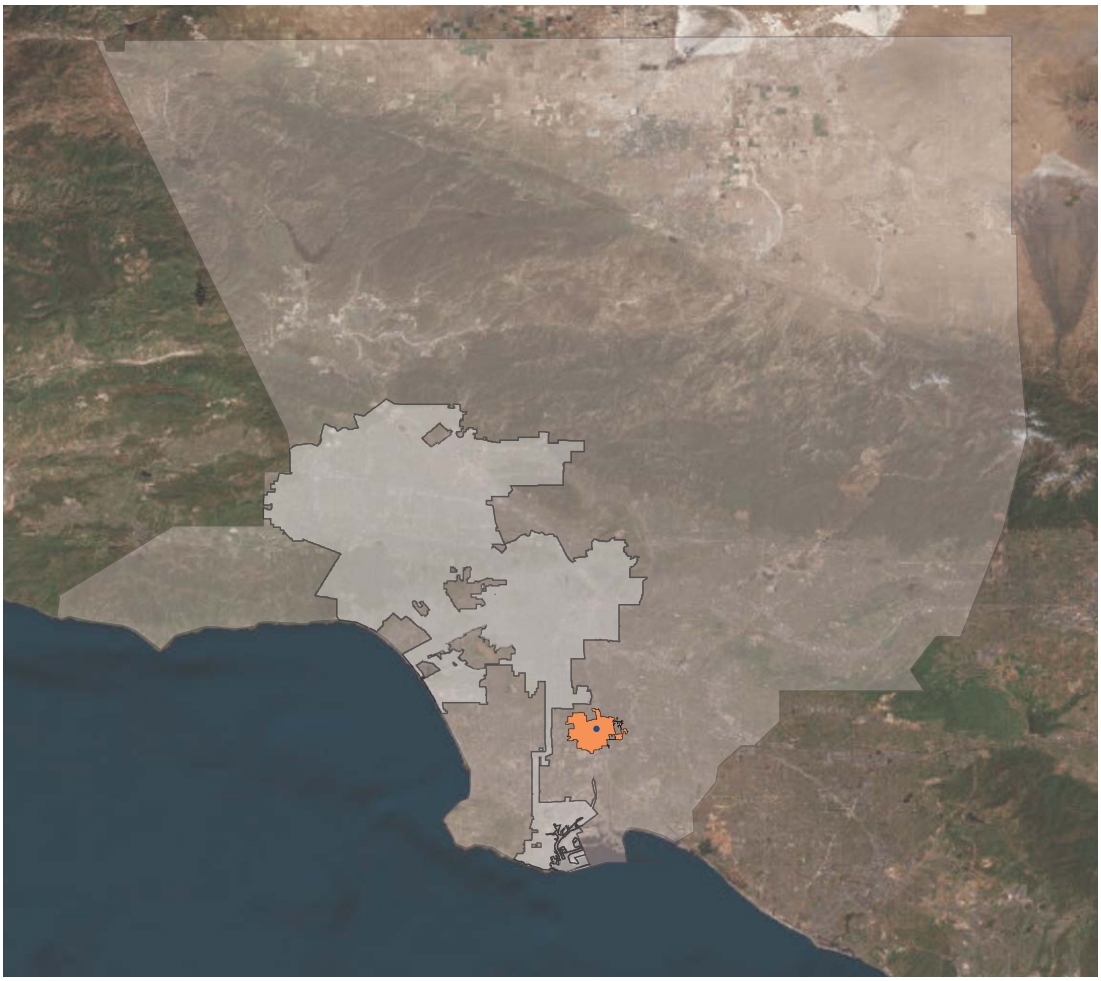


Fig. 5.1 *Map of Compton and Los Angeles County*

impoverishment; by 2000, 28 percent of the town's residents lived below the poverty line, double California's 14.2 percent figure and more than twice the national 12.4 percent."[183] The median household income is low- to middle-income (see Figure 5.3), with a significant percentage of families occupying the lowest income bracket.

183 Emily Straus, "Straight Outta Suburbia," *The Atlantic*, August 14, 2015, Accessed November 3, 2015, http://www.theatlantic.com/politics/archive/2015/08/compton-california-the-other-suburban-story/401282/.

Compton—population characteristics and demographics

Population	
Population estimates (July 1, 2014)	98,597
Population (Census, April 1, 2010)	96,455
Age and Sex (Census, April 1, 2010)	
Persons under 5 years	9.20%
Persons 5-17 years	23.90%
Persons 18-64 years	59.40%
Persons 65 years and over	7.50%
Female persons	51.30%
Race and Hispanic Origin (Census, April 1, 2010)	
American Indian and Alaska Native alone	0.70%
Asian alone	0.30%
Black or African American alone	32.90%
Hispanic or Latino	65.00%
Native Hawaiian and Other Pacific Islander alone	0.70%
Two or More Races	3.40%
White alone, not Hispanic or Latino	0.80%
Population Characteristics (Census, April 1, 2010)	
Foreign born persons	29.90%
Housing (2010-2014)	
Housing units	24,523
Owner-occupied housing unit rate	54.90%
Median value of owner-occupied housing units	$233,400
Median selected monthly owner costs -with a mortgage	$1,666
Median gross rent	$1,082
Households (2010-2014)	23,395
Persons per household	4.15
Living in same house 1 year ago, persons age 1 year+	87.90%
Language other than English spoken at home	62.10%
Education (2010-2014)	
High school graduate or higher, persons age 25 years+	60.10%
Bachelor's degree or higher, age 25 years+	6.40%
Health (2010-2014)	
With a disability, under age 65 years	9.00%
Persons without health insurance, under age 65 years	26.20%
Economy (2010-2014)	
In civilian labor force, age 16 years+	61.00%
In civilian labor force, female, age 16 years+	55.70%
Income and Poverty (2010-2014)	
Median household income (in 2014 dollars)	$43,230
Per capita income in past 12 months (in 2014 dollars)	$13,847
Persons in poverty	26.70%
Geography (Census, April 1, 2010)	
Population per square mile	9,633.90
Land area in square miles	10.01

Fig. 5.2 *Compton—population characteristics and demographics*

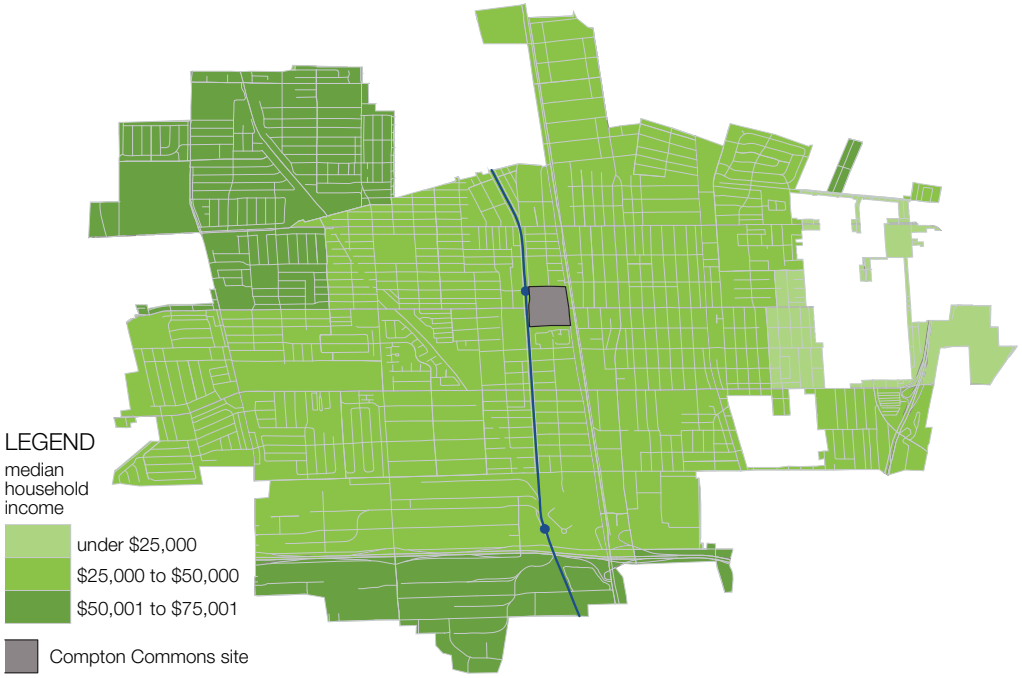


Fig. 5.3 *Compton—median household income by census tract (2014)*

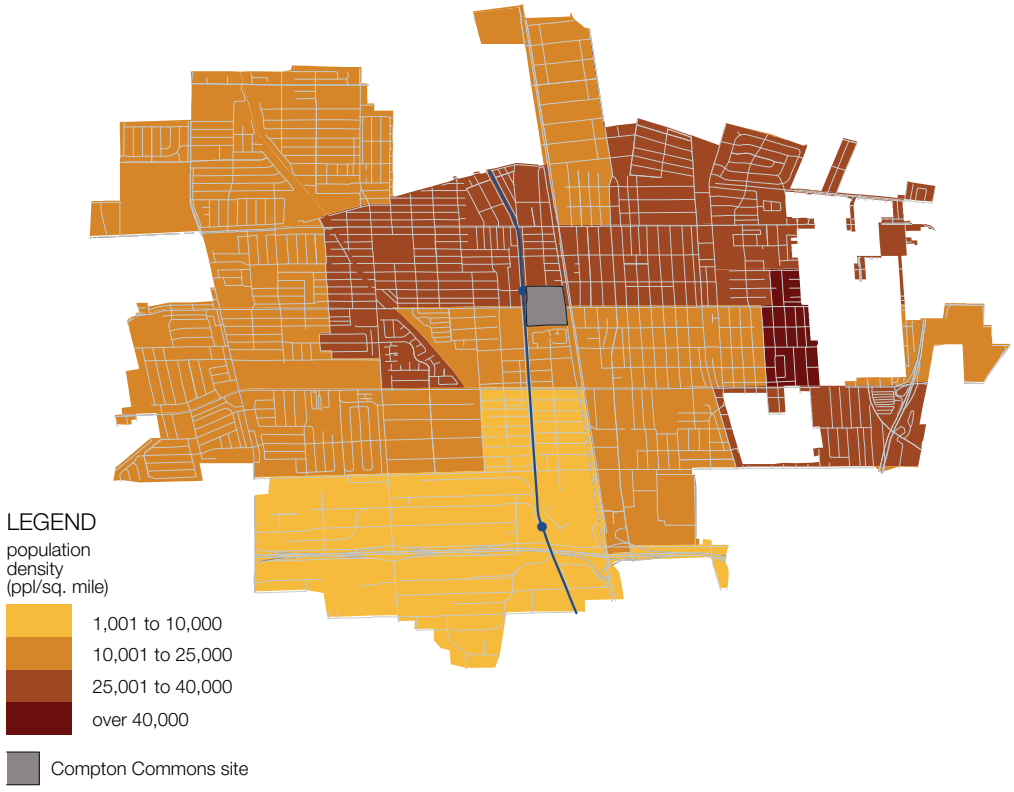


Fig. 5.4 *Compton—population density by census tract (2014)*

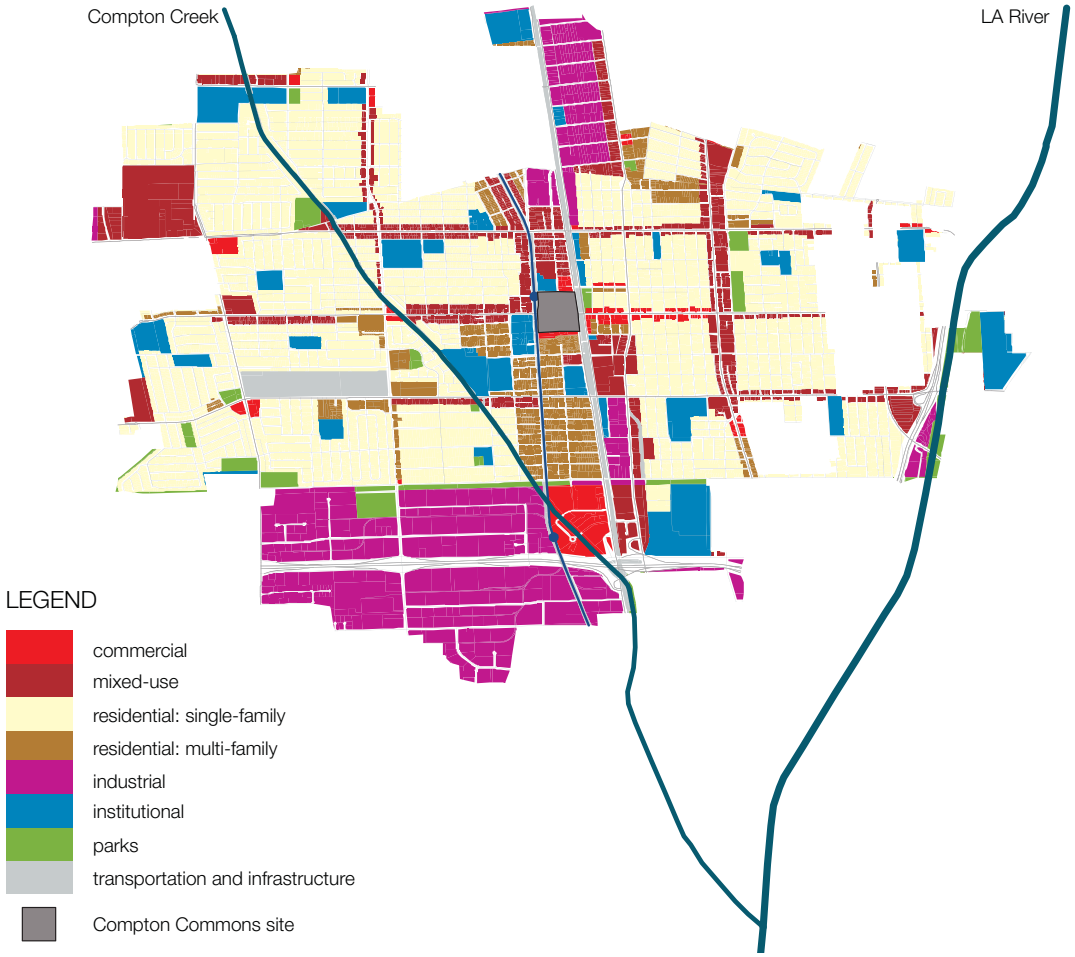


Fig. 5.5 *Compton—zoning (2014)*

Compton has been a predominantly working-class city, with a substantial area of land zoned industrial. (see Figure 5.5) This industrial employment base once had a significant number of highly-paid, unionized jobs, but, reflecting US-wide trends of the past 40 years, these jobs have largely been replaced by low-pay, unskilled positions.

Compton was developed as a primarily residential inner-ring suburb of Los Angeles. Its built fabric is composed primarily of single-family detached homes, low-rise apartment and townhouse complexes, as well as single-storey retail developments. (see Figure 5.8) As residential suburban development moved further from the central core in the 20th century, Compton experienced a steady decline in the number of middle-income families as this demographic moved further out into newer subdivisions on the suburban fringes. "Compton is emblematic of inner-ring suburbs, which developed next to central cities as primarily single-use, residential-only subdivisions.

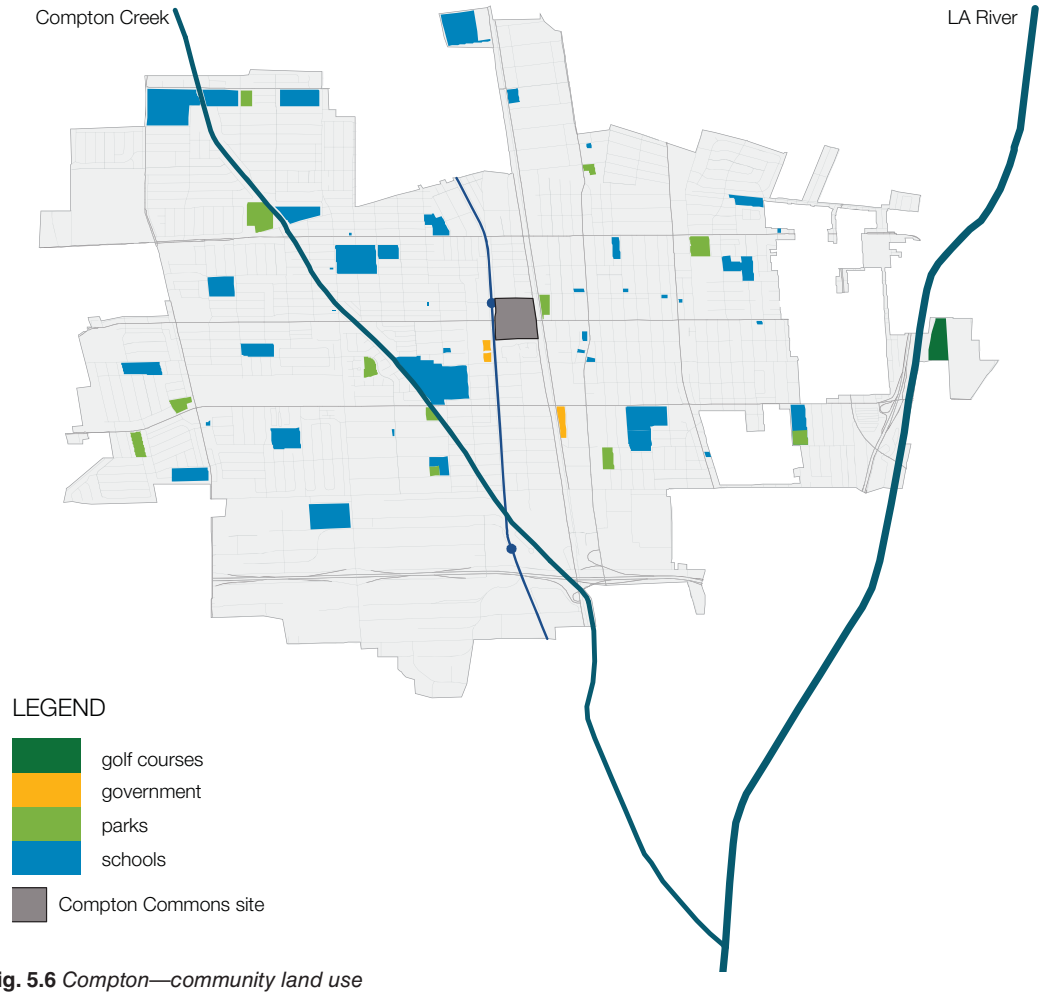


Fig. 5.6 *Compton—community land use*

These suburbs lack strong business districts, limiting their commercial potential, and they contain aging housing stocks, which diminish their appeal to higher-income earners."[184]

To address the needs of population growth and sustainable development, this thesis proposes to increase the density and intensify the range of program in inner-ring suburbs, such as Compton, through mixed-use infill development situated, whenever possible, near public transit. As a legal entity, Compton is an independent city—ineligible to receive many of the benefits afforded to the City of Los Angeles, with its broader tax base, but is still responsible for carrying a large share of its own infrastructure costs. This thesis takes the position that, if a municipality is excluded from the shared provision of infrastructure from the larger urban entity within which it is situated, it should assert its independence in all civic matters and re-organize itself as a truly independent entity, not

184 *Ibid.*

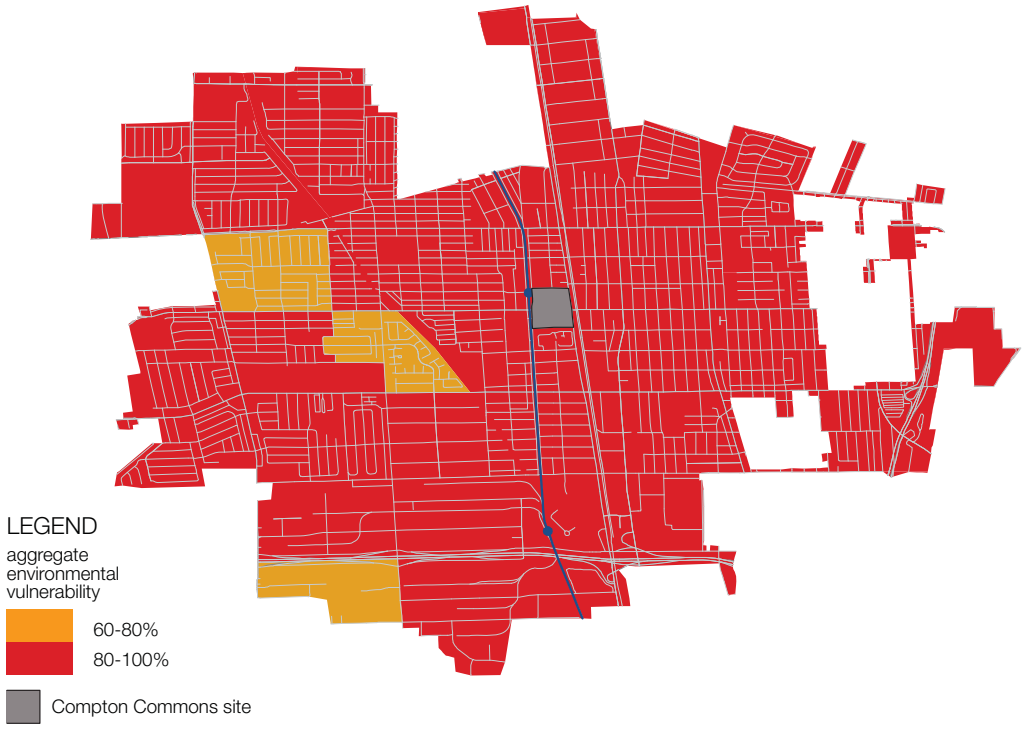


Fig. 5.7 *Compton—aggregate environmental vulnerability*

just a suburb. It is this point that forms the basis for the proposal of a new civic center for Compton that is not merely one of many nodes within the greater Los Angeles area, but is the social and economic engine of a strong local community.

5.3. Water Stewardship

This thesis has examined a wide range of water issues in Los Angeles, both historical and contemporary. The most critical of these is water scarcity, exacerbated by recent droughts, population growth, and the uncertainty of future water supply wrought by climate change. These crises highlight the importance of a long-term strategy that not only prioritizes conventional conservation measures, but embraces more radical, innovative approaches to ensuring a reliable, sustainable water supply in perpetuity.

Historically, as Los Angeles' population grew; increased water demand was met by procuring this resource from increasingly distant sources. Today, this approach is no longer tenable, and any increase in water demand and decrease in available resources is addressed through progressively stringent, government-mandated conservation measures. This is a

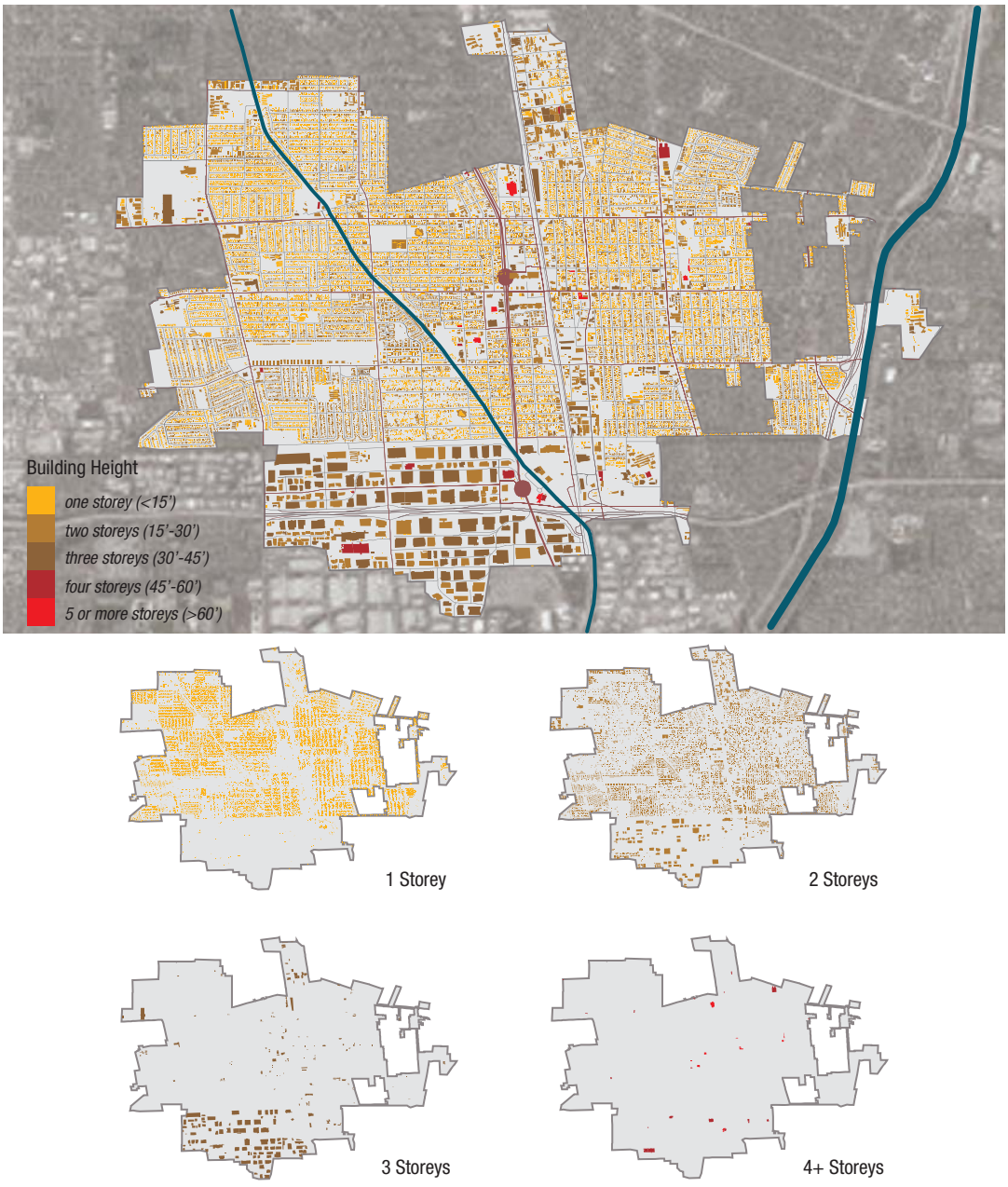


Fig. 5.8 *Compton—building heights*

positive and necessary measure, but it fails to provide a robust and sustainable strategy for an uncertain future that may include an unprecedented and dramatic decline in the availability of water resources. There are, however, two potential sources of water supply that have only been utilized to a fraction of their full potential—stormwater runoff and greywater recycling.

5.3.1. Urban Runoff

The extensive growth of the Greater Los Angeles area has created vast expanses of impervious surfaces: areas covered with buildings, roads, highways, parking lots, driveways and sidewalks where water cannot soak into the ground and return to the aquifers within the watershed. This development has dramatically altered the pre-existent processes of the hydrologic cycle, decreasing the level of infiltration and significantly reducing groundwater recharge. The amount of stormwater runoff has, correspondingly, increased significantly. The velocity of runoff over paved surfaces is considerably faster than over vegetated surfaces, thus the peak flow —the maximum flow in a stream as a result of a storm event —occurs sooner, and is significantly higher than it would be in pre-development conditions. Additionally, paved surfaces collect a variety of pollutants, including debris, oil, animal waste, pesticides, and other chemicals, which are transported in the runoff to downstream waterbodies, impacting water quality and aquatic ecosystems.

Surface runoff in areas of at least 75 percent impermeable cover will increase by a factor of nine or more, compared with an undeveloped area. Until the 1960s, the annual percentage of rainfall that infiltrated into the ground or evaporated was more than 80 percent, with less than 20 percent of the rainfall converted into runoff. This ratio has steadily decreased since then, and now over 50 percent of the annual rainfall leaves the watershed as runoff.[185]

5.3.2. The Traditional Approach: Conveyance and Storage

In urban areas where natural drainage and storage processes have been significantly altered, the objective of the design of stormwater management systems is to compensate for increased runoff and decreased infiltration; to serve as a substitute for the natural floodplain lost to development. The traditional design of stormwater systems focuses on the efficient conveyance of runoff during a major storm event, based on historic rainfall statistics and runoff calculations. The traditional stormwater management system consists of networks of engineered structures such as curbs, gutters, catch basins, storm sewers, and open channels. To expand system capacity, storage facilities such as detention and retention basins can be incorporated into the system to detain or retain a portion of runoff to reduce peak flows in the channels. This stormwater is later released into the conveyance system after the peak flow has occurred. The design criteria for these traditional stormwater systems vary depending on the size of the facility and the

185 US Environmental Protection Agency, "National Stormwater Calculator," Last updated October 7, 2015, http://www2.epa.gov/water-research/national-stormwater-calculator.

magnitude of the design storm, the maximum rainfall event that the system is designed to manage. These systems are designed with different levels of flood protection, depending on the size of the drainage area and the design storm employed. The Federal Emergency Management Agency (FEMA) Flood Insurance program requires that all regional systems, such as the Los Angeles River, provide 100-year flood protection. However, as new storm events are added to the hydrologic record, the magnitude of the design flood event is subject to continual revision. These changes sometimes result in the need for expensive alterations to expand capacity as the calculated magnitude of flood events changes.

5.3.3. Conveyance Facilities

Conveyance facilities move water on or below the surface through a series of engineered structures. This is the oldest and most common approach to stormwater management. Conveyance facilities include gutters, catch basin inlets, pipes, open channels, and sometimes even streets. In general, they are reasonably economical and straightforward to design, build and maintain. Conveyance channels are designed to be hydraulically efficient. Smooth concrete allows for using a minimal width of channel and the least possible surface resistance or roughness to move water quickly through the watershed.

Changing the roughness of a channel surface, for example by lining a stream channel with concrete, has significant impacts on the velocity of water flow, and consequently on the volume of water that a channel can convey in a certain amount of time. The capacity of the channel – how much water can move through it and how fast—is directly related to the roughness of the channel surface. The smoother the surface, the faster the water can flow over it. For a given channel width, the capacity of a natural channel containing rocks and vegetation to move water at a particular rate is considerably less than that of a concrete-lined channel with the same dimensions. Thus, a concrete channel could be much smaller in size than a natural channel to provide the same level of flood protection. A vegetated channel would need to occupy much more floodplain area in order to meet the same flood protection needs of a community. Because of this efficiency, concrete flood channels are sized to manage the occasional large storm without utilizing the adjacent floodplain normally occupied by flood flows in a natural river system during floods. This approach allows the flood conveyance footprint to be smaller, and maximizes the amount of land available for development.

5.3.4. Detention Basins

Detention basins are used in a flood control system to detain a portion of the flow

and slowly release the water after the peak runoff has occurred. Detention basins reduce the peak runoff volume, although the total stormwater volume conveyed by the system remains unchanged. Multipurpose facilities, such as those used for water conservation and flood protection, have a specific capacity reserved for stormwater storage. These facilities must be carefully managed to ensure that capacity is available when needed. Single purpose facilities reserve the entire basin for stormwater storage.

5.3.5. Retention or Infiltration Basins

Retention and infiltration basins reduce the total volume of storm runoff by retaining a portion of the runoff and allowing it to infiltrate (if the basin is permeable) and/or evaporate. These basins reduce the total stormwater volume that is conveyed downstream and correspondingly reduce the peak runoff. They can also help to restore the base flow in streams by recharging groundwater. This has become an increasingly important component of maintaining Southern California's groundwater supply. For example, an average of about 250,000 acre-feet of stormwater runoff is captured for recharge annually within the Los Angeles and San Gabriel Rivers watersheds alone, utilizing spreading basins and instream options.[186]

There are two types of retention or infiltration basins. An inline basin is located in the flow path of a channel. An offline basin is located outside the channel with runoff diverted into it, with some sort of flow control to prevent overfilling.

5.3.6. The Need for a New Approach

The efficient removal of stormwater to protect public health and safety from flooding is an important and desirable goal. There is a growing realization, however, that the traditional approaches to stormwater and flood management have unintended consequences that affect the environment in a multitude of negative ways. Not only are we losing a valuable local resource—water, we have damaged our natural ecosystems by concreting stream channels and sending polluted urban stormwater runoff into our rivers and the ocean. We have replaced part of the natural water cycle with an artificial system in which there is little connection between rainfall and underground aquifers. Currently, water imported from hundreds of miles away, such as the environmentally sensitive Sacramento-San Joaquin Delta and the Colorado

186 Data.gov, "LADWP Stormwater Capture by Fiscal Year," Last updated April 9, 2015, http://catalog.data.gov/dataset/ladwp-stormwater-capture-by-fiscal-year-4f912.

River, is used to replenish underground aquifers to make up for the loss of natural recharge from stormwater. This imported water is often more costly and less reliable than the development of local water resources such as the conservation of stormwater.

Another drawback is that these engineered flood control channels create a potential hazard to the public. In the event that someone may be caught up in the swift flow of water rushing to the sea, people have been prohibited from entering the rivers for recreation. As a result we are increasingly alienated from our local rivers and streams and the natural habitat and recreational opportunities they once provided. There is increasing interest in methods of managing stormwater runoff that help restore the natural water balance. Stormwater may be managed as an asset, while at the same time maintaining the protection of life and property as the primary objective. One way to reduce the total volume and velocity of stormwater entering the flood management systems is through techniques that are distributed throughout the watershed to capture or slow runoff at its source. This approach can reduce the overall threat to public safety while reducing pollution and increasing natural infiltration and local water supplies.

5.3.7. Water Quality Concerns

There are valid concerns as to whether infiltration transports pollutants from surface water to groundwater. Research indicates that this is not necessarily the case. The Los Angeles Basin Water Augmentation Study examined the impact of stormwater infiltration on groundwater quality. Several years of monitoring infiltration at a number of locations with different hydro-geologic conditions found no apparent trends to indicate that stormwater infiltration negatively impacted groundwater quality. Soils have been shown to act as bio-filters, removing contaminants from surface water runoff as it percolates down into groundwater basins. However, any area where infiltration is planned, the site conditions must be carefully evaluated to ensure that soils are capable of infiltrating the expected runoff volume safely and with sufficient clearance to groundwater, and that there are not pre-existing conditions that might preclude infiltration, such as soil contamination.[187] The existence of extensive industrial land uses, and a multitude of EPA clean-up sites in Los Angeles, suggest that great care be taken with the assessment of potential groundwater infiltration sites.

187 The Los Angeles and San Gabriel Rivers Watershed Council, "Los Angeles Basin Water Augmentation Study," Last modified December 15, 2001, https://wiki.epa.gov/watershed2/index.php/LA_Basin_Water_Augmentation_Study.

5.3.8 Storm Frequency

The extreme nature of southwestern hydrology, with infrequent but high-intensity storm events, is frequently cited as the primary reason why traditional, hard-scaped infrastructure is a necessary stormwater management strategy. In much of the Los Angeles area, where areas once occupied by seasonal floodplains are now occupied by development, this is a valid concern. However, the more frequent small storms are significant contributors to total rainfall. In the Los Angeles coastal plain, the number of storms that exceed the threshold of 0.75 inch occur just a few days per year. If the amount of runoff generated from all storms, including the first 0.75 inch of the larger storms, was captured for reuse or infiltration it would represent more than 70 percent of annual rainfall. Depending on the soil type and how saturated the soil has already become, runoff generated from the more typical small storms may be easily infiltrated in areas that have a permeable surface. These are the easiest places to infiltrate stormwater. Therefore, one of the aims of watershed management planning should be to minimize the amount of impermeable land cover. This increases opportunities for infiltration of rainfall, groundwater recharge and the reduction of overall runoff volume and velocity.

5.3.9 Multiple Purpose, Multiple Benefit

As the watershed approach to planning and resource management gains attention, public agencies and communities are recognizing the fact that stormwater management systems can serve more than one purpose. Single purpose conveyance systems are increasingly viewed as throwing water (and therefore money) away. They typically do not address other watershed management concerns—water supply, water quality, recreation, wildlife habitat – or take into account the funds that agencies spend, often independently, on each of these other concerns. Projects in a watershed that provide multiple benefits can therefore be eligible for multiple sources of funding, saving money and resources in the long run. Detention basins, for example, can be used for golf courses and parks. Hiking, biking, and equestrian trails can be added alongside stream channels. Many runoff detention facilities in Los Angeles County, such as the Sepulveda Basin and Whittier Narrows, already provide such multiple uses and more, and others could be modified to further enhance public use. Some of the many benefits that may be realized from multiple purpose projects include the following:

Water supply
By increasing groundwater recharge with local stormwater, we can become less dependent on imported water to meet our drinking water needs. Using more stormwater for recharge also allows us to take advantage of unused storage capacity in our groundwater aquifers, further reducing our demand for imported water. This greatly increases the reliability of our water supply both locally and state-wide.

Energy savings
The use of stormwater for beneficial purposes requires markedly less energy than conveying water from Northern California or the Colorado River, which both saves money and reduces greenhouse gas emissions.

Habitat
By restoring stream channels and recharge areas and creating new parks and treatment wetlands, we can provide much needed habitat to replace our wetlands, and riparian and chaparral habitats lost to development.

Open space and recreation
Parks and open spaces provide needed recreation and access to open space in park-starved urban areas, while also increasing infiltration and, in some cases, serving as flood detention facilities during large storms.

Water quality
By reducing the volume of runoff, water quality can be improved in downstream waterbodies.

Restoration
Restoring natural stream functions provides erosion control and sediment management.

Cost savings
It is becoming increasingly costly to maintain the traditional concrete channels in already developed areas. Projects that serve multiple purposes are proving to be cost effective when all the multiple savings and benefits are considered.

Quality of life
Greening the urban hardscape increases property values and enhances the community by providing nearby recreation amenities and opportunities for greenways and for commuting by foot or bicycle.

5.3.10 Design Strategies

Low impact development (LID) is a comprehensive land development design approach

with a goal of maintaining and enhancing the pre-development hydrology of a site. Design principles strive to preserve natural landscape features and minimize impervious cover. The basic principle of LID is to mimic pre-development processes: manage rainfall at the source using distributed, decentralized small-scale systems and soft infrastructures.

It is not possible to capture 100 percent of the runoff in a watershed, but, what impact would capturing some portion of precipitation have on reducing total runoff and increasing infiltration? The Watershed Council conducted such an analysis for the Los Angeles basin, where most of the watersheds are classified as some type of urban land use. On average, rainfall on these urban lands uses generates nearly 200 billion gallons of runoff every year. If the existing SUSMP policy of capturing or treating the first 0.75 inch of rainfall was implemented throughout the Los Angeles Basin to capture and infiltrate stormwater, groundwater recharge would potentially increase by 60 percent and stormwater runoff would decrease by about half. Hypothetically, if runoff from a 0.75 inch rainfall event was captured on just half of the residential area—15 percent of the total basin—total runoff would be reduced by approximately 30 percent. That translates into a diversion of approximately 43 billion gallons of water per year (about 132,000 acre-feet), or enough to supply an estimated one million people for a year.

There are several projects of varying scale that are addressing water conservation in southern California. An ambitious project that is achieving dramatic levels of water conservation is the Orange County Water District's Groundwater Replenishment System, an award winning facility that is addressing southern California's increasingly critical water scarcity. It is essentially a toilet-to-tap process that processes and purifies sewage water to drinking level quality before pumping it into underground aquifers for later extraction as drinking water.

After wastewater is treated at the Orange County Sanitation District, it flows to the GWRS where it undergoes a state-of-the-art purification process consisting of microfiltration, reverse osmosis, and ultraviolet light with hydrogen peroxide. The resultant water is near-distilled-quality. Approximately 35 million gallons (132,500 cubic meters) per day of the GWRS water are pumped into injection wells to create a seawater intrusion barrier. Another 35 million gallons (132,500 cubic meters) are pumped daily to Orange County Water District's percolation basins in Anaheim where the GWRS water naturally filters through sand and gravel to the deep aquifers of the groundwater basin.[188] While this project is commendable for its complete re-use of water, it is highly

188 Orange County Water District's Groundwater Replenishment System, Accessed February 3, 2015, http://www.ocwd.com/

energy-intensive and represents the type of large-scale infrastructural project that may not be affordable for many municipalities. It does, however, point to the multi-faceted approach to sustainable water conservation practices, which involves initiatives across multiple scales and approaches that involve both 'high-tech', 'low-tech', and 'natural' infrastructures.

The second recent project of note is the South Los Angeles Wetlands Park. Funded by the Proposition "O" water quality bond that voters approved in 2004, the nine-acre park was formerly an "underutilized and blighted" bus maintenance yard.[189] This is an excellent example of repurposing a space that no longer served its original purpose. In this park, a series of constructed wetland ponds treats runoff from the surrounding neighborhood before it is released to the LA River. This project has created a public space in a neighbourhood sorely in need of them, and when stormwater is available, it has proven effective in treating the urban runoff it receives. However, if there was no rainfall for extended periods of time, potable water had to be used to keep the plants alive and ensure the continued functioning of the water treatment systems.

The approach adopted in the design proposal for Compton Commons will harvest stormwater from the local watershed and greywater from showers in a closed-loop system that is treated by constructed wetlands and recycled for all non-potable water uses within the development.

5.3.11. Constructed Wetlands

Constructed wetlands are designed and built to treat wastewater, mimicking the biotic and abiotic processes of natural wetlands. They most frequently consist of a shallow depression in the ground with a level bottom. The flow is controlled in constructed wetlands so that the water is spread evenly among the wetland plants, allowing natural processes to occur and clean the wastewater more efficiently. Constructed wetlands provide simple and effective wastewater treatment. They can be used to treat wastewater from domestic, urban, agricultural, industrial and mining operations. Their up-front construction costs are much less (50 to 90 percent) than conventional systems and their ongoing operating costs are similarly lower. Constructed wetlands offer aesthetic qualities and strengthen local ecosystems—enhancing and expanding habitats for all manner of flora and fauna.

Wastewater flows through a pipe from a septic tank or other type of primary wastewater treatment system into the constructed wetland. There are several types of constructed

189 "Adel Hagekhalil on Significance of South LA's Wetlands Park," The Planning Report, http://planningreport.com/2012/02/26/adel-hagekhalil-significance-south-la-s-wetlands-park.

wetlands. Wastewater can either flow on top of the existing soil (surface) or through a porous medium such as gravel (subsurface) (see Figure 5.9). Flow is distributed evenly across the width of the wetland cell. A waterproof liner is used on the sides and bottom of the cell to prevent leaks and assure adequate water for the wetland plants. This cell is planted with wetland plants such as cattails and bulrushes. Roots and stems of the plants form a dense mat. Here chemical, biological, and physical processes occur to treat the wastewater. Water levels are controlled in both surface and subsurface systems. In subsurface systems, the normal water level is kept just below a gravel surface, which improves treatment and controls the propagation of mosquitoes. The free water surface constructed wetland (see Figure 5.10) is the most similar to natural wetlands. It is essentially an open pond planted with a variety of aquatic plants. Emergent aquatic macrophytes have roots in the soil at the bottom of the body of water, but grow up through the water and have leaves and flowers that extend into the air. Floating-leaved aquatic macrophytes float on the surface of the water, and submerged aquatic macrophytes have roots in the soil at the bottom of the body of water, but remain submerged. (see Figure 5.10)

As wastewaters flow through the system, suspended solids and trace metals settle and are filtered. Plants and organic material also absorb trace metals. Organisms that live in water, on rocks, in soil, and on stems and roots of wetland plants use these organic materials and nutrients as food. Plants provide much of the oxygen needed by the organisms to live and grow. Plant roots keep the rocks or soil loose so that water can flow through easily.

Constructed wetlands will address many, but not every, wastewater need. They may be employed to serve a wide range of urban and rural uses; their design can be tailored to the influent, the available land and the available budget. They meet secondary treatment limits and can be designed for advanced treatment. Their construction and operating costs are low, compared to conventional 'hard infrastructures', and they do not require highly trained operators or extensive daily monitoring protocols.

The design proposal for Compton Commons will utilize vertical subsurface flow and free water surface CW's to treat both the harvested stormwater and recycled greywater generated by the residential development on the site. In addition to the performative aspects of these constructed wetlands, they will be designed as central landscape features, animating the public spaces of the proposed development.

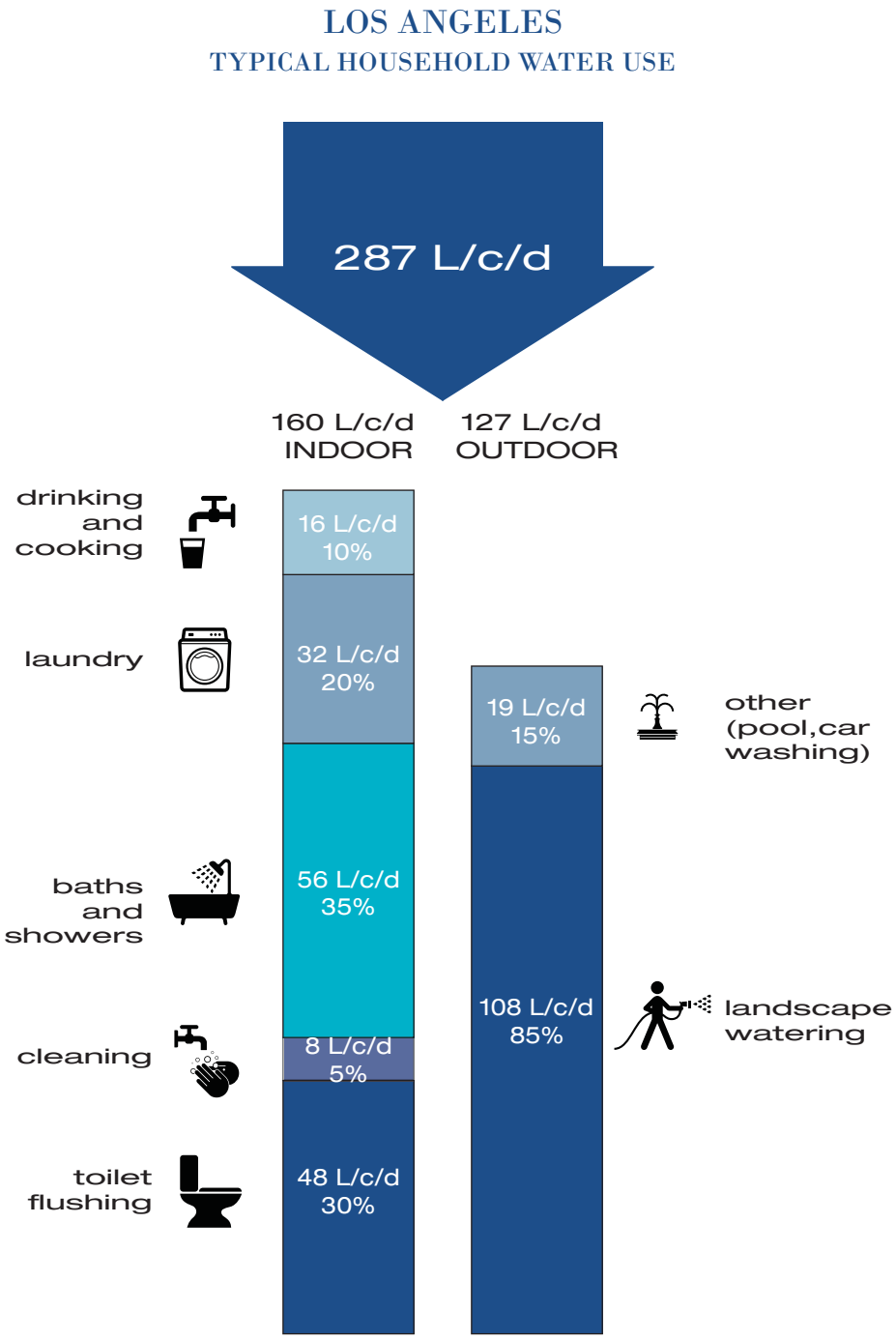


Fig. 5.9 *Los Angeles—typical household water use*

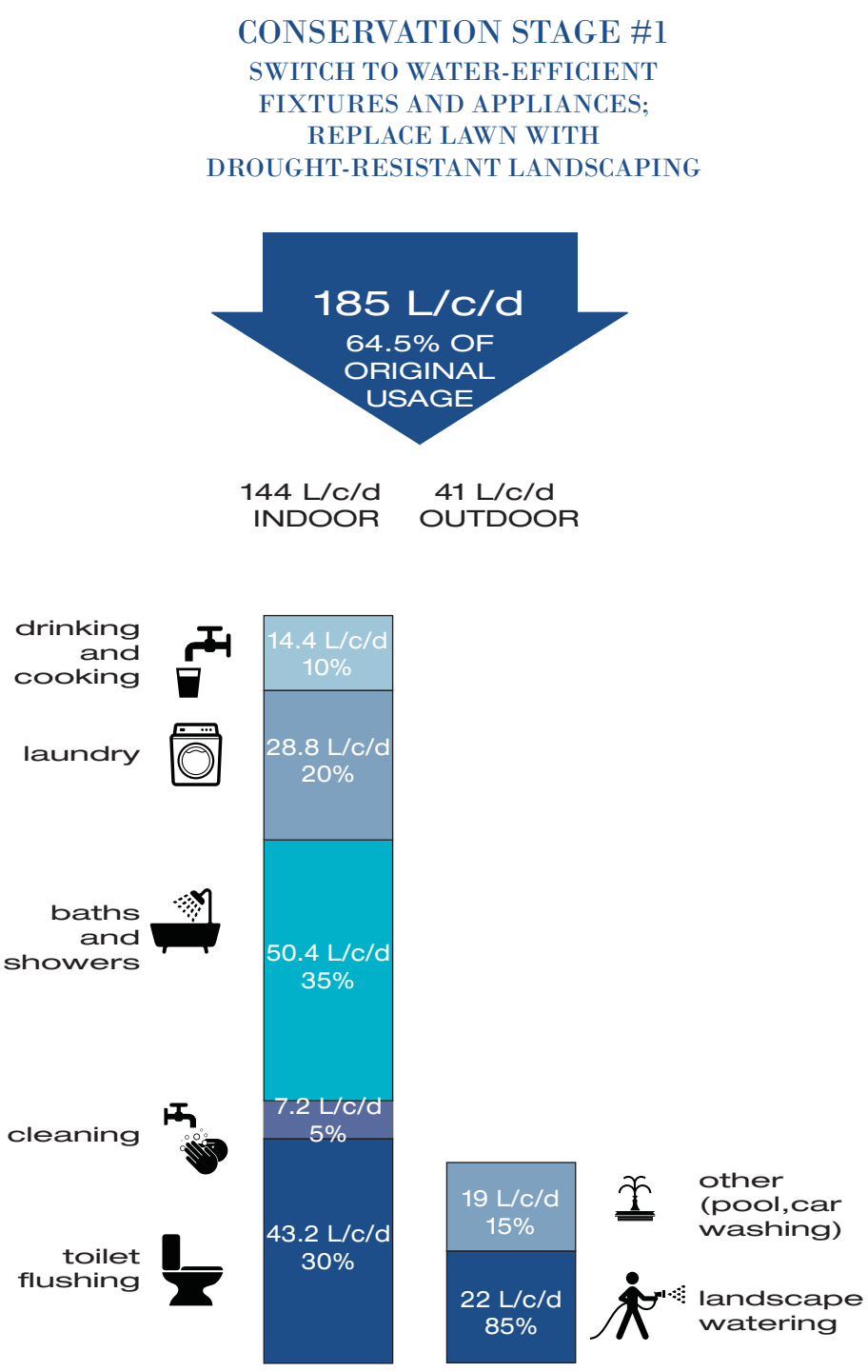


Fig. 5.10 *conservation—stage #1*

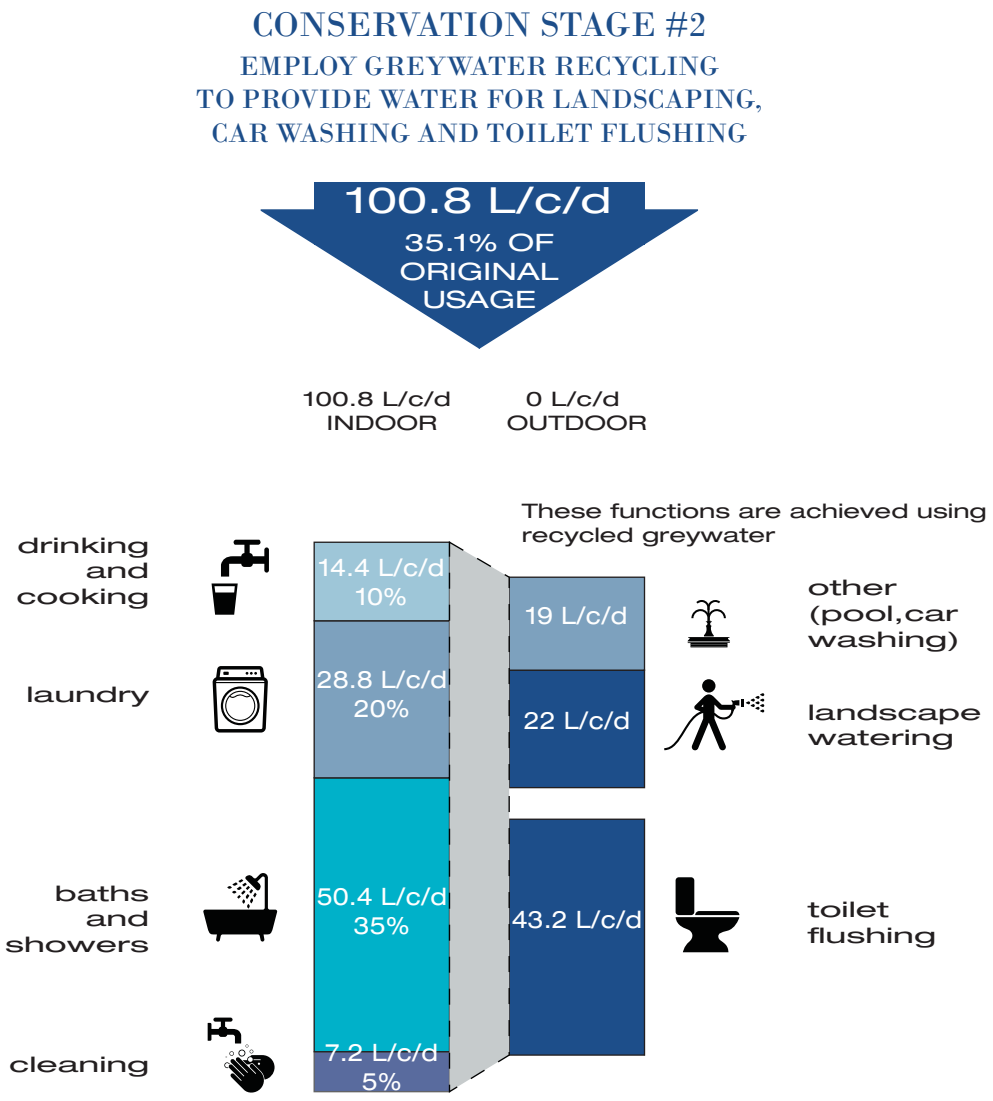


Fig. 5.11 *conservation—stage #2*

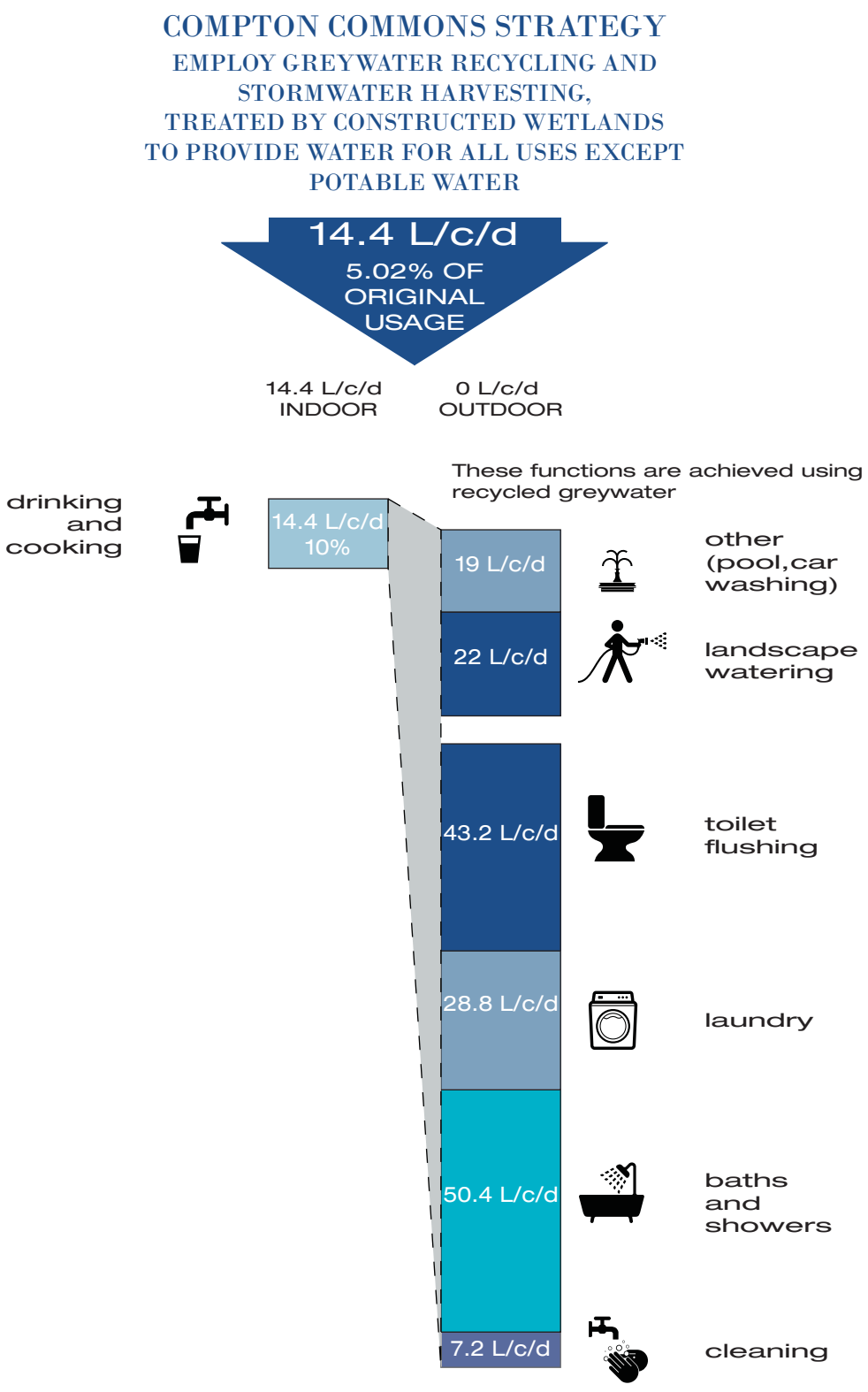


Fig. 5.12 *Compton Commons strategy*

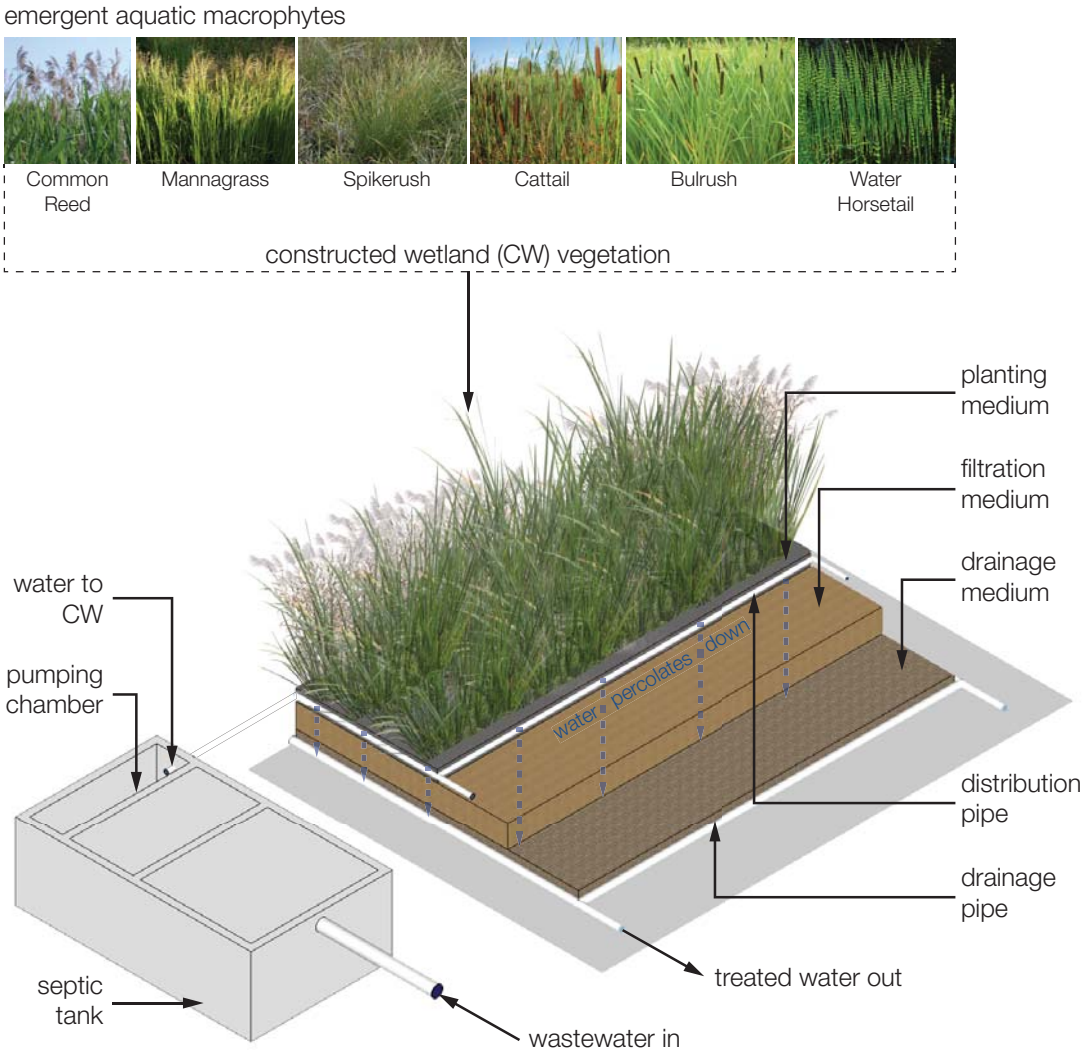


Fig. 5.13 *vertical subsurface flow constructed wetland—schematic diagram*

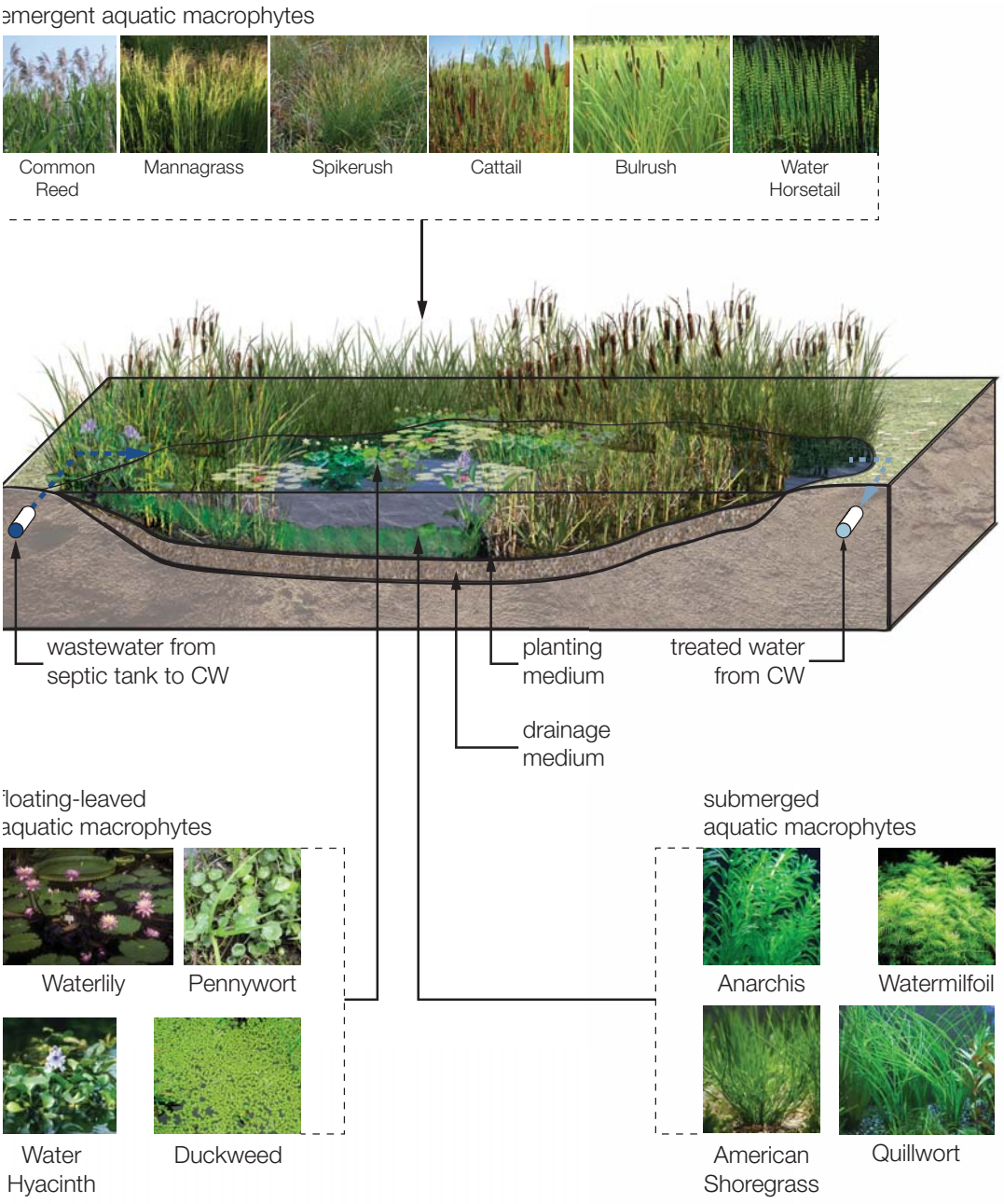


Fig. 5.14 *free water surface constructed wetland—schematic diagram*

5.4. Making Capitalism Work for People

A central tenet of Compton Commons is the creation of a space— physical, economic and political—that operates in an independent sphere outside the territories of capitalism and large-scale government. This is a humane state of exception in which standard protocols of power are suspended by community-driven legal mechanisms. Here, land tenure and resource management is community-based and its disposition is driven by transparent processes of contestation and consensus-building. Capitalism and representative democracy are both driven by top-down, large-scale processes. Compton Commons operates within a legal framework that is driven by local, small-scale, bottom-up political processes that are intimately involved with the issues it addresses and the resources it manages. The aforementioned legal mechanism that enables the community to assert this level of self-determination is the CLT, which will be discussed in greater detail in the section to follow (5.3.1).

In this scenario, two adjacent strip malls will be acquired to form the basis for the Compton Commons development. This private property will be transferred to a CLT, and any subsequent development will occur within this community-based property tenure model. The advantages of this strategy are multiple:

1. Prices for retail developments are generally calibrated to rental income. A shopping mall, if purchased with a down payment of 30 percent of its sale price, can generally cover its mortgage payments through its retail leases, at current sales levels.
2. Most retail leases are a base rent + percentage of sales.
3. Intensifying the use of a shopping mall creates low-cost land. If the parking lot can be re-designed to accommodate higher-value uses, the land that used to be a parking lot can be re-developed to higher-value uses for only the cost of creating parking structures to offset some of the parking spaces lost to development intensification, as well as the site work to prepare the land for new buildings.
4. When the land of the development is held by a community trust, the increased revenue experienced by the existing retail establishments, due to the dramatic population increase, will result in a rental revenue increase (based on percentage of sales) that goes back to the community trust.

This framework could provide a model for development in which both capitalist ventures and community initiatives prosper. The existing tenants benefit from an increased customer base and a portion of this increased revenue goes back into the community and is not siphoned off into capital markets through profits and dividends.

5.4.1. Community Land Trusts

> The CLT model's flexibility and adaptability to local conditions make it an appealing solution to a range of problems affecting communities across the country including disinvestment, gentrification and displacement, foreclosure, loss of affordability due to expiring public subsidy, housing discrimination, and decreasing social capital.[190]

A CLT is a not-for-profit organization with membership open to any resident of the community in which it is located. The purpose of a CLT is to create a democratic and participatory institution to hold land and to retain the use-value of the land for the benefit of the community, as opposed to land ownership for its exchange-value. The objective of a CLT is to provide affordable access to land for housing and small businesses, as well as a wide variety of community-oriented uses, and to protect this land from future profit-oriented development which may displace long-standing residents. The CLT is a locally-driven and sustainable model of affordable housing and community development that has grown steadily throughout the United States, Canada, and the United Kingdom during the past 40 years.

A CLT acquires land by gift or purchase and then develops a land-use plan for the parcel, adopting an approach that fosters healthy ecosystems, an inclusive, appropriate social use of the land and a sustainable approach to development. The planning process incorporates input from residents of the community to ensure that the development addresses local needs.

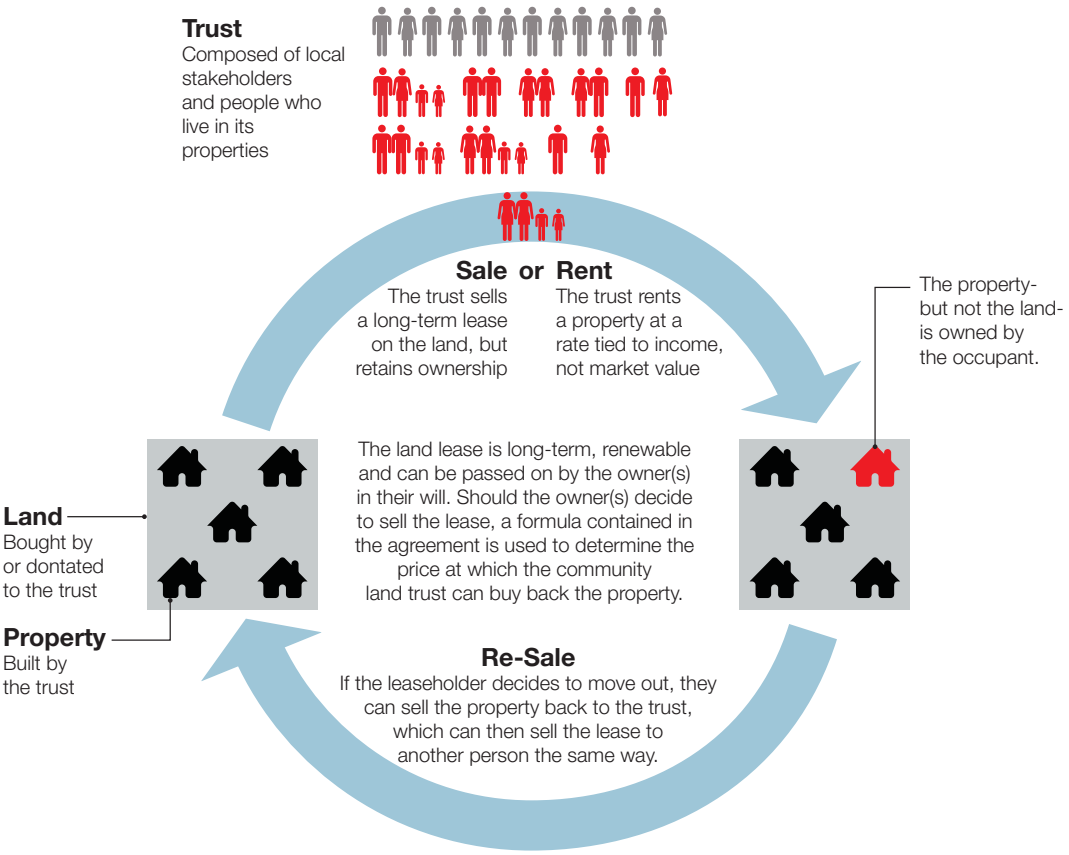
5.5. Housing

The provision of affordable housing is another central tenet of Compton Commons. If the land upon which the housing is built is removed from the speculative forces of the market and held by the community in perpetuity, the appreciation of property value is not reflected in the cost of housing. In Los Angeles, as well as in other major North American cities, this property value appreciation is dramatically outpacing income growth and driving rapidly increasing housing costs and rising levels of unaffordability. (see Chapter 3) A CLT framework restores the primacy of the use value of housing by de-emphasizing its exchange value and removing it from the volatile and corrupt forces of capital property markets.

In simplest terms, a CLT develops a parcel of land, retaining the ownership of the land

190 The Architectural League's Urban Omnibus The Culture of Citymaking, "The Value of Land: How Community Land Trusts Maintain Housing Affordability," Accessed February 17, 2016, http://urbanomnibus.net/2014/04/the-value-of-land-how-community-land-trusts-maintain-housing-affordability/

Community land trusts keep properties affordable by putting only the properties, not the land they occupy, on the market.



Since the community land trust is selling only the property and is not seeking to make a profit, the cost of the lease is far cheaper than the market price.

Fig. 5.15 *community land trust (CLT)—schematic diagram*

in perpetuity, and either sells or leases the individual units (houses, apartments, offices, retail spaces, etc.) at a price based on the cost of construction of the unit and as well as a land lease that ensures there will be a stable reserve fund to cover ongoing maintenance costs. (see Figure 5.)

5.6. Independent Micro-enterprise

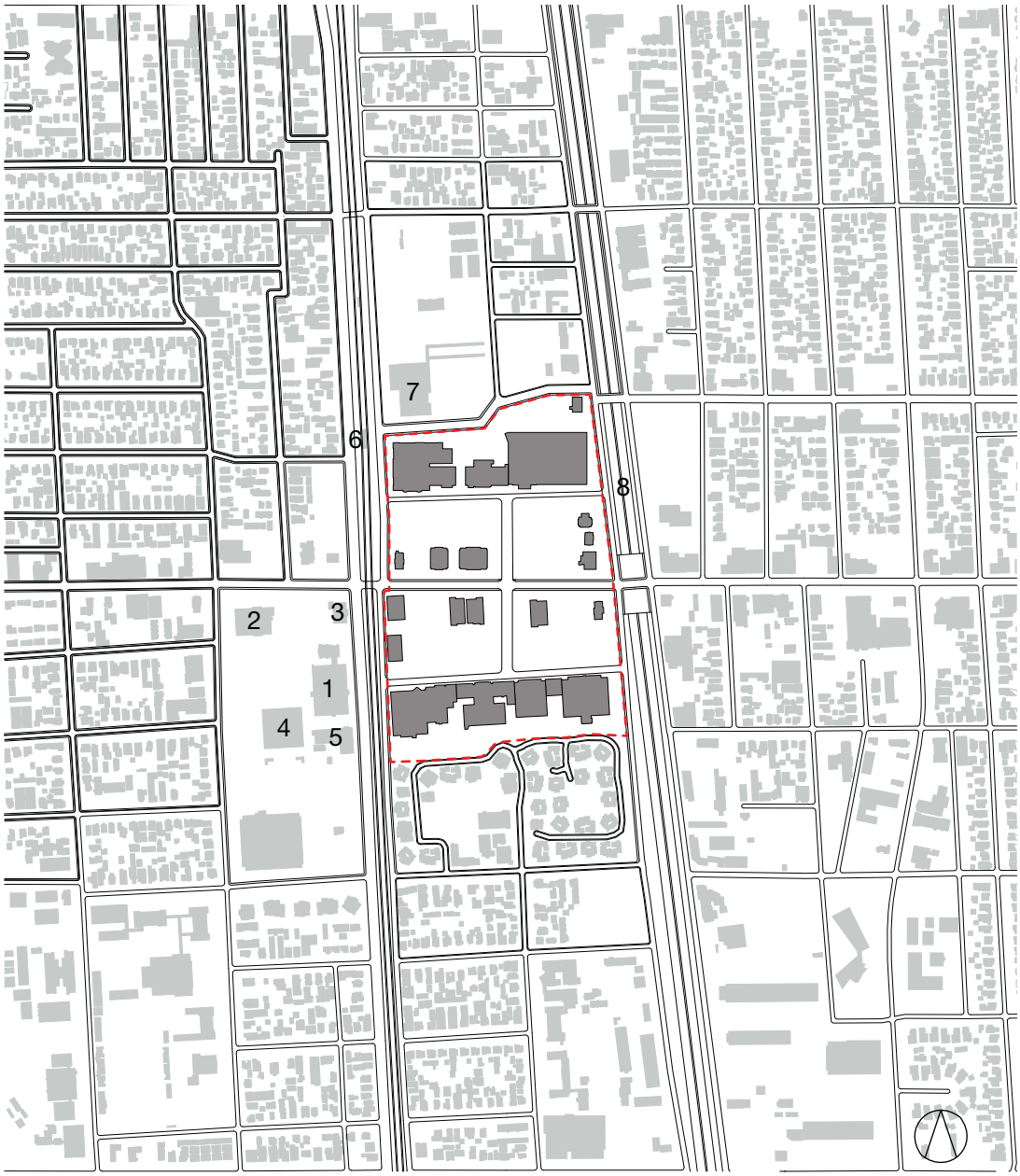
A Community Land Trust is proposed as the basis for establishing an equitable and inclusive foundation for community development that can provide affordable housing in markets where speculative property markets have inflated the costs of housing far beyond any

sustainable relationship to real income for ever-widening segments of society. A CLT can also serve as a framework that fosters independent local enterprise by affording flexibility, a supportive community infrastructure and lower occupancy costs—crucial elements for small-scale fledgling ventures that for-profit real estate enterprises cannot offer. A CLT can offer inexpensive office and retail space in smaller units with more flexible terms than is available in the free market. In addition to this, small-scale economic enterprises can be fostered by a supportive community in terms of peer networking, co-operative leasing and equipment-sharing arrangements, as well as a wide variety of community-based training, skills development, and educational initiatives. There is a broad range of small-scale enterprises, such as food trucks, micro-retail, and 'makerspace' facilities, which can be fostered by this community approach. A variety of these will be proposed as elements in a design masterplan in the next chapter, but the types and spatial disposition of these enterprises will be ultimately determined by, and evolve with, community needs.

The following chapter will present a design proposal based on this strategic platform with the ambition of crafting a locally-informed, personal response. While there is no pretence to universal applicability, this platform could also inform a wide range of community development initiatives that wish to incorporate ambitious water conservation strategies, affordable housing, and local economic self-sufficiency.

6.0 COMPTON COMMONS—DESIGN PROPOSAL

Fig. 6.1 *Compton Commons site*



LEGEND

- Compton Commons Site
- 1 Compton City Hall
- 2 Compton Public Library
- 3 US Postal Service
- 4 LA County Courthouse
- 5 Compton Police Station
- 6 Compton Blue Line Rail Station
- 7 MLK Transit Centre
- 8 Alameda Corridor cargo rail lines

Fig. 6.2 *existing site plan (1:10,000)*

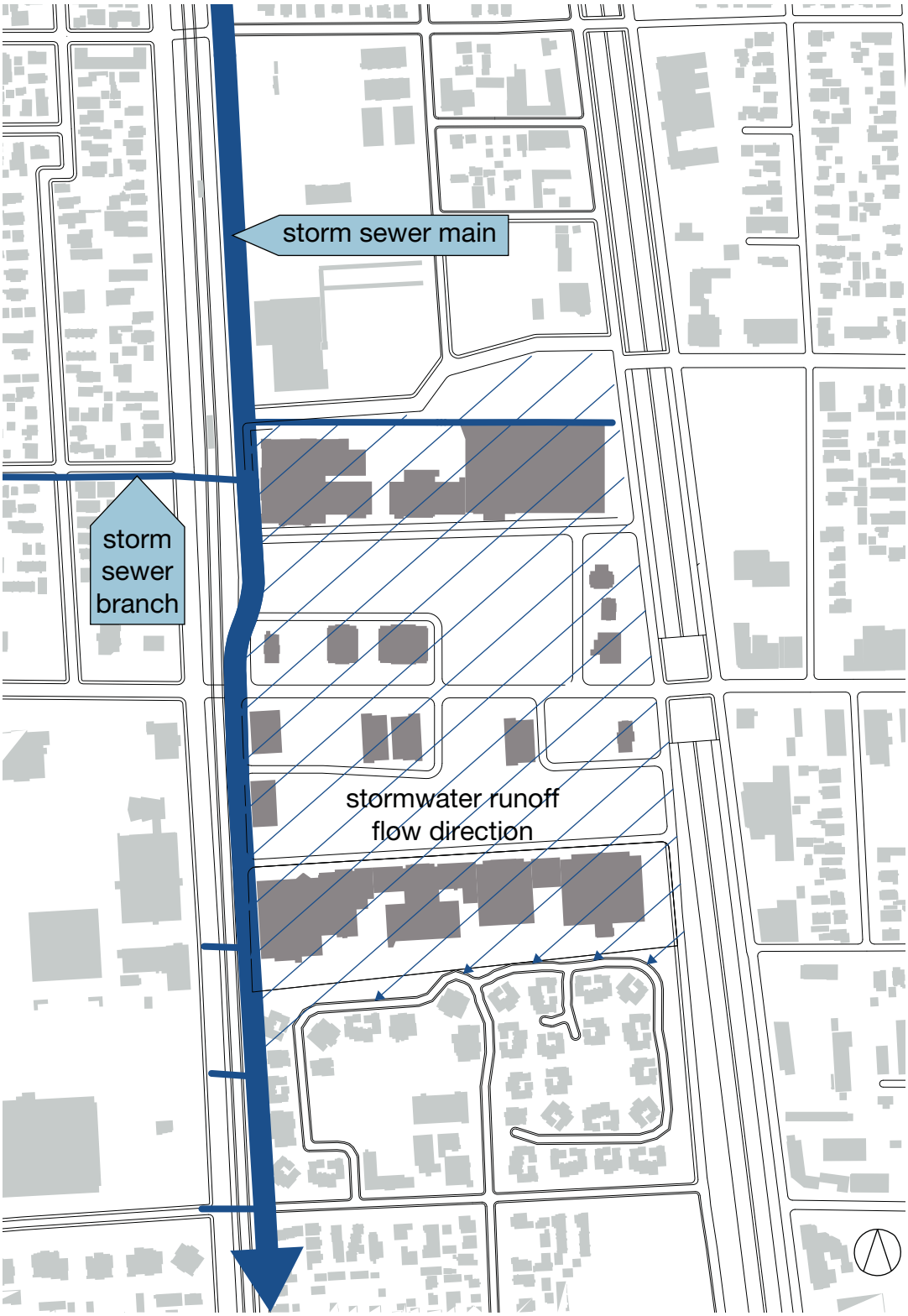


Fig. 6.3 *existing site plan with hydrology (1:5,000)*

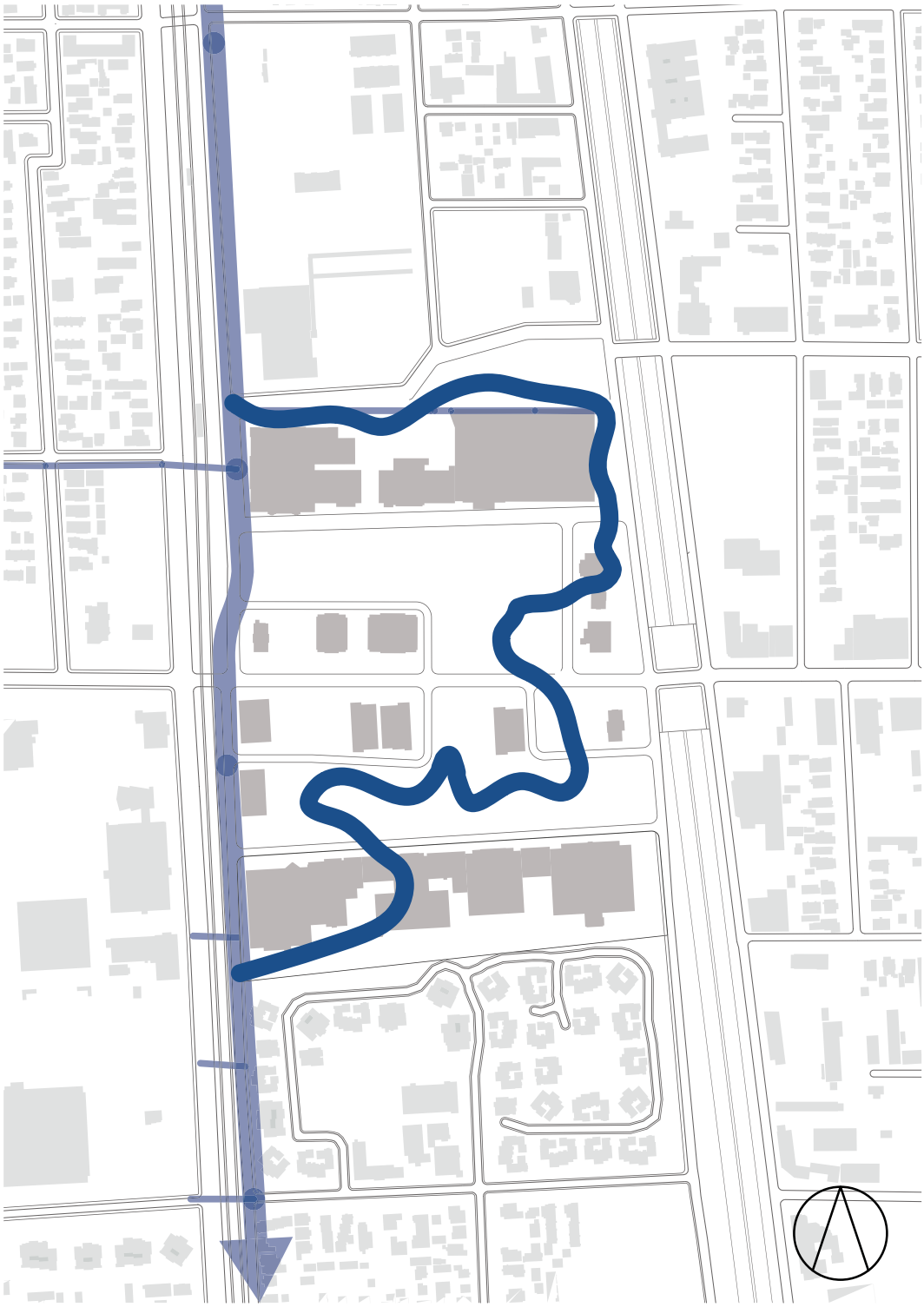


Fig. 6.4 *storm water harvesting schematic with riverine flow path (1:10,000)*

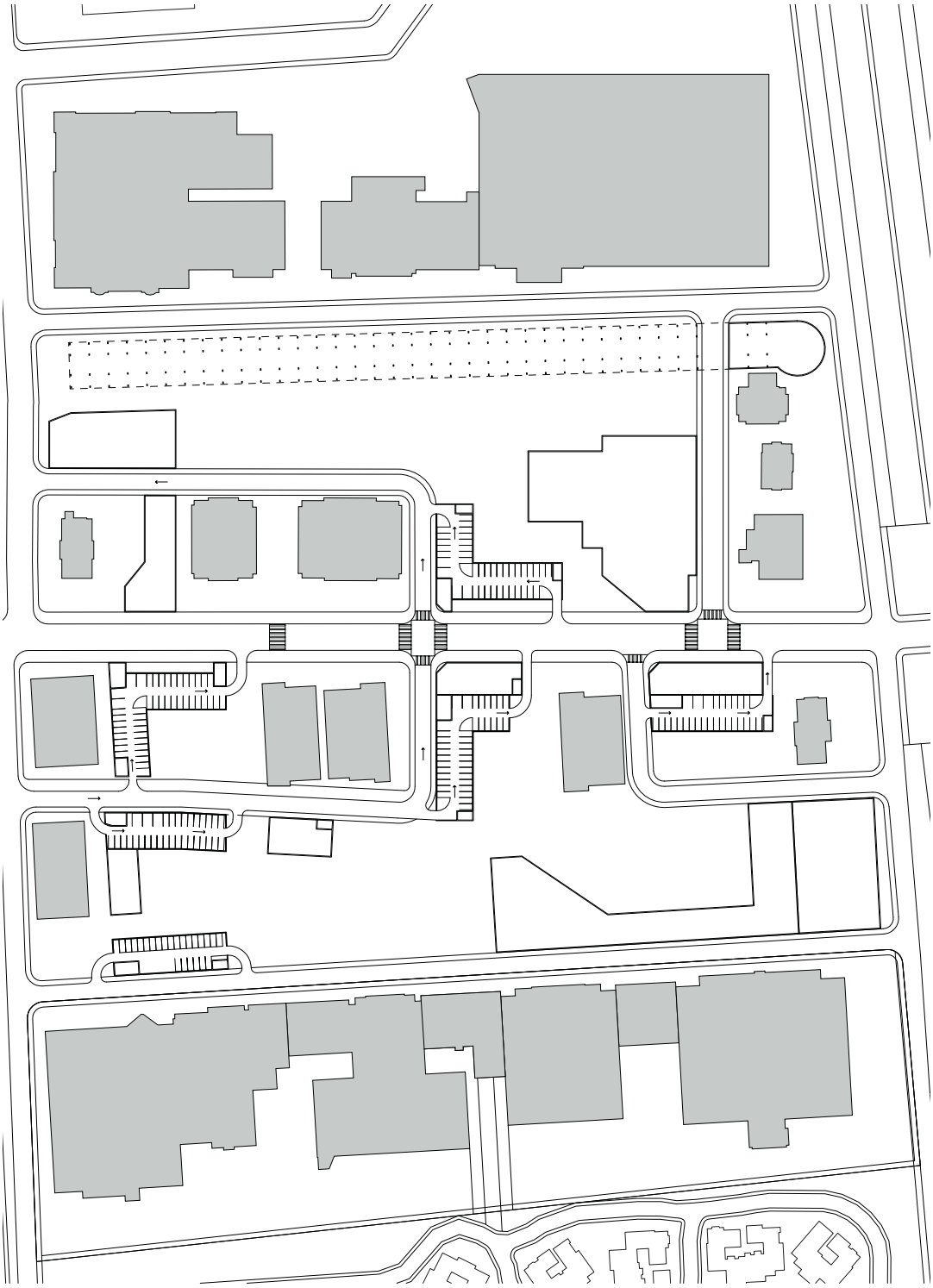


Fig. 6.5 *site plan—new buildings: ground level (1:2,500)*

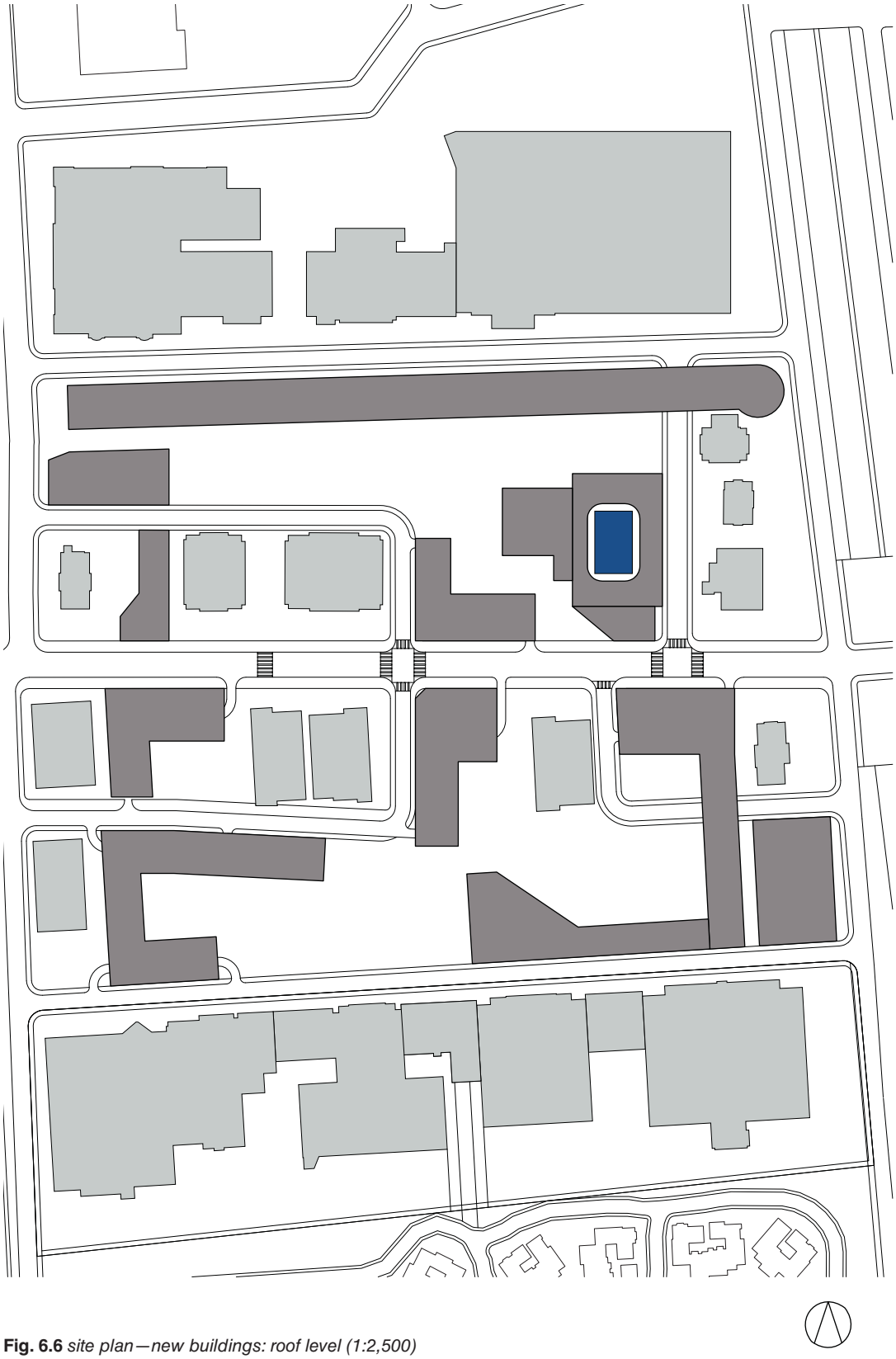


Fig. 6.6 *site plan—new buildings: roof level (1:2,500)*

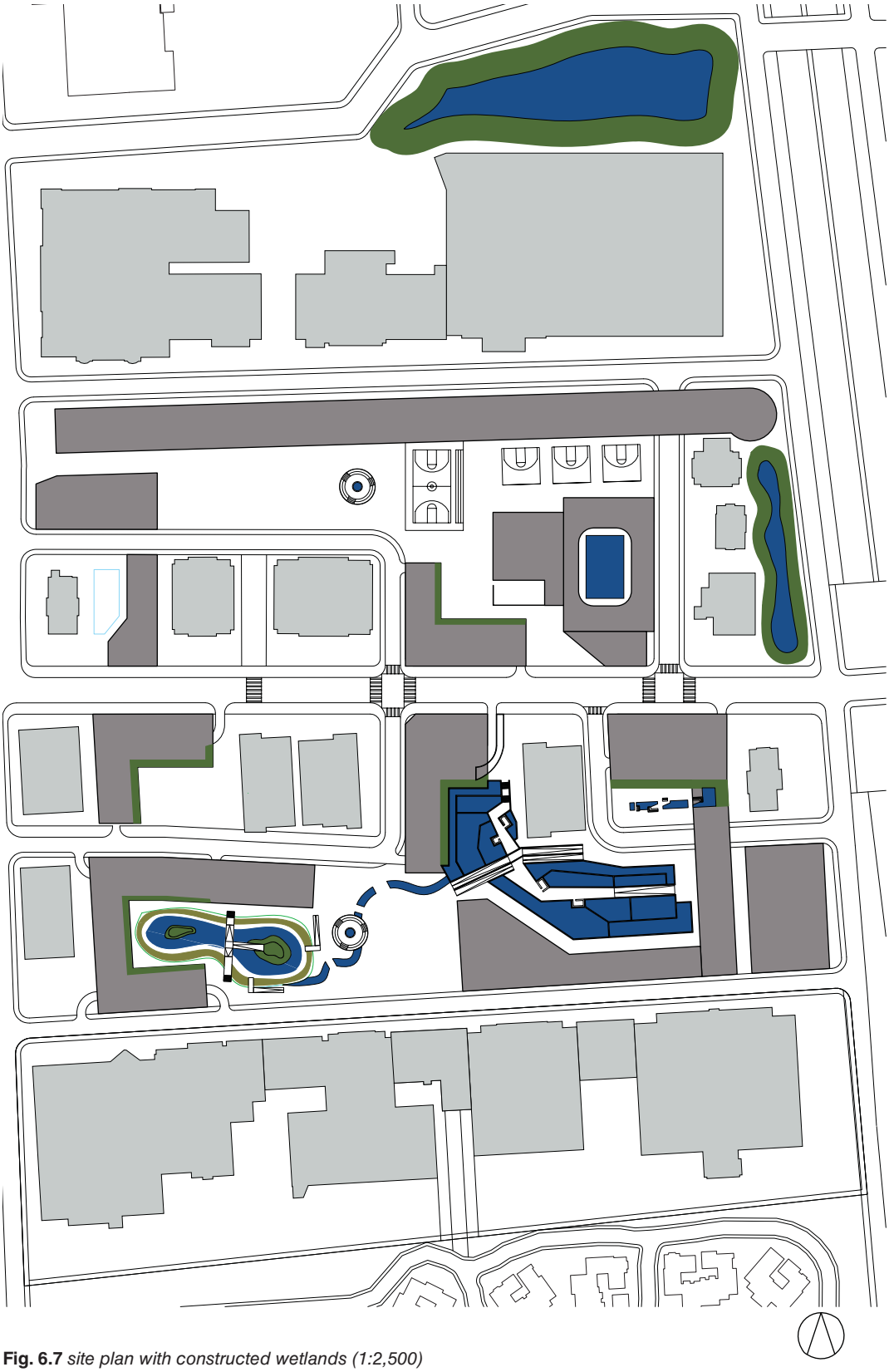


Fig. 6.7 *site plan with constructed wetlands (1:2,500)*

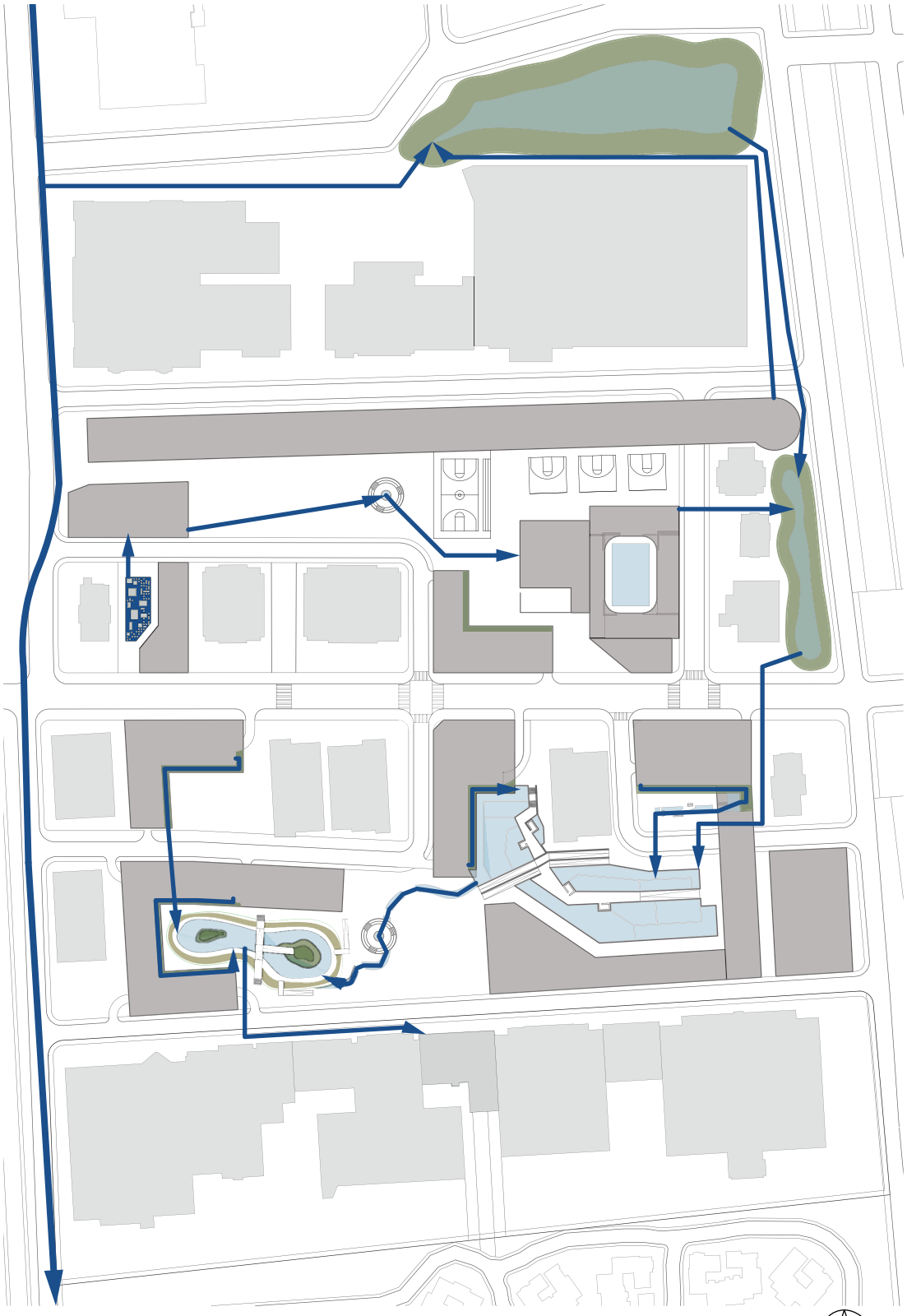


Fig. 6.8 *stormwater and greywater treatment schematic (1:2,500)*

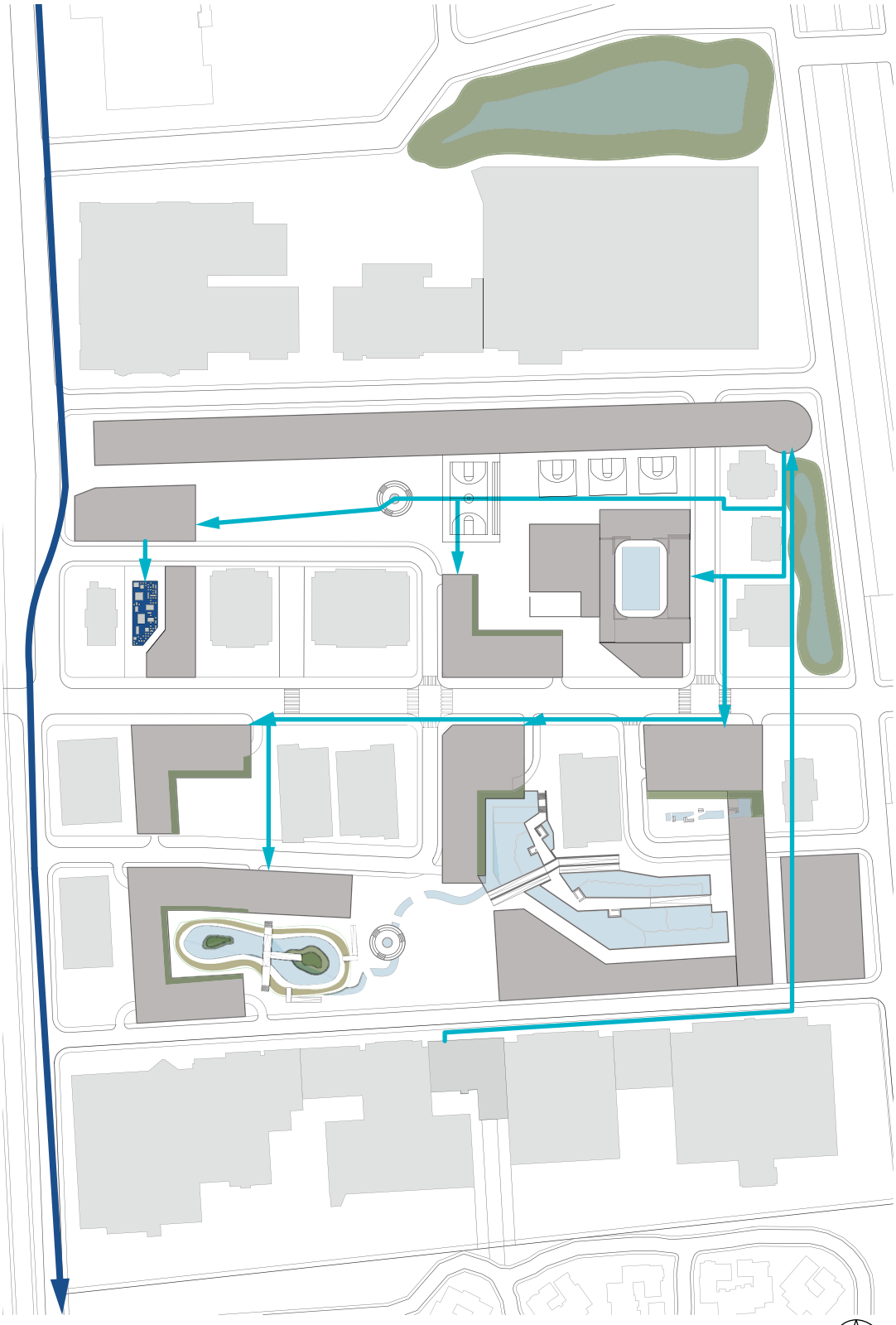


Fig. 6.9 *greywater supply schematic (1:2,500)*

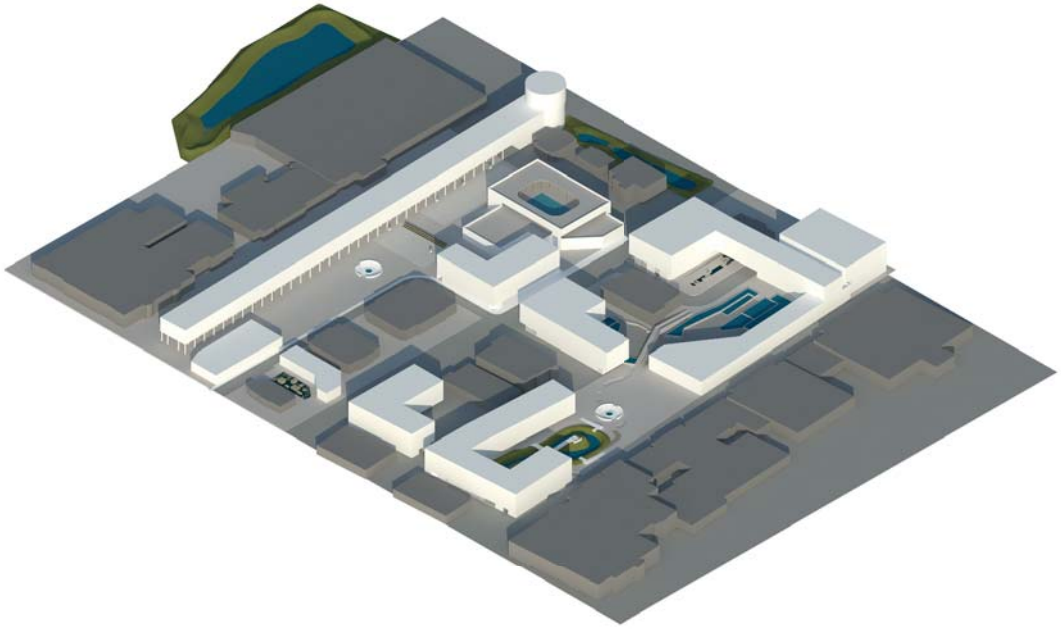


Fig. 6.10 *site isometric*

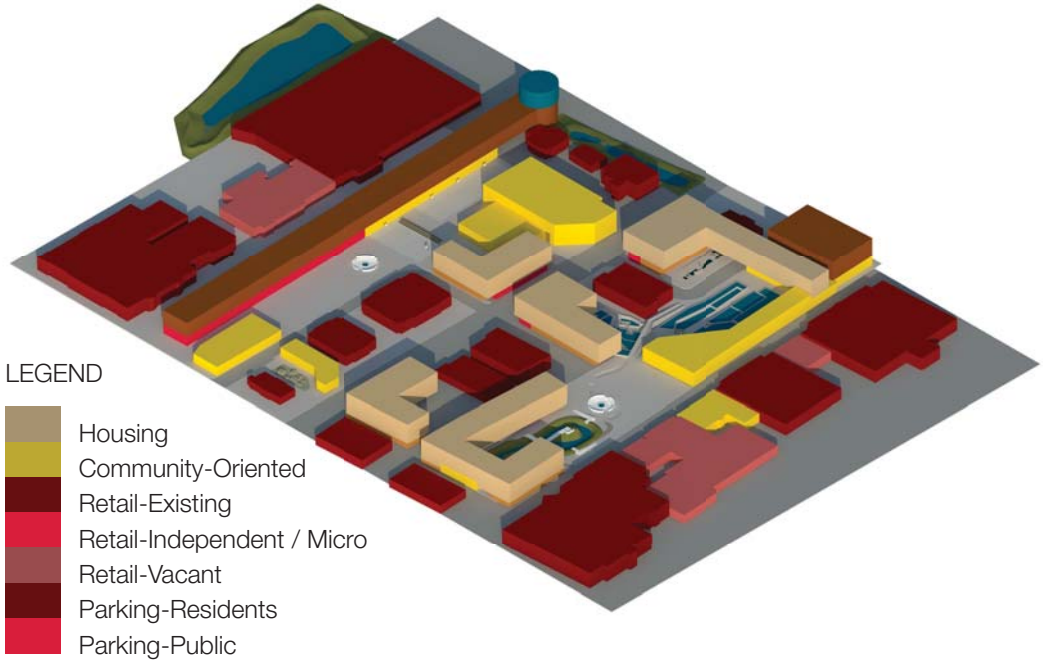


Fig. 6.11 *program distribution isometric*

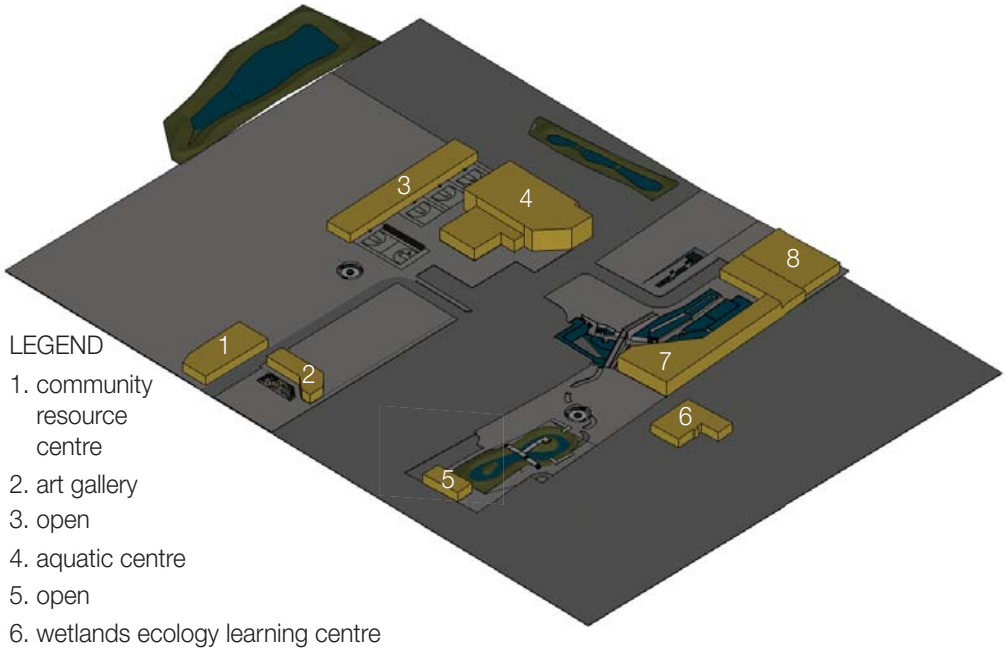


Fig. 6.12 *detailed program distribution isometric—community use*

Fig. 6.13 *art gallery sculpture courtyard rendering*

Fig. 6.14 *basketball court rendering*

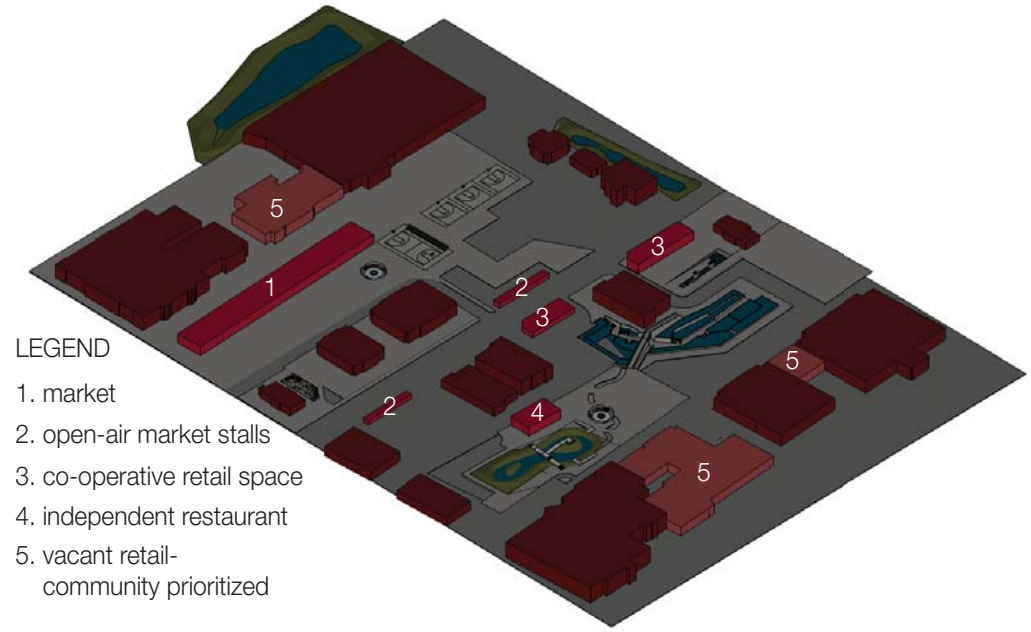


Fig. 6.15 *program distribution isometric—independent and micro-retail*

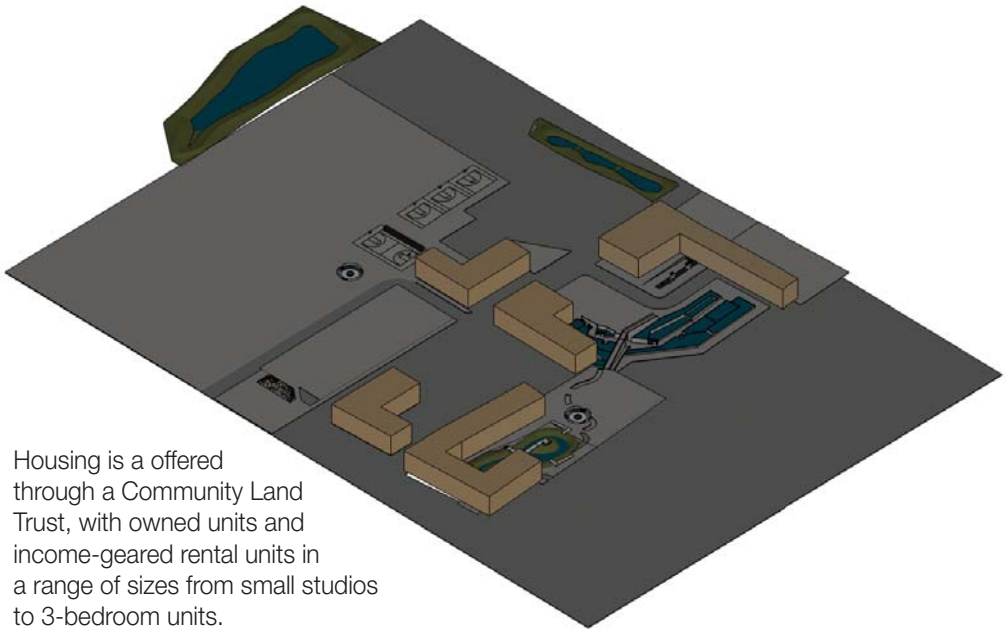


Fig. 6.16 *program distribution isometric—housing*

Fig. 6.17 *apartment courtyard rendering*

Fig. 6.18 *apartment terrace overlooking constructed wetlands rendering*

Fig. 6.19 *main plaza rendering*

Fig. 6.20 *terraced constructed wetlands rendering*

CONCLUSION

This thesis has investigated a range of contemporary crises—from water scarcity to spatial inequity—and the role neoliberal global capitalism has played in their production. Los Angeles has experienced these crises and felt many of their effects throughout its history. The current drought has called into question the availability of necessary water resources, and the evidence suggests that the city will have to deal with a substantial decline in the level of water supply in perpetuity. Demand, however, will continue to grow due to pressures from projected population growth, suggesting that water scarcity will be the 'new normal'. Radical and comprehensive conservation strategies will be needed to maximize the productivity of diminishing water supplies to support sustainable growth.

Transitioning from supply-side and demand-side approaches to a comprehensively sustainable water resource management paradigm is one example of the reparation of a metabolic rift generated by the top-down techno-scientific approach embedded within global capitalism. This is one of a vast array of environmental rifts that beset the world today. Additionally, the multitude of socio-economic rifts is an equally critical issue, but there has been an encouraging groundswell of protest, resistance and remedial action at all scales, from local to global. Uneven development is still a widespread and globally ubiquitous phenomenon, but the acceptance of the inevitability of this inequity and the unassailability of capitalism is diminishing. An array of discourses about the structural failures of capitalism and possible alternatives in a post-capitalist future has emerged. The right to the city, and a variety of community-based social justice initiatives related to this concept, are among the anti- and post-capitalist discourses pointing the way towards a more equitable and inclusive future. Resistance to the expansion of the territory of capitalism into all aspects of life and every corner of the biosphere is increasing, and the validity of property rights over fundamentals such as DNA is being called into question. This contestation of the absolute extension of private property rights is supported by an emerging alternative model of property rights, 'the Commons', as a third pillar of governance alongside capitalism and representative democracy. This governance philosophy posits that there are resources and territories over which there can be no justification for private, exclusive ownership, as they are 'owned' by all. While the grassroots resistance and critical discourse that have called capitalism into question are encouraging, the crises that are being addressed are

monumental. There is still a long way to go, but the inevitability and unassailability of capitalism can no longer be assumed.

The design proposal outlined in this thesis, *Compton Commons*, has engaged in this discourse through the inclusion of core concepts such as affordability, inclusivity, sustainable resource stewardship, and grassroots economic development in a mixed-use development that is meant to provide a foundation for community-building. The design philosophy represents a shift from a 'government' paradigm to a 'governance' model. Here, the community is the locus of agency and power—not global corporations or big government.

Compton Commons is not intended to be a comprehensive solution to the crises and issues investigated in this thesis, but an example of a community-based initiative that addresses the local manifestations of these issues. At a conceptual level, one could support this proposal and envision the multiple benefits it would offer. However, the impediments to implementation are numerous and substantial. The design proposal is predicated on the acquisition of a site that would cost approximately twenty to thirty million dollars ($20,000,000-$30,000,000) in up-front capital without the involvement of investors that would expect a significant return or major government funding that would underwrite the entire project. The fundraising strategies initiatives that could realize this project would be the topic of another major research project. Additionally, realizing this project would require a number of major zoning adjustments and the co-operation of local government and community groups. It is also likely that there are other impediments that have not been considered. However, if this proposal, like the multitude of others that seek to address the critical issues humanity is facing, can be realized, an ambitious and relentless strategy must be adopted. To paraphrase philosopher Slavoj Žižek, we must 'demand the impossible'[191], or pursue our necessary goals with the attitude outlined by John F. Kennedy in describing the mission to the moon:

> We choose to go to the moon, we choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too.[192]

[191] Slavoj Žižek, *Demanding the Impossible* (Cambridge, UK: Polity Press, 2013)
[192] Democratic Underground, John F. Kennedy,
http://www.democraticunderground.com/discuss/duboard.php?az=view_all&address=389x6431379

Addressing the vast array of global issues we face is a daunting task, but adopting the stance that the future is a work that we can author may empower necessary changes, regardless of the barriers and challenges in our path.

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