

# Forgotten Waters

Remembering and Reimagining Water in Los Angeles

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## ABSTRACT

Los Angeles is inextricably tied to water — the city's founding and expansion is famously attached to a series of water wars that continue on today for a number of reasons. LA imports 85% of its water through three major aqueducts, all of which are vulnerable to leaks, evaporation, and natural disaster. On the latter issue, reports state that there is a 75% chance one or more M7.0 or greater earthquakes will strike Southern California in the next thirty years. Because these aqueducts collectively cross the San Andreas fault 32 times, a major Earthquake would have catastrophic effects on LA's water supply. Yet most Angelenos are unaware of where their water comes from, paying most attention to this precious resource when historic droughts force residents to stop watering their lawns and water costs go up. And who could blame Angelenos for this disconnect when they rely on an elaborate state-run system to convey their water from hundreds of miles away? What can be done by individuals and communities to tackle this crisis and revitalize the city's local water supply?

By showing how LA's water became so vulnerable and reimagining where it's headed, my aim is reignite interest in water that already exists in LA, namely the Los Angeles River. As environmental reporter Emily Green said, "an important element of managing the local water supply involves maintaining a 'water ethic' so that people know where their water comes from." I believe nature-based, design, and arts driven initiatives can provide a pathway for individuals and communities to actively participate in this water ethic and directly address this crisis.

## INTRODUCTION

Los Angeles has a long, impressive, and contentious water history. The city's expansion was made possible by the incredible engineering that William Mulholland deployed to build the Los Angeles Aqueduct in 1913, which to this day, provides Los Angeles with a third of its water, largely by gravity alone. But that water travels hundreds of miles everyday, starting out as snowpack in the Sierra Nevada Mountains, melting into streams, making its way to Owens River, diverting to the Los Angeles Aqueduct, and then traveling 233 miles before it reaches drought-ridden Los Angeles. The impacts of that diversion have reverberated in ways LA's brazen water managers could not — or would not — foresee, with devastating ecological and cultural impacts. A once verdant farmland became an arid wasteland so that LA could grow into the metropolis that it is today.

But LA faces both water scarcity and seismic activity. The LA Aqueduct, along with the Colorado River and California Aqueducts supply LA with 85% of its water, and all are vulnerable to leaks, evaporation, and natural disaster. Collectively, the aqueducts cross the San Andreas fault 32 times and reports state that there is a 75% chance one or more M7.0 or greater earthquakes will strike Southern California in the next 30 years (Field et al., 2014). A serious seismic event would cause major infrastructure damage, water contamination, and supply chain issues.

Yet, given the significant history and severity of the issue today, most Angelenos are unaware of where their water comes from, paying most attention to this precious resource when historic droughts force residents to stop watering their lawns and water costs go up. And in reality, who could blame Angelenos for this disconnect when they rely on an elaborate state-run system to convey their water from hundreds of miles away? Or equally troubling, why should they care about LA's local waterways when the LA River — once the primary source of freshwater for the city — appears to merely be a concrete channel, blending in with the freeways and overpasses that run through the city.

By showing how LA became so vulnerable, what could happen if an Earthquake struck, and what can be done now, my aim is to spur interest in community resilience rather than short term disaster preparedness. Through a nature based lens, this thesis will explore how interactive design interfaces and public arts initiatives, can empower communities and individuals to become active participants in water conservation and stewardship. As environmental reporter Emily Green said, “an important element of managing the local water supply involves maintaining a ‘water ethic’ so that people know where their water comes from” (Frank, Maclaren, and Rothbard 2013). By bridging the gap between design, ecology, and community, I hope to contribute to this “water ethic” and the shift towards a more resilient water future for Los Angeles.

## PART ONE: REMEMBERING THE LOS ANGELES AQUEDUCT

### Early Water Management in Los Angeles

Los Angeles and the west as a whole, is a climate of extremes — long dry periods are often followed by deluges of water due to the Pacific high, a “bewildering and yet persistent meteorological phenomena” (Reisner 1993). A large zone of high pressure moves all the precipitation northward, until it begins to slip south towards Mexico in October, only to move back up the coast in March. In short, it doesn’t rain often, but when it does, it pours, and when it pours, it floods. In response, the history of the American West, California, and Los Angeles in particular, is defined by the insatiable need to tame the flow of water — by diverting it, stealing it, fighting over it, and capturing it for future use. “The whole state thrives, even survives, by moving water from where it is, and presumably isn’t needed, to where it isn’t, and presumably is needed. No other state has done as much to fructify its deserts, make over its flora and fauna, and rearrange the hydrology God gave it. No other place has put as many people where they probably have no business being. There is no place like it anywhere on earth” (Reisner 1993). California is home to thirty-nine million people, boasts the world’s fifth largest economy, and provides the rest of the country with one third of its table food, and yet none of it is “remotely conceivable within the preexisting natural order” (Reisner 1993). Los Angeles sits at the very center of this story, with its existence continuing on at the expense of a little known valley, over 200 miles away.

In the centuries before the Spanish missionaries arrived in the Los Angeles area, the Los Angeles River and its tributaries flowed over 500 square miles of largely flat floodplain, now covered by LA’s urban sprawl. For most of the year, the river was little more than a stream trickling through a wide sandy bed. But when the heavy winter storms arrived, that small stream would transform into a torrent, fed by waters rushing down from the mountains carrying gravel, silt, boulders, and trees. That debris deposited over centuries, created a layer of alluvial silt, resulting in an incredibly fertile farmland. An attractive place to settle, the valley was one of the most populous areas in pre-colonial North America, with no fewer than 45 Tongva villages located near the river’s banks (Di Palma and Robinson 2018).

All of that changed with the arrival of the Spanish and the founding of El Pueblo de la Reina de Los Ángeles in 1781. The colonizers immediately recognized the fertility the river provided as well as its potential for flooding. Between the city’s founding and the construction of the LA Aqueduct in 1913, the LA River provided the city with all of its fresh water through a series of ditches called *zanjas*. Miner and author John Shertzer Hittell wrote, “the *zanjas*, or irrigating ditches run through the town in every direction.” They “vary in size, but most of them have a body of water three feet wide, and a foot deep, running at a speed of five miles an hour. They

carry the water from the river to the gardens, and are absolutely necessary to secure the growth of the fences, vines, and many of the fruit trees” (Hittell 1863).

But as the city’s population began to climb, so did its water needs — from 1850 to 1900, the population grew from 1,600 to 100,000 and more than doubled every decade for the next fifty years. In 1858, former judge William C. Dryden founded the Los Angeles Water Works Company and built a 40-foot water wheel in the *zanja madre* (the mother ditch) and a brick reservoir, from which water was conveyed underground through wooden pipes to the homes of the wealthy. In 1868 the company was succeeded by the Los Angeles City Water Company, and over the next thirty years, a series of dams, reservoirs, waterwheels, and covered pipes were built. Meanwhile, the original dirt zanjás were lined with masonry, brick, and concrete. But this system almost drained the river dry, and by 1900, Los Angeles had all but abandoned the zanjás (Di Palma and Robinson 2018).

### **Conception and Construction of the Los Angeles Aqueduct**

Enter Fred Eaton and William Mulholland, a contradictory pair of self taught engineers who brazenly shaped the future of Los Angeles. In 1875, at the age of 19, well-to-do Fred Eaton became the superintendent of the Los Angeles City Water Company, where he hired William Mulholland, an Irish immigrant and former sailor. First working as a ditch digger, Mulholland rose the ranks to become the company’s Deputy Zanjero, the water distributor in charge of maintaining the *zanja madre*. When Eaton was elected City Engineer in 1886, his protege took over for him as superintendent. Later, when Eaton was elected LA’s mayor in 1898, he worked to transfer the Water Company over to city control, and in 1902 the Los Angeles Department of Water and Power (LADWP) was formed with Mulholland continuing in his role as superintendent (Weingarten 2015).

By that point, LA’s water situation was critical. The city sent engineers in all directions on a quest for water and Mulholland surveyed all of the rivers and groundwater basins south of Tehachapi, concluding that the groundwater was too limited. In 1904, while on a camping trip in the Sierra Nevada mountain range, Eaton took note of the gleaming snow caps, which melted into streams that fed the Owens River and eventually Owens Lake, which had recently become a dead end due to a volcanic eruption blocking off its southern flow. To him, it was a waste of water with endless potential. Yes, Los Angeles was more than 200 miles away, but it was all downhill. All one would have to do to transport the water to the city was dig some canals, lay some pipe, and let gravity do the rest. Knowing Mulholland was on the search for water, Eaton took him to Owens Valley with only “a mule team, a buckboard, and a demijohn of whiskey,” where Mulholland readily endorsed Eaton’s proposal to build an aqueduct (Wheeler 2002).

While Mulholland laid plans for this almost impossible feat of engineering, Eaton had quietly begun purchasing water options adjoining the river without revealing to the farmers and ranchers what he and Mulholland intended to do with them. All in all, he acquired the rights to more than 50 miles of riparian land. On March 22nd 1905, Mulholland reported to the Board of Water Commissioners that Owens River was the only viable source. Immediately after, Eaton proposed that the City of Los Angeles acquire from him whatever water rights and options he had been able to secure to further the project. By July 1905, the Los Angeles Times headline proclaimed “Titanic Project to Give City a River” (Hoffman 1977).

The aqueduct took six years to build, five thousand men (43 of them perished), and 23 million dollars. The job — completed on time and under budget — required 215 miles of road, 280 miles of pipeline, 142 tunnels, more than 1 million barrels of cement and 6 million pounds of dynamite (Sahagun and Van Der Brug 2013). Beginning 3.5 miles north of Blackrock in Inyo County, the aqueduct diverts the Owens River into an unlined canal to begin its 233 mile journey south to the Lower San Fernando Reservoir, later renamed the Lower Van Norman Reservoir. It was later expanded with the construction of the Mono Extension and the Second Los Angeles Aqueduct. An astounding engineering feat, the aqueduct uses gravity alone to convey 430 million gallons of water to Los Angeles daily.

While it was considered a triumph to the population of Los Angeles — which by the 1920s had passed the one million mark — the people of Owens Valley or Payahuunadü (as the indigenous Paiute know it), had quite literally been left in the dust. The construction of the aqueduct effectively eliminated the Owens Valley as a viable farming community and eventually devastated the Owens Lake ecosystem. A group labeled the “San Fernando Syndicate” — including Eaton, Mulholland, Harrison Otis (publisher of The Los Angeles Times), Henry Huntington (an executive of the Pacific Electric Railway), and other wealthy individuals — were made up of investors who bought land in the San Fernando Valley allegedly based on inside knowledge that the Los Angeles aqueduct would soon irrigate it and encourage development. By the 1920s, the aggressive pursuit of water rights and the diversion of the Owens River resulted in the outbreak of violence known as the California Water Wars.

In the early hours of Sunday, May 21, 1924, a group of Owens Valley residents bombed a stretch of the aqueduct near the town of Lone Pine. A furious Mulholland quickly dispatched detectives to uncover their plot. The local community, however, circled its wagons. “Every resident of the Owens Valley knows who did the dynamiting,” one of the investigators remarked, “but no one will tell” (Owens 2023). But by the end of 1926, after another round of buyouts, Los Angeles controlled 90% of the valley’s land and water and Owens Lake — which had spanned 110 square miles — had completely dried up. Uncowed, the resistance movement carried on its campaign: between 1924 and 1931 a local newspaper recorded 11 separate attacks on the aqueduct. Despite these skirmishes, the water wars eventually ended,

and Owens Valley became a desiccated landscape. By 1933, the City of Los Angeles had purchased 85% of the valley's residential and commercial property and 95% of the valley's farm and ranch land (Miller 2021).

### **Post 1950 Controversy and Legal Action**

In 1963 LADWP announced its plan to construct a second aqueduct from the Owens Valley to Los Angeles and by 1970, the project was completed. But what followed were decades of legal action between Owens Valley residents, environmental groups, and the Los Angeles Department of Water. It began in 1972, with a legal challenge over the second aqueduct using the newly passed California Environmental Quality Act (CEQA) and continued on throughout the decade (Stringfellow 2013). In the 1980s, air quality began to be monitored due to the formation of the Great Basin Unified Air Pollution Control District (GBUAPCD) which recorded PM-10 levels 100 times over allowable federal standard. It was quickly determined that the source was Owens Lake, the largest single source of PM-10 in the nation (U.S. Environmental Protection Agency 2012). The caustic mix of arsenic, cadmium, nickel, sulfates, salts, and other contaminants caused eye irritations, nosebleeds, and allergic reactions.

The blowing dust reached as far as the China Lake Naval Air Weapons Station, located 75 miles to the south, causing disruptions to ongoing tests. Officials from the U.S. Forest Service voiced concerns about its irritation to both visitors and staff. However, the most severe impacts were felt by the 40,000 residents of Owens Valley, primarily belonging to the Paiute-Shoshone Tribe. At Lone Pine Elementary School, many students relied on inhalers, and frequent thick dust clouds led to the entire student body being kept indoors during recess. This spike in dust levels also resulted in an increase in visits to local emergency rooms by patients suffering from asthma (Braxton Little 2024). In the 2012 Community Health Needs Assessment Report by the Southern Inyo Healthcare District in Lone Pine stated that 91.5% of cancer deaths in Inyo County resulted from lung cancer—compared to the national average of 52.6% (MJ Phillips & Associates 2012).

For a thousand years, the indigenous Paiute used a complex irrigation network to sustain themselves before settlers and cattle ranchers arrived in 1850, stealing and settling their land. To mitigate the effects of Los Angeles' appropriation of land and water resources on reservation environments in the Owens Valley, the Big Pine Paiute Tribe, Bishop Paiute Tribe, Lone Pine Paiute-Shoshone Reservation, and Utu Utu Gwaitu Paiute Tribe formed the Owens Valley Indian Water Commission in 1991. The Fort Independence Reservation became a member in 1992. Since its establishment, the Commission, in collaboration with its member Tribes, has endeavored to settle water rights issues concerning the exchanged lands through negotiations with the City of Los Angeles Department of Water and Power and other



stakeholders. Additionally, the Commission has partnered with Tribes in the Owens Valley and Eastern Sierra to safeguard environmental resources and reservation habitats.

In 2001, the LADWP began the Owens Lake Dust Mitigation Program, the largest dust mitigation program in the United States. Initially proposed to reduce airborne particulate matter across 48.6 square miles of the exposed dry lakebed, the program has become a collaboration with regional partners to meet goals for not only dust emissions, but also for managing habitat, protecting cultural and tribal resources, and using water efficiently (LADWP 2022).

In the past, Owens Lake served as a crucial rest stop for migrating waterfowl and shorebirds along the Pacific Flyway in the western United States. To comply with legal requirements for dust control, the LADWP initiated shallow flooding of the lakebed in 2001. Presently, LADWP annually disperses up to 95,000 acre-feet of water across specific sections of the lakebed. This flooding, covering an area of thirty-six square miles, has created a thriving marshland and shallow lake environment that attracts over 241 bird species, including some that are federally listed as threatened or endangered. However, the presence of these protected species poses a legal challenge for LADWP, as it is obligated to ensure the continued provision of healthy marsh and shallow lake habitats for the birds and other wildlife now dependent on the revitalized Owens Lake.

As of 2022, LADWP ratepayers have funded dust control measures at a cost in excess of \$2.5 billion. Dust is now 99.4% contained and emissions occur only during severe windstorms and other extreme weather events. Despite the high level of containment, the current plan requires LADWP to use a significant amount of water on dust control measures each year and may not be sustainable long term.

Over the past few years, California has witnessed the profound effects of climate change. The state endured the most severe drought and fire seasons on record, reaching a peak in the 2022 drought. Subsequently, 2023 brought one of the wettest years ever recorded. During the summer of 2023's "Great Melt," the historic Sierra snowpack melted rapidly, leading to the flooding of Owens Lake and its restoration to a full lake for the first time in a century. The swift snowmelt also caused extensive damage to roads in the Eastern Sierras and resulted in a breach in the LA Aqueduct near Owens Lake's shore. California's water and transportation infrastructure are ill-prepared for the rapid fluctuations in precipitation levels brought about by climate change.

The full extent of the damage done by the aqueduct can never be fully captured, and is a lesson in the unknowable ripple effects of disrupting the flow of water. This technological dominance over nature set the stage for the rest of Western U.S. and these systems are being tested in a critical moment.

## **PART TWO: REIMAGINING THE LOS ANGELES RIVER**

### **Los Angeles's Water Vulnerabilities**

The aqueduct didn't just have devastating ecological and cultural effects on Owens Valley. It also set the stage for the rest of the American west's water management, from the subsequent Colorado and California aqueducts to the Hoover Dam and Lake Powell. This network of dams, channels, and pipes is both infrastructurally and politically complex, but the central truth is that water demand exceeds supply. While climate change contributes to periods of intense drought and extreme fluctuations in weather, the system was flawed to begin with and now it's being tested in a critical moment. Water scarcity is not just the logical outcome of people living where they shouldn't, but it's also a failure of governance.

Instead of large-scale communal water governance — of which there are few examples — state and federal governments took a regulatory approach, issuing water rights to “individuals, companies, water utilities, electricity producers, irrigation districts, and other water users. The fatal flaw in this approach was that states issued far more water rights than the water flowing in their rivers. California, for example, has issued five times more rights than the mean volume of river water available. For the Colorado River, state regulators continued issuing more and more water rights even after the river had been almost completely drained by the mid-1950s” (Richter 2014).

While major cities are often the obvious place to point blame for overconsumption, urban and residential use only accounts for 10% of total water usage, while agricultural and environmental use accounts for the other 90%. Los Angeles, for example, has been a model water conservation city. Over the past 50 years, LA has been able to reduce its total water use by 23% even while its population grew by 43% (Richter 2014).

Despite this progress in the face of climate change, the aqueduct system still made Los Angeles vulnerable in a major way. LA is essentially an island. Its water supply travels hundreds of miles everyday along a few major channels and they are susceptible. All three aqueducts collectively cross the San Andreas fault 32 times. If an earthquake were to strike — and it's predicted that a large one will — our water supply would be cut off, resulting in a massive humanitarian crisis. The same can be said for the city's food supply, which travels on trucks from the Central Valley along the interstate 5 everyday.

### **From Flood Plain to Flood Control**

The focus then, must be turned back to local watersheds and rivers. In Los Angeles, the primary freshwater source is the Los Angeles River, which is a prime example of poor

governance and a lack of foresight. As mentioned previously, the Los Angeles river was prone to flooding, and as the city developed throughout the early 20th century — encroaching on the river's banks and its ever-changing course — these floods caused major damage and casualties. A year after the Los Angeles Aqueduct was completed in 1913, a major flood caught many by surprise, and perceptions of the river were forever changed. Already replaced as the primary source of water by the Los Angeles Aqueduct, the Los Angeles River was now understood to be dangerous — “an urgent problem requiring an immediate solution” (Di Palma and Robinson 2018).

Propelled by the technological triumph that was the LA Aqueduct, city engineers started drawing up plans to control the river. As one such engineer stated in 1915, “Land here is so valuable it is advisable to keep the right of way as narrow as possible”(Gumprecht 2001). The straw that finally broke the camel's back was the catastrophic flood of New Year's Eve 1934. It killed over 100 people, destroyed 198 homes, and caused millions of dollars in damage. In 1936 the U.S. Army Corps of Engineers was charged with overseeing flood mitigation projects across the nation, including in Los Angeles. Just two years later in 1938, another major flood hit — the most damaging in the river's history. A “solution” was found while the first reinforced concrete freeway in the nation was being constructed. The county had begun using the same material to channelize the adjacent Arroyo Seco creek and found that it withstood the raging waters.

Over the following two decades, the Army Corps systematically reshaped the Los Angeles River from a meandering, intermittent stream flanked by willows and cottonwoods into the concrete storm drain we observe today. Trees were uprooted from the banks, the riverbed was excavated and lined with concrete, and its course was straightened. Historian Blake Gumprecht notes that “A single drop of rain falling high in the San Gabriel Mountains can now reach the sea in less than sixty minutes.” This transformation stands as a prime example of human intervention prevailing over nature, culminating in the creation of Los Angeles's idealized vision of a river: a “water freeway.” The irony of celebrating the swift drainage of water to the ocean in a region prone to drought was not recognized at the time by either the military engineers or the public (Di Palma and Robinson 2018).

The project was completed in 1970, but by the 80s and 90s, a grassroots movement began to reconnect Angelenos to the river. In 1985, poet and activist, Lewis MacAdams along with the sculptor and architect Pat Patterson, the gallery owner Roger Wong, and the architect Frederick Fisher, cut a hole through the chain-link fence bordering the river and trespassed onto its bed. In 1986, MacAdams founded FoLAR, Friends of the Los Angeles River. Through poetry, performance, and art, FoLAR fought for the river's restoration. The grass-roots group remained small and little-known until 1989, when its opposition to a proposal to use the concrete bed to relieve congestion captured the attention of the public. “Membership surged, articles about the

river appeared in local and national newspapers, and politicians began paying attention” (Di Palma and Robinson 2018).

That same year, the Donald C. Tillman Water Reclamation Plant commenced operations in Van Nuys. While other facilities had already been discharging treated wastewater, the Tillman Plant notably augmented the flow into the river by an extra 20 million gallons per day, effectively doubling the water volume. Surprisingly, the introduction of this wastewater fostered a lush riverside environment, motivating locals to engage in activities such as walking, biking, birdwatching, horseback riding, and even kayaking and canoeing.

By the late 90s and early 2000s, a renewed interest in the river had been stirred, through a combination of grassroots efforts, major news articles, book releases and more. Throughout the country, the LA River became known as a site for environmental and civic activism. One such act of civil disobedience happened in 2008 when a group of kayakers, led by writer George Wolfe and Corps employee Heather Wylie, organized an expedition down the Los Angeles River. The journey aimed to showcase the navigability of the river and challenge the perception that it was merely a concrete channel. The expedition garnered significant attention from the media and the public, highlighting the river’s recreational potential. By demonstrating that the river was navigable in certain sections, the expedition provided evidence to support legal arguments regarding its navigability under federal law.

Legally, establishing navigability is crucial because it determines whether a waterway is subject to federal jurisdiction and protection under laws such as the Clean Water Act and the Rivers and Harbors Act. The kayaking expedition contributed to the assertion that the Los Angeles River met the criteria for federal protection by demonstrating its capability to support recreational use, despite being channelized and altered for flood control purposes. This legal recognition has implications for the management, conservation, and recreational opportunities of the river under federal law.

Ultimately, the kayaking expedition played a pivotal role in advancing the legal recognition of the Los Angeles River as a navigable waterway. By challenging perceptions and providing tangible evidence of its navigability, the expedition contributed to efforts to protect and enhance the ecological health, recreational value, and overall welfare of the river.

## **Revitalization Efforts**

This is one of many events that led to official efforts towards revitalization, with a series of master plans starting in 1996 by LA County, the City of LA in 2007, the LA River Ecosystem Restoration Feasibility Study (also known as the ARBOR Study) in 2015, the Lower LA River

Working Group in 2018, the Upper LA River and Tributaries Working Group in 2019, and the latest approved master plan in 2022.

But these plans have been marred by controversy, from famed architect Frank Gehry's participation to stalled implementation and funding. If anything, the tension surrounding these plans stems from various — often competing — but legitimate concerns. Issues like gentrification and displacement, environmental impact versus development, and community engagement and representation have been brought to the table by various advocacy groups.

Before the latest plan was approved by the board of supervisors, several environmental groups sent a letter withdrawing their support, including East Yards Communities for Environmental Justice, Friends of the LA River, Heal the Bay, LA Waterkeeper, Los Angeles Neighborhood Land Trust, Trust for Public Land, Sacred Places Institute for Indigenous Peoples, and The Nature Conservancy in California. They noted in part the lack of any representation in the planning process of Gabrielino Tongva tribal members. But they also objected to the inclusion of features such as elevated parks built on concrete platforms. Laura Cortez, an organizer and co-executive director at East Yard Communities for Environmental Justice, says the plan ignores their input by laying down more concrete. Cortez and other community advocates would like to see more of a "naturalization" of the river. "Prioritizing native plants, prioritizing the idea of letting the natural river flow, those are the types of things that are not extraordinary," Cortez said. "They are not out of reach, but they are definitely needed" (Ujjiye and Perez 2022).

Additionally, conservation groups LA Waterkeeper (as previously mentioned) and the Center for Biological Diversity filed a lawsuit against the county over a faulty environmental review process in the plan. The petition points out that while the Master Plan is intended to provide a roadmap for development along the LA River, it "provides little to no guidance about the details or priorities of some vaguely described projects. Under the California Environmental Quality Act, an environmental review can only be successfully completed if the project being evaluated is well defined and all foreseeable environmental impacts from planned future projects are assessed" ("LA County Sued Over Faulty Environmental Review Process for Los Angeles River Master Plan" 2022).

"The Master Plan attempts to have it both ways by claiming a wide variety of projects and approaches could be pursued along the river, and then also concluding that specific projects that have yet to be fully defined will have less than significant environmental impacts," said Benjamin Harris, a staff attorney with LA Waterkeeper. "That's simply not allowed under our state's environmental laws. A thorough analysis of proposed projects must be conducted now based on the information available" ("LA County Sued Over Faulty Environmental Review Process for Los Angeles River Master Plan" 2022).

A key aim of the Act is to facilitate sufficient public involvement, ensuring that the community is well-informed about the project's effects and has the chance to offer feedback on them. The lawsuit contends that the county conducted an inadequate planning process for the Master Plan and neglected to offer substantial responses to comments from state agencies concerning potential project impacts, as mandated by the Act.

Much of the response is to the continued use and addition of more concrete to build platform parks along the river. “We need to make sure we have a plan for the river that truly serves all Angelenos, and particularly frontline communities with little access to parks or other natural areas,” said Bruce Reznik, LA Waterkeeper’s executive director. “The plan approved by the county simply doesn’t have enough information for the public to understand how it will harm and benefit different areas” (“LA County Sued Over Faulty Environmental Review Process for Los Angeles River Master Plan” 2022).

Indeed, the debate over whether concrete can and should be removed from the river continues. Environmental groups say the master plan asserts, without evidence, that concrete removal would be infeasible for the vast majority of the LA River due to flood and displacement impacts. A study commissioned by Friends of the LA River indicates nature-based solutions are possible in many areas along the 51-mile river channel and could reduce flood risk and provide greater ecological, public health and climate resiliency benefits than those a channelized river can offer. “The river is central to building community connection to nature and to protecting the rich biodiversity that exists within our region,” said Elizabeth Reid-Wainscoat, a campaigner at the Center for Biological Diversity. “These benefits only exist if we value it as a river and don’t treat it as a ditch to build over” (“LA County Sued Over Faulty Environmental Review Process for Los Angeles River Master Plan” 2022).

While the controversy over the master plan continues, other independent projects along the river have begun to take hold, continuing a legacy of bridging art and activism to address critical environmental issues.

### **Art, Technology, Activism: Tools for Environmental Resilience**

As previously outlined, the official efforts towards river revitalization have been met with mixed reviews, from outright scrutiny to excitement about the river’s potential. Either way, many of the proposed projects have remained in bureaucratic limbo. While there’s a push for some of the outlined initiatives to move forward in lieu of the 2028 Olympics being held in LA, the master plan actually has no legal jurisdiction over land use, and no authority to implement its recommendations. Decisions about what happens along the lower river corridor must be made by the county and the 14 cities that border it.

While the county, stakeholders, design partners and advocacy groups continue to debate the right course of action, smaller organizations, design studios, non-profits, and labs have established themselves along the river, creating a network for independent exploration, experimentation, and alternative strategies towards reimagining the river. Four of these groups include Clockshop, the Los Angeles River Integrated Design Lab (LA-RIDL), Friends of the Los Angeles River (FoLAR) and Metabolic Studio. Concentrated in the 11 mile stretch of the river known as the Glendale Narrows, these initiatives are just a few of the many sites along the 51 mile river worth exploring. But they are highlighted for their success in bridging art, design, technology, and activism.

### **Clockshop and the Bowtie**

Clockshop is a multidisciplinary arts organization located in Los Angeles, California. Founded in 2004 by Julia Meltzer and David Thorne, Clockshop brings together contemporary art, historical inquiry, and community engagement. The organization operates within a historical bow-truss building in the Frogtown neighborhood.

The organization hosts a variety of programs, including exhibitions, performances, screenings, discussions, and public art projects. They often collaborate with artists, writers, historians, and other cultural practitioners to explore themes related to urbanism, ecology, social justice, and the history of Los Angeles. “Clockshop works with artists to deepen the connection between communities and public land, in order to build a shared vision of a future based in belonging and care...we address the climate crisis as a cultural problem that requires equitable cultural solutions. Through long-term collaborations with artists, like-minded partners, and local stakeholders, Clockshop promotes ecological stewardship and climate resilience among the communities we serve.” Their projects often center working-class communities of color in Los Angeles, as they are most affected by the development and gentrification along the river.

In addition to its artistic endeavors, Clockshop is also working to help transform the Bowtie, 18 acres of undeveloped industrial land along the LA River in Northeast LA. Located within Taylor Yard, formerly the Southern Pacific Railroad headquarters, the Bowtie represents a relic of the area's industrial history. After the cessation of rail operations, local residents advocated for repurposing 100 acres of this post-industrial terrain into green space. In 2003, California State Parks acquired the Bowtie property alongside the land for Rio de Los Angeles State Park, which opened in 2007. However, the Bowtie lay dormant for over a decade until Clockshop collaborated with California State Parks from 2014 to 2020 to activate the space with art and cultural programs. This initiative attracted thousands of visitors and set the stage for its conversion into a public state park.

During 2021 and 2022, California State Parks and Clockshop initiated a community engagement process, collecting feedback from more than 2000 residents to influence the conceptual design for the Bowtie. This ground-up backing proved instrumental in obtaining a \$5 million grant via the federal Outdoor Recreation Legacy Partnership program in May 2022, signifying a noteworthy advancement in the park's progress. Construction for a 2.5-acre segment is scheduled to begin in 2024, with the entire 18-acre park expected to be finalized by 2026 or 2027.

### **The Los Angeles River Integrated Design Lab**

The Los Angeles River Integrated Design Lab (LA-RIDL), directed by Associate Professor Alexander Robinson at the USC School of Architecture, is a research laboratory focused on achieving inclusive, nature-based outcomes for the LA River and similar climate-stressed infrastructure. Embracing a transdisciplinary approach, LA-RIDL innovates both infrastructure design and engagement practices, blending artistic expression, technical expertise, and community inclusivity.

As one of the flagship initiatives within the Landscape Architecture + Urbanism program, LA-RIDL aims to revolutionize the conception and implementation of infrastructure by fostering inclusivity and imaginative multifunctionality. Through its research, the lab explores and applies innovative infrastructure design methodologies that integrate community engagement, landscape architecture, and engineering principles.

Collaborating with experts from USC Viterbi School of Engineering, USC Cinematic Arts, USC Institute of Creative Technologies, USC Dornsife Public Exchange, City of Los Angeles Bureau of Engineering, and the United States Army Corps of Engineers, LA-RIDL is currently developing a 60-foot-long hydraulic model of the LA River. Equipped with a custom augmented reality (AR) community design interface, it simulates flood events and to engage stakeholders, students, residents and more in the design process. Additionally, LA-RIDL is pioneering advanced instrumentation and data collection through the LA River Observatory (LARO) project, which will enhance river management and serve as a platform for community outreach and education.

### **Friends of the Los Angeles River**

Friends of the Los Angeles River (FoLAR) is a non-profit organization dedicated to the protection, restoration, and revitalization of the Los Angeles River. Founded in 1986 by poet and activist Lewis MacAdams, FoLAR has played a pivotal role in raising awareness about the ecological and cultural significance of the LA River and advocating for its transformation into a



thriving urban waterway. Its roots are tied to his artistic expression and acts of civil disobedience.

At its core, FoLAR seeks to reconnect communities with the river, fostering a sense of stewardship and appreciation for this vital natural resource. Through a combination of advocacy, education, and hands-on restoration projects, the organization works to promote the health and well-being of the LA River ecosystem while advocating for policies that prioritize environmental sustainability and public access.

Currently, FoLAR is engaged in several key initiatives aimed at enhancing the ecological integrity and recreational potential of the LA River. This includes ongoing efforts to remove concrete channeling and restore natural habitats along the riverbanks, as well as advocating for the creation of green spaces, parks, and bike paths that will make the river more accessible to local residents. Additionally, FoLAR organizes educational programs, volunteer clean-up events, and community workshops.

### **Metabolic Studio: Bending the River**

Metabolic Studio is an interdisciplinary art and research hub overseen by environmental artist Lauren Bon. Its mission is to tackle critical social and environmental issues through art interventions and innovative projects geared toward reparative action. Rooted in Sherrie Rabinowitz's belief that “artists must create on a scale equivalent to society's capacity to destroy,” Metabolic Studio aims to bridge art, science, and activism to offer creative solutions and alternative perspectives on pressing social and environmental challenges, focusing particularly on water, land use, and energy issues.

Since its inception in 2005 with the transformative *Not A Cornfield* project, which regenerated a vacant industrial site into a living sculpture of corn, Metabolic Studio has been reimagining relationships between humans, non-humans, and living systems.

Currently, the studio is engaged in *Bending the River*, an adaptive reuse of the LA River infrastructure, aiming to reconnect historically flooded land with water from the Los Angeles River. This project, powered by solar energy, redirects water through an underground network of pipes to provide irrigation for the Los Angeles State Historic Park, occupying the former site of *Not A Cornfield*. The initiative is informed by dialogue with diverse stakeholders, including artists, indigenous communities, activists, local residents, and numerous governmental bodies necessary for its realization. With over 75 permits secured across various governmental jurisdictions, including the first private water right in Los Angeles, *Bending the River* will operate entirely off-grid, relying on solar power, gravity, and reclaimed floodplain.

The current state of the LA River, a concrete-lined flood control channel constructed in the 1930s, serves primarily to transport wastewater out to sea. Through the principles of adaptive reuse, the project diverts a portion of the river's water, elevating it to the Metabolic Studio for treatment in a native wetland system before redistribution to local parks, notably the adjacent 52-acre LA State Historic Park.

## **PART THREE: THE VISUALIZATION**

The history of the Los Angeles Aqueduct and the Los Angeles River has been told many times over and in many forms — through film, art, official city documentation and more. Yet most Angelenos are unaware of the ongoing relationship between LA and Owens Valley as well as what the LA River can offer them as residents. The task then, was to tell a complex story in relatively simple visual terms so that almost any Angeleno could grasp the overall narrative. Future iterations of the project would include a Spanish version to appropriately serve the Los Angeles community.

The storytelling microsite is divided into two parts, which is reflected in the initial split screen layout. The first part is about remembering where LA's water comes from, while the second highlights those reimagining where it's headed. But before the history of the aqueduct can be introduced, some basic information is provided to set the stage, including where LA gets its water and how far it travels.

To begin the historical context of why LA's water travels so far, a slider visual shows just how fast LA's population was growing at the turn of the 20th century. To balance the historical context provided, the introduction to Owens Valley is first framed by a satellite graphic explaining how the water cycle and diversion works. A timeline is then provided to complete part one.

Part two begins with one of LA's major water vulnerabilities. A map shows where the San Andreas fault crosses all of the aqueducts, essentially rendering LA an island unto itself. It shows how the city is just one major earthquake away from being severed from 86% of its water. This reality serves as a catalyst to turn attention towards local water, namely the Los Angeles River.

Repeating the split screen slider effect, one can see the river before and after it was paved, showing why many in Los Angeles do not perceive the river as a river. To conclude part two and the site as a whole, a map plots various active projects along the river that specifically combine art, technology and activism to better connect Angelenos with the river. By clicking on

a marker, an image of the selected initiative appears, with graphics highlighting the work being done at the site, and the possible futures for the river that these projects are working towards.

Heavily relying on accessible data visualizations, maps, historical photographs, and color schemes, the site is also arguing for an idea expressed by dutch map maker and information designer Joost Grootens, whose work and style heavily inspired this work: "it is a misconception to assume that something complex should look complicated."

## CONCLUSION

The story of Los Angeles' water history, from the audacious engineering feats of William Mulholland to the contentious battles over resource allocation and environmental justice, serves as a stark reminder of the complexities and vulnerabilities inherent in our relationship with water. It underscores the urgent need for innovative solutions that not only address immediate challenges but also foster long-term resilience and sustainability.

In the face of climate change, seismic risks, and increasing water scarcity, traditional approaches to water management are proving inadequate. The centralized, infrastructure-intensive systems that have sustained cities like Los Angeles for decades are now vulnerable to disruption and failure. This vulnerability extends beyond physical infrastructure to encompass broader environmental, social, and economic impacts, affecting communities and ecosystems alike.

Amidst these challenges, there is a growing recognition of the role that art and design can play in environmental activism and resilience. By engaging communities, fostering dialogue, and reimagining our relationship with water, art and design offer powerful tools for addressing complex environmental issues. They have the capacity to inspire, educate, and mobilize individuals and communities, fostering a deeper understanding of the interconnectedness of human and ecological systems.

Through initiatives like *Bending the River* and grassroots movements like Friends of the Los Angeles River, artists, activists, and community organizers are leveraging the power of creativity to catalyze change. By reframing narratives, challenging perceptions, and advocating for inclusive, nature-based solutions, they are reshaping the way we think about and interact with our environment.

In the words of Emily Green, "an important element of managing the local water supply involves maintaining a 'water ethic' so that people know where their water comes from." By bridging the gap between ecology, community, and design, we can cultivate this water ethic

and foster a deeper sense of stewardship and responsibility for our shared resources. In doing so, we can pave the way towards a more resilient and sustainable water future for Los Angeles and beyond.

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