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Mapping Racial Injustice

The Future of Density

Scenario Planning in a Pandemic

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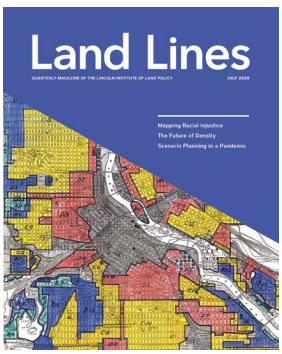


In the 1930s, color-coded maps of U.S. cities including Minneapolis determined lending guidelines based primarily on race. Credit: Mapping Inequality.

PRESIDENT'S MESSAGE GEORGE W. McCARTHY

Think Land Policy Is Unrelated to Racial Injustice? Think Again.

IN THE DEPTHS of the Great Depression, with the housing market in shambles and roughly half of America's home mortgages in default, the U.S. Congress stepped in to provide massive emergency relief. From 1933 to 1936, the Home Owners' Loan Corporation (HOLC) refinanced more than $3 billion in mortgages—equivalent to roughly $1 trillion as a share of the economy today. The HOLC pioneered the self-amortizing mortgage, allowing people to own their homes outright in 25 years.

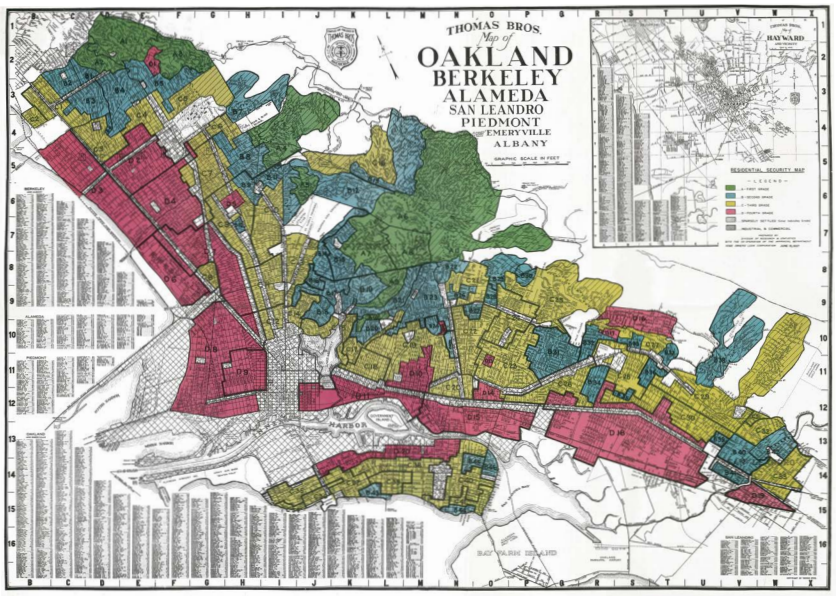
To offer additional opportunities for homeownership, the National Housing Act of 1934 created the Federal Housing Administration (FHA), which insured new mortgages and made them more widely available. By the 1940s, millions of families had purchased or retained homes using the two programs. Thus, out of the ashes of the Great Depression, the great American middle class was born. But the government did not extend new opportunities to all.

In their frenzied attempt to save the U.S. economy, New Dealers had to navigate difficult political waters. Deficit hawks, nativists, and racists in Congress opposed any programs that risked increasing the federal debt or offering "handouts" to immigrants or people of color. For no particularly good reason, fiscal prudence also dictated that public lending must minimize financial risk. Mortgages could only be extended to those with the best prospects of repaying or possessing collateral that would maintain its value. HOLC agents traveled the country, meeting with local real estate and banking professionals to determine where and to whom home refinancing would be offered.

Secret color-coded maps of the nation's cities, discovered by historian Kenneth Jackson in the 1970s, guided the HOLC's lending decisions. Red indicated "hazardous" neighborhoods where lending was discouraged, while green indicated the "best" places; yellow and blue were in between. Neighborhoods that were home to high proportions of people of color or Eastern or Southern European immigrants were always shaded red, regardless of the quality of the homes or the local economy. For its part, the FHA explicitly focused on the racial composition of neighborhoods to estimate home values.

According to Jackson, the HOLC and FHA "devised a rating system that undervalued neighborhoods that were dense, mixed, or aging" and "applied [existing] notions of ethnic and racial worth to real-estate appraising on an unprecedented scale." These policies denied people access to government-backed loans, and to the wealth-generating power of homeownership. They deepened the racial and economic divides that have been the subject of recent demonstrations in cities around the world.

Those demonstrations were triggered by the homicide of George Floyd at the hands of police. But this tragedy rekindled longstanding outrage at decades of increasing inequality and repeated episodes of racial injustice. The racist policies that emerged from the Great Depression were not adequately addressed by federal remedies of the later 20th century, including desegregation of schools, the Civil Rights Act, the Fair Housing Act, the Community Reinvestment Act (CRA), and dozens of precedent-setting court decisions and executive orders. Once the scales of equality are tipped, simply promising equal treatment under the law cannot equilibrate the system. Weakly affirmative efforts to improve lending practices like the CRA also were not enough.



After the Great Depression, the Home Owners' Loan Corporation commissioned maps to rate lending risks in neighborhoods across the country. The zones, largely based on race, would dictate health and economic outcomes for decades. Credit: Mapping Inequality.

Even as governments enacted these laws to address discrimination, they were engaged in urban renewal, which actively accelerated the decline of non-white communities made ready for "redevelopment" through decades of disinvestment. Using eminent domain, local governments snatched up the homes and businesses of Black and immigrant communities at rock-bottom prices, replacing them with commercial development or homes for wealthier families. Displaced residents were left to seek shelter in segregated markets or in poorly managed public housing units. Decades later, social scientists beginning with Oscar Lewis blamed them for deteriorating life outcomes based on the theoretical "culture of poverty" that they absorbed and transmitted across generations.

In Minneapolis, where George Floyd took his last breaths, 29 percent of the people displaced by urban renewal between 1950 and 1966 were families of color, though they represented 3 percent of the city's population. In Glynn County, Georgia, where Ahmaud Arbery was killed by a former police officer and his son while jogging, 93 percent of the households displaced by urban renewal were families of color although they made up only one-third of the population.

Urban renewal flowed into the largest infrastructure project of the century, with similar results. To carve paths through our cities for the U.S. interstate highway system, the government used eminent domain once again to divide and destroy thriving Black neighborhoods. In one sense, it was hard to argue with planners' logic: *you build roads where land is cheap.* But why was land cheap in these neighborhoods? Was it truly cheaper than alternative routes? In Minneapolis–St. Paul, federal planners and local officials decided in the 1950s to drive I-94 through the heart of Rondo, the social, cultural, and historic center of the area's Black and immigrant communities, rather than use a nearby abandoned rail corridor. The project displaced 600 Black families and shuttered 300 businesses. Dozens of cross streets were turned into cul-de-sacs, denying children direct access to their schools, and parishioners their churches.

In dozens of other cities, new interstates gutted thriving communities or physically segregated them from the economic mainstream. Highways cleaved two of the oldest Black neighborhoods in the country, Treme in New Orleans and Overtown in Miami. In the latter, some 10,000 homes, predominantly owned by people of color, were taken and demolished. In the former, planners and activists are now advocating for the demolition of that section of I-10, with the goal of restoring Claiborne Avenue as a commercial corridor.

How did leaders decide to raze and rebuild neighborhoods or push highways through our cities? The HOLC maps eerily presaged, and almost certainly contributed to, these planning decisions. The maps continue to reflect enduring patterns of racial and economic segregation in today's cities. Need to build affordable housing? Look no further than a red HOLC neighborhood to find the places where lives and land are still undervalued.

Contemporary pundits puzzle over disparate mortality rates from COVID-19, which indicate that Black Americans are 2.4 times more likely to die from the disease than white Americans. Many explain it away by citing underlying health conditions or lack of access to health care. But the truth is far more complex, and land policy is unquestionably part of the equation. Life expectancy between "hazardous" HOLC neighborhoods and more affluent suburbs varies by as much as 20 years. The tenfold gap in net worth of the typical white family and the typical Black family is directly attributable to the homeownership gap initiated by the FHA. The collision of these data points is not a coincidence.

In popular accounts, the New Deal is credited with saving capitalism. The federal government stepped up with unprecedented domestic spending, doubling national debt between 1933 and 1936. Although racism wasn't invented during that recovery, the resulting agencies and laws formalized a new, covert form of discrimination. We saw similarly disturbing trends in the response to the Great Recession, when the federal government saved the global financial system by pumping trillions of dollars of liquidity into investment banks, insurance companies, and other public entities, but stood by idly as the wealth of communities of color evaporated. According to the Pew Research Center, from 2005 to 2009, median wealth fell by 66 percent among Hispanic households and 53 percent among Black households, compared with just 16 percent among white households.

As the world faces the arduous task of recovering from another history-making economic depression, the policies we enact can only succeed if they address systemic racism formalized by past policy makers. We cannot settle for narrowly delimited responses to current events and forget that the roots of unacceptably disparate life circumstances and future prospects are deeply embedded in land policy. We cannot make the same mistakes we made in the 1930s—allowing the urgency of the moment to give cover to policies that maintain racial discrimination—nor can we take actions like we did in the Great Recession, prioritizing the wealth and survival of corporations over communities.

Today's threats require the same bold commitment of resources that brought us out of the Great Depression and the Great Recession. But this moment requires something else: creativity, perseverance, and the discipline to think beyond expedient solutions that leave people and places behind.

Leading economists expect it will take a decade to achieve a full economic recovery. To get there, we need unprecedented coordination among all levels of government, as well as increased engagement with new and existing coalitions of civic leaders. We need leaders who remediate bad behavior at all levels of government and geography. Policy makers need to use the powers of planning and the preemptive legal power of higher levels of government to remedy spatial inequality and social isolation by overriding exclusionary local zoning or deploying tools like eminent domain to acquire land in high opportunity areas for affordable housing. They need to invest in new infrastructure and amenities in the old "hazardous" neighborhoods to turn them into neighborhoods of choice. And they must work with the private sector to employ local residents and not displace them as they reinvest in their neighborhoods. All of our actions must be aggressively affirmative to redress decades of covert and overt discrimination.

The coming months and years will not be easy, but if we can learn from the past—and commit to a shared vision of a more equitable and sustainable future—we just might emerge a more just society, better able to meet the next crisis that threatens to further divide us.

Data Companies Track Our Pandemic Patterns

NUMINA, A TECH STARTUP based in Brooklyn, New York, uses purpose-built sensors to gather data on pedestrian and bicyclist behavior, offering urban planners, policy makers, and mobility-focused businesses granular, anonymized information that can help shape new projects and tweak existing streetscape designs. While Numina has always focused on walkers and cyclists, its technology is proving useful for evaluating one behavior that wasn't on anybody's data-point wish list a year ago: social distancing.

It's a modest but compelling example of how technology can help us see cities in different ways—and how the aftermath of the COVID-19 pandemic could shift the dialogue about the role of big data in planning and urban land use.

At the center of Numina's service is a camera-like device designed to be installed using existing infrastructure, such as utility poles. The device collects video that's run through Numina's software, which distinguishes among cyclists, walkers, cars, buses, dogs, and other moving objects, then sorts the resulting data. Since its system was prototyped in St. Louis in 2015, with support from a Knight Foundation grant, Numina has focused on what it calls "curb-level activity"—gauging the impact of a specific traffic-calming project, for example, and thus complementing higher-level data such as the Census Bureau's American Community Survey.

In March, as social distancing and lockdown orders were issued in response to the spread of the novel coronavirus in the United States, Numina already had sensors in place that were positioned to capture data demonstrating changes in actual urban travel behavior. Sensors in Golden Gate Park in San Francisco, for instance, tallied a massive shift from cars to bikes. And in New York, fascinating time-lapse video—with pedestrians and vehicles represented by colored boxes—showed the difficulty of keeping a six-foot distance from other people on a particular corner. Even with pedestrian traffic radically decreased from pre-lockdown levels in Manhattan, some walkers circled out into the street to avoid others. "Our data shows that New Yorkers are doing their best with #socialdistancing," Numina tweeted. "But this snapshot from Saturday shows how difficult it can be, given limited sidewalk space."

Time-lapse video gathered by Numina's sensors reveals social distancing patterns on the streets of New York City. Credit: Numina/@numina.

These data points added to a public discussion in multiple cities about closing streets to give walkers and cyclists more space to move safely. Numina CEO Tara Pham says the firm has been fielding an "unprecedented" number of inquiries from cities grappling with those issues. "Cities need new kinds of data to monitor social distancing behaviors, crowd density in public spaces, and adoption of new initiatives," she says. "They are not planning for temporary interventions, but 18- or 24-month changes, or possibly permanent [changes]." That means the urgency of the pandemic may spark a new openness to using such data—sweeping sets, collected in almost real time via various technologies—as a more prominent planning tool.

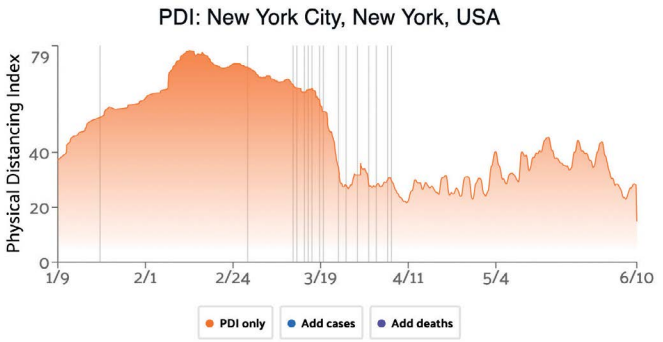
"Cities have embraced a variety of 19th and 20th century modalities for understanding places and people: interviews, surveys, focus groups," says Justin Hollander, a professor of urban and environmental policy and planning at Tufts University. Often those methods have served planners well, he continues. But they also have flaws and limitations. In recent years, even planners with no technical expertise have increasingly been able to access data "to understand what's going on in our communities in ways that weren't possible before."

Hollander addressed the potential for using data sets culled from social media and other sources in his 2016 book *Urban Social Listening* (supported in part by the Lincoln Institute). "Things have exploded since then," he says—and that sense has only increased since the pandemic hit.

Another example of how our current crisis has surfaced existing data sets in new ways: Google's recent release of Community Mobility Reports. As the company explained in a public statement, health officials trying to gauge the policy impact on individual movements needed to contain the virus could benefit from "the same type of aggregated, anonymized insights we use in products such as Google Maps." If you use Google Maps, you know, for instance, that it can tell you when a restaurant or other business is busiest; that's because many users (whether they realize it or not) have given the wildly popular app permission to track their movements. This creates the kind of massive data trove that can make Maps so helpful to its users.

And that means it's also helpful to health officials (and really, to anyone) interested in knowing, down to the county level, the degree to which people are moving around. For instance, the Community Mobility Report for the Louisiana parish where I live shows me that in mid-April, people were visiting retail locations 62 percent less than they had been a month earlier. The *New York Times* has worked with mobile phone companies to create similar data visualizations.

Part of a Google Community Mobility Report for Maricopa County, where the Lincoln Institute's Phoenix office is located, showing changes in activity this spring. Credit: Google and the Google logo are registered trademarks of Google LLC, used with permission.



By analyzing video streams and using computer vision modeling, Voxel51 has created a Physical Distancing Index for several major cities around the world, illustrating the impact of the novel coronavirus on human behavior in real time. Credit: EarthCam/Voxel51.

Other projects abound. Computer vision startup Voxel51 analyzes live video streams of dense urban streets around the world to create a "physical distancing index" that, according to the company, "captures the average amount of human activity and social distancing behaviors in major cities over time." Automated technology developed by Zensors, a firm with roots in Carnegie Mellon University's Human-Computer Interaction Institute, is being used to analyze the feeds of available CCTV cameras to study social-distancing behavior.

While each of these entities, large and small, insists the data it collects is anonymized and non-invasive, some of this is bound to raise privacy concerns. Those concerns are real, and need to be dealt with seriously to maintain public trust. But over time, the creative and productive deployment of big data may result in a new receptiveness among policy makers to using data for planning—not only for near-term pandemic recovery efforts, but for longer-term projects and approaches.

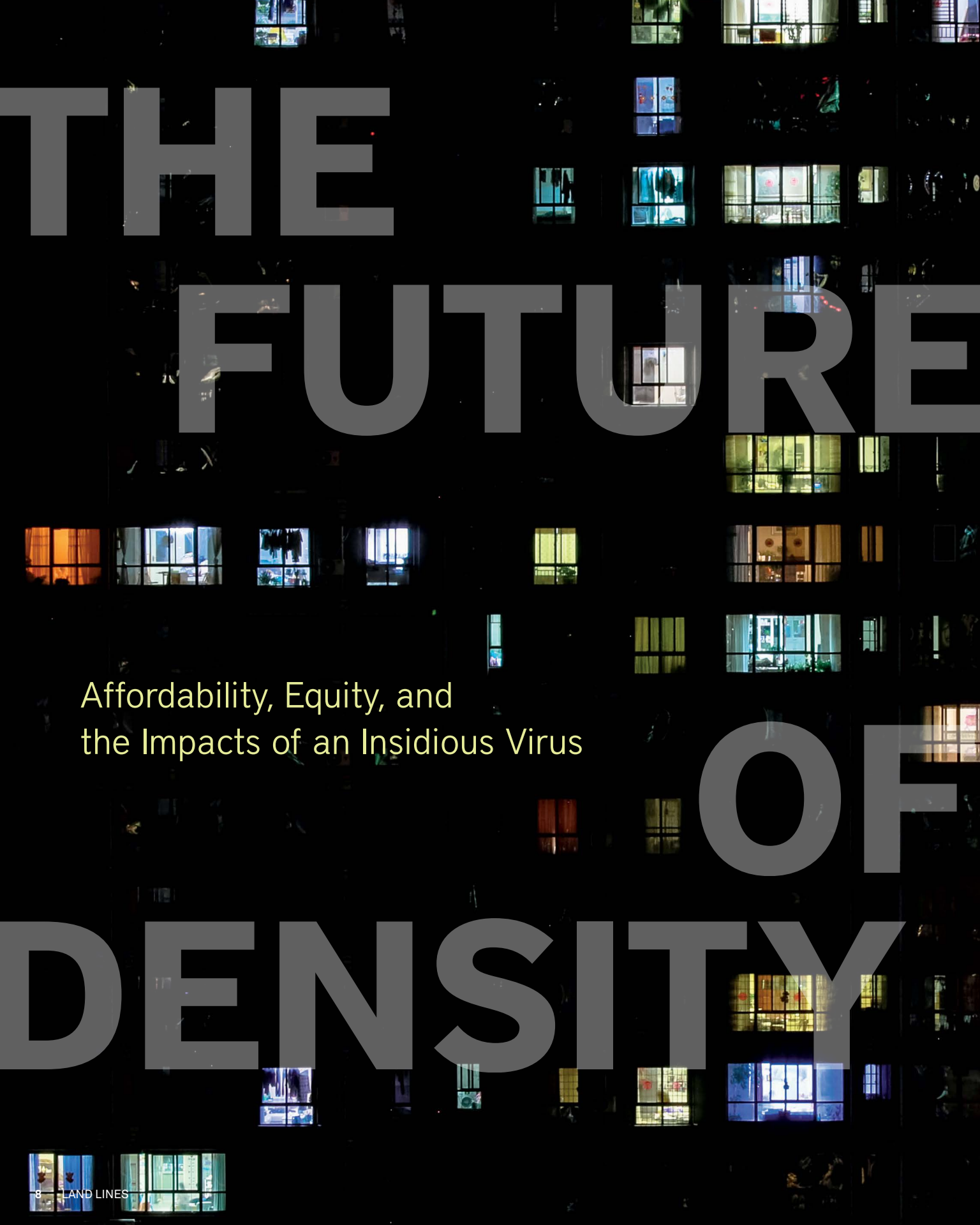
Hollander recounts a recurring critique of data-driven planning efforts as lacking "the human touch." But the key is that these new sources don't replace traditional human input—they just make planners less reliant on it. And ultimately, that could lead to more inclusive planning. After all, plenty of city residents don't want to answer survey or focus group questions, let alone attend community meetings. Their voices and insights are thus lost, and that can skew feedback outcomes.

"This new treasure trove of insight is going to fundamentally rework our understanding of human society," Hollander says. "And it's going to continue to play a really important role in shaping urban planning."

What if neutral data could suggest different answers to, say, where that new bridge should go, or which buildings to target for preservation? Answers based not on selective feedback, but on evidence that is already being collected by tech companies? These coronavirus-era efforts are just the latest example of something that's been underway for years. "You can really get a good handle on where people are, and where they're going," Hollander says. "The data's there."

"This new treasure trove of insight is going to fundamentally rework our understanding of human society," Hollander says. "And it's going to continue to play a really important role in shaping urban planning."

Rob Walker is a journalist covering design, technology, and other subjects, and is the author of *The Art of Noticing*.



THE FUTURE OF DENSITY

Affordability, Equity, and the Impacts of an Insidious Virus

By Anthony Flint

AS CITIES AROUND the world begin the slow and careful work of recovering from the initial wave of devastation caused by the novel coronavirus, their quest for resilience hinges on one characteristic that has long been a foundational asset: density.

The ravages of the last six months—500,000 lives lost and counting, record unemployment, bankruptcies, trillions of losses in assets and tax revenue—have hit cities particularly hard. The crisis threatens the building blocks of a functioning urban economy: residents and businesses located downtown, transit systems that serve them, thriving colleges and universities, and amenities and services including restaurants, retail, sports, and entertainment.

Given that more than half of the world's population lives and works in urban areas—a number that is expected to increase to 68 percent by 2050—the recovery of urban areas is of vital importance.

Historically, cities have responded to disease and disaster with affirmative measures: first responders and building codes after great fires, water and sewer infrastructure prompted by cholera, or tightened security to guard against international terrorism. This time around, amid social distancing requirements and concerns about contagion, density has been in the spotlight, with skeptics in media and policy circles questioning its merits and advocates quickly rising to its defense.

A closer look at the realities of this virus and the way it has spread makes it clear that density itself is not the cause of collective pain. Density defines cities; it's what makes them work. The more significant factors powering the pandemic—and the issues cities urgently need to address—are overcrowding, lack of affordability, and economic and racial disparities.

THE MANAGEMENT OF the pandemic has several components, including testing, contact tracing, treatments, and ultimately, the world hopes, a vaccine. In the meantime, the public health protocols of social distancing—a minimum six-foot buffer between people—rely on reducing proximity. That can be achieved by, for example, limiting the number of people in a workplace, elevator, or subway car, or on a college campus, at any one time; drawing circles in a park to delineate safe distance between visitors; or letting a restaurant spill into the street for more space between tables.

In that sense, density is just one more thing that needs to be managed. But a closer look raises myriad questions about whether cities can function economically and socially with reduced proximity—let alone navigate a recovery that makes cities more sustainable and equitable. The pandemic has highlighted extensive economic and racial disparities, and the recent worldwide wave of protests over police brutality and structural racism further underscores how much work remains.

As the pandemic surged, the world saw wealthy city-dwellers decamp to second homes or hunker down in larger apartments, but lower-income workers in service jobs—disproportionately in communities of color—could not work from home and could not afford not to work. If their jobs didn't vanish, they risked higher exposure to infection, and if they got sick, their often-crowded living conditions—necessitated in part by the high costs of housing—made self-isolation more difficult.

As the author Jay Pitter wrote when the coronavirus began sweeping across North America this spring, there are different kinds of density at issue. There exists, she noted, a "dominant density . . . designed by and for

Credit: Afton Almaraz via Getty Images.

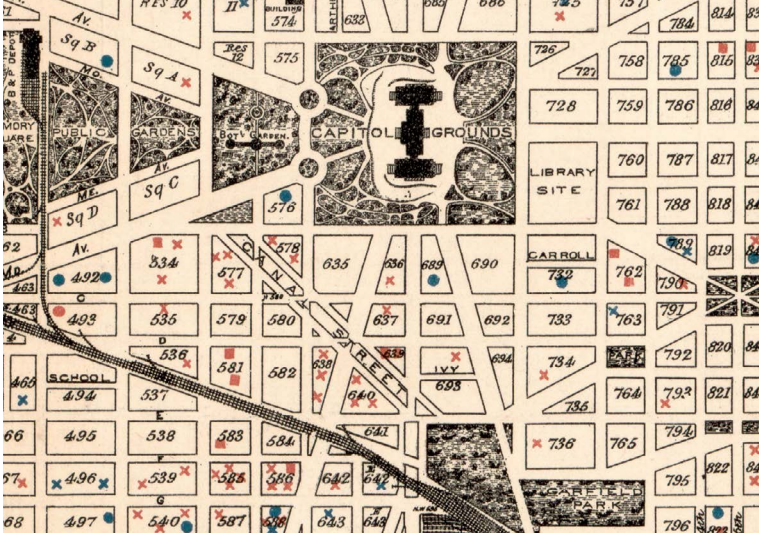
predominately white, middle-class urban dwellers living in high-priced condominiums within or adjacent to the city's downtown core," and "forgotten densities" that include those in the periphery: "favelas, shanty towns, factory dormitories, seniors' homes, tent cities, Indigenous reserves, prisons, mobile home parks, shelters and public housing" (Pitter 2020).

So while taking over parking spaces and making other changes to the public realm may be salutary short-term fixes, says Amy Cotter, director of climate strategies at the Lincoln Institute, "it won't even begin to be sufficient. We're going to need policies that do double- or even triple-duty," addressing structural issues in housing, transportation, and the environment, to realize an equitable and sustainable recovery for the four billion-plus urban residents worldwide.

IN THE 19TH CENTURY, the global rise of diseases such as cholera and yellow fever led to new design practices and systems intended to keep people healthier, in part by giving them more space (Klein 2020). Formerly cramped and dirty cities introduced wide boulevards, water and sewer infrastructure, and public parks that served as the "lungs of the city," a concept embraced by Frederick Law Olmsted, whose landscape designs include New York's Central Park and the Emerald Necklace in Boston.

Such improvements were inarguably positive, but some came with economic and social consequences, intended or otherwise. To execute the cholera-inspired widening and straightening of Paris streets, for example, authorities razed lower-income neighborhoods. They also smoothed the way for the military to conduct surveillance and suppress potential rebellions, notes Sara Jensen Carr, an assistant professor of architecture, urbanism, and landscape at Northeastern University who wrote the forthcoming book *The Topography of Wellness: Health and the American Urban Landscape*.

In the early 20th century, separated-use zoning in the United States was driven in large part by public health concerns in congested



Officials have long tracked the connections between density and contagion, as illustrated by this 1894 map of Washington, DC, which indicates fatal cases of malaria, typhoid, scarlet fever, and other infectious diseases. Credit: Library of Congress, Geography and Map Division.

urban areas—that a tannery shouldn't be allowed to be sited next to tenement houses, for example. Arguably, that change in land use rules ended up reinforcing racist housing policies and enabling suburban sprawl. The redrawing of zoning maps extended to the racial segregation of residential areas, and set the foundation for federally imposed redlining in the wake of the Great Depression. The separation of uses is the basis for far-flung, low-density suburban development generally, following World War II.

Striving for more "light and air" in cities, the modernist pioneer Le Corbusier proposed clearing out the cluttered section of central Paris and replacing it with towers in parks. The United States embraced the idea in the era of urban renewal, building housing in windswept plazas and bulldozing the urban fabric—often houses and businesses in communities of color—to make way for extensive parking facilities and destructive freeways.

The history of urban interventions in response to crises underscores the need for policy makers and planners to be more thoughtful about what problem they are actually trying to solve, and what impacts and ripple effects the fixes could have. That means understanding more about how the coronavirus is actually spread, across all human settlement.

THE SCIENTIFIC LITERATURE supports the broad supposition that infectious disease spreads more easily in densely populated urban environments, whether the plague or the Spanish flu of 1918. "Scholars have argued that virtually all human infectious diseases due to microorganisms arose out of the emergence of urbanism," writes Michael Hooper, professor at Harvard University's Graduate School of Design. The association of density and disease, he notes, became known as the "urban penalty" (Hooper 2020).

But epidemiologists say that airborne infectious disease spreads at a more fine-grained level, such as in crowded churches, military barracks, or homes shared by large families—a significant narrowing of scale from the city as a whole. The drivers of the spread of the coronavirus are close contact in crowded indoor spaces, with the duration of time spent together another factor, says Muge Cevik, an infectious disease specialist at the University of St. Andrews. "There is a strong correlation between indoor crowding and pandemic hotspots, especially in packed cities for sure. But the same pattern is also reflected in nursing homes or meatpacking plants," she says. Indeed, the virus has torn through rural areas with comparable force, fueled by flareups in factories or prisons and, as an analysis by the *Wall Street Journal* shows, exacerbated by crowded family housing. This has all happened far from any urban center (Thebault 2020, Lovett 2020).

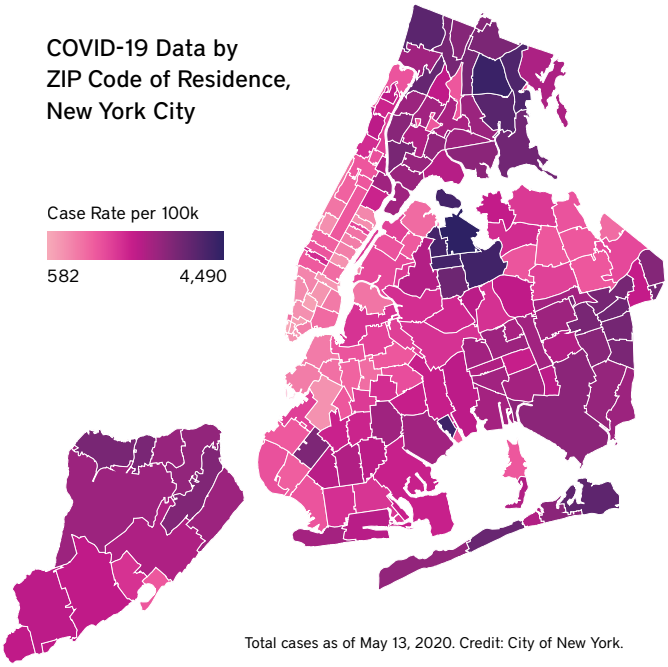
One recent study found that COVID-19 death rates were higher in low-density counties, in part due to differences in access to health care (Hamidi 2020). Early data suggest that even within cities, for every apartment complex like the one dubbed the "death tower" in the Bronx, there's a relatively low-density neighborhood that has been hit just as hard (Freytas-Tamura 2020). Several devastated New York neighborhoods, like Elmhurst, Borough Park, and Corona, have a high population density, measured as people per square mile, without sufficient housing density, as measured by units per acre, says Julie Campoli, principal at Terra Firma Urban Design in Burlington, Vermont. "In other words, larger households living in small spaces," Campoli says. "For the low-income residents in affected areas of Queens and Brooklyn, sharing tight quarters is the only affordable option in a city with very high rents."

"For the low-income residents in affected areas of Queens and Brooklyn, sharing tight quarters is the only affordable option in a city with very high rents."

NEW POLICIES AND PRACTICES to confront the coronavirus, whether incremental measures or more revolutionary change, will be informed by nuanced analysis of what's actually happening on the ground, in the spread of the disease.

It's a matter of following the string back to why there is a greater concentration of people living in the same household, says Yonah Freemark, a doctoral candidate in urban studies at MIT and founder of The Transport Politic blog.

Data suggest the spread of COVID-19 has far more to do with overcrowding in indoor spaces than with neighborhood density. Credit: Joey Cheung via iStock.



Total cases as of May 13, 2020. Credit: City of New York.

"Any sort of condition where you see crowding for any period of time seems to be a vector of this disease, and that can be people living closer together. People are more likely to be crowded because housing is expensive," he says. "If we had more density and more housing for people, we would have less crowding within the units and people could afford to be in larger units."

Many other systemic problems have made residents in poorer urban neighborhoods more susceptible to this disease, ranging from a lack of adequate health insurance to a legacy of environmental injustice. A study by Harvard's T.H. Chan School of Public Health found that communities with higher levels of fine particulate matter—air pollution from nearby power plants or highways—have recorded more deaths from the coronavirus (Wu 2020).

Confronting all of those issues, which were intensifying long before the current pandemic set in, may seem as daunting as a massive overhaul of society. But when it comes to housing, at least, advocates suggest that now is the time to begin to address the inequities and lack of affordability the pandemic has so starkly revealed.

Many states have put a hold on evictions and instituted other tenant protections, not only for residents but also for small businesses and nonprofits (Howard 2020). Those policies could become a more permanent safety net. California passed an initiative to allow the most vulnerable and homeless populations to safely isolate in vacant hotel rooms. Oakland Mayor Libby Schaaf has suggested seizing the moment to keep that policy in place, providing safer and more secure shelter than temporary encampments.

Campoli, who wrote *Made for Walking: Density and Neighborhood Form* (Campoli 2012) and coauthored *Visualizing Density* (Campoli 2007), echoes the idea that the need to address affordability is more pressing than ever. "A long-term solution to fighting the spread of pathogens in cities is to make housing a right," she says. "Investing in affordable housing and implementing policies that ensure everyone has a home to shelter in will help cities achieve density without the overcrowding and homelessness that bring suffering and spread disease."

New approaches in the design of multifamily housing should also play a role in urban recovery, Campoli says. "Experimenting with temporary installations for social distancing makes sense, but when it comes to expensive investments like buildings and public spaces, let's make changes that add value well beyond the immediate crisis," she says. Campoli suggests that multifamily housing should increasingly include features such as carefully designed outdoor spaces, better ventilation systems, flexible partitions that enable privacy, and even touchless doors and handwashing stations in public rooms.

Policy makers will have to be creative and work with what's feasible. State and local budgets are piling up record deficits, just when added services are most needed. The economic downturn triggered by the pandemic will almost certainly slow down real estate development, which could lead to a decrease, at least temporarily, in such market-based solutions as inclusionary housing. Privately built multifamily housing below the luxury level, with its lower profit margins, may get put on hold.

Yet local governments might be able to take advantage of the massive reshuffling in urban real estate that is already underway, according to the Lincoln Institute's Martim Smolka, a senior fellow who is advising cities in Latin America on their response to the pandemic. That means special attention to land policy, regulations, and financing mechanisms related to urban development and land markets.

Office space in central business districts, with busy elevators, shared bathrooms, and scarce parking, will likely be abandoned in favor of properties in lower-density residential zones at the urban periphery, Smolka says. Less space will be needed as more employees work remotely more often (Seay 2020). An appropriate intervention might be to acquire the now lower-valued office buildings and convert them to affordable housing—and to charge development rights for those areas that require a zoning change from residential to commercial.

Trading places in this manner would present new opportunities to reenvision metropolitan areas in terms of housing and labor markets. Large metropolitan areas might see increases in density in suburban areas, in what urban planners refer to as the polycentric model: multiple urban villages across a larger area (Zeljic 2020). "That could actually increase economic efficiency and social equity, due to lower mobility costs and flatter land price gradients," Smolka says.

Similarly, looking at recovery in a larger, more regional framework—the New York–Boston corridor, for example—opens up possibilities for smaller legacy cities to play a more prominent role across a larger landscape. If more employees are working from home, they could live in more affordable places, like Hartford or Worcester, and make only the occasional trip into headquarters in bigger cities.

There is already evidence that major companies are staging an exodus, as reduced workplace density fails to justify high rents (Davis et al., 2020). Higher-income residents, young professionals, and aging boomers may well follow, drawn once again to large suburban houses with big back yards, accessed by car—especially as the amenities that attracted them to the city in the first place steadily disappear (Davis 2020). As jobs at many levels vanish, middle- and working-class populations might also quit the metropolis; they simply cannot afford to stay (Morgan 2020).

Others hope the advantages of downtowns will persevere, fueled by persistent demographic trends. "For the next two decades, 80 percent of net new households [in the United States] will be singles and couples," says David Dixon, a partner in the urban design firm Stantec. "A majority of our population growth will be folks over 65. That means unprecedented demand for urban living and a knowledge-dominated economy."

But Dixon—who notes that a similar anti-density frenzy arose in the wake of 9/11, with the advantages of compact urbanism swiftly subordinated to "feelings, not data"—says cities must address the other crisis in their midst if they are to rebound: "Major cities aren't losing their allure, they are losing their affordability."

Yet local governments might be able to take advantage of the massive reshuffling in urban real estate that is already underway . . . . That means special attention to land policy, regulations, and financing mechanisms related to urban development and land markets.

As workplaces evolve in the pandemic's aftermath, some office buildings could become candidates for conversion to housing or other uses. Credit: Jan Fidler via Flickr CC BY 2.0.

The World Economic Forum, C40 Cities Group, and others see this moment as a chance for cities to create a more equitable and sustainable future. Credit: REUTERS/Peter Nicholls.

"EVERYONE DESERVES to live in a community that is healthy, equitable, and resilient," wrote Smart Growth America CEO Calvin Gladney in June, as protests unspooled across the country. "These communities have housing their residents can afford, provide access to transportation options that affordably connect people to jobs and opportunities, and offer public spaces that anyone can safely enjoy." Gladney pointed out that decisions made over decades related to land use, transportation, and the built environment have led to an unequal system, urging the country to use this moment to do better.

"Everyone deserves to live in a community that is healthy, equitable, and resilient . . . . These communities have housing their residents can afford, provide access to [affordable] transportation . . . and offer public spaces that anyone can safely enjoy."

In early May, C40 Cities, which represents more than 750 million people around the world, released a statement of principles that embraces building "a better, more sustainable, and fairer society out of the recovery from the COVID-19 crisis," warning against a return to "business as usual" (C40 Cities 2020). "The only parallel to what we're facing right now is the Great Depression," said New York City Mayor and C40 member Bill de Blasio in a statement. "Against that kind of challenge, half-measures that maintain the status quo won't move the needle or protect us from the next crisis. We need a New Deal for these times—a massive transformation that rebuilds lives, promotes equality, and prevents the next economic, health, or climate crisis."

Other organizations including the World Economic Forum are promoting the idea of "building back better" as the world copes with the repercussions of the COVID-19 crisis. Setting the bar higher will mean confronting persistent and pernicious problems in our cities. It will also mean building on the strongest physical assets of those same cities: walkable, mixed-use environments served by transit and mobility systems other than private vehicles. "Smart density and the agility and creativity of cities is what's going to allow us to not just get through this health crisis, but emerge with a more equitable, healthy environment," says Schaaf.

Resilient cities will recover from this crisis, and density—adjusted as it must be to ensure greater accessibility and affordability for all—is sure to be a critical component. "Americans have always had a love-hate relationship with cities and an aversion to density, so it's no surprise that spreading out would be considered an appropriate response to this moment," Campoli notes. "But in the long run, proximity is essential for healthy communities and the environment. We aren't planning to give up on the essential activities that sustain us." □

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SCENARIO PLANNING IN A PANDEMIC

How to Embrace and Navigate Uncertainty

By Emma Zehner

Local authorities focus on quickly getting services back up and running, returning to previous systems and making them as effective as possible in the new context. After a year of upheaval, staff and the wider public have little appetite for change.

—"Race Back to Normal" scenario, Social Finance

EARLIER THIS YEAR, the U.K.-based nonprofit Social Finance carried out a weeklong scenario planning exercise for local governments. The process asked officials to imagine four potential futures as they looked toward pandemic recovery: Innovation Against the Odds, Civic Renewal, Central Command and Control, and Race Back to Normal (Social Finance 2020).

The four scenarios varied along two axes—responsibility, referring to whether the crisis response is directed by the central government or localities, and transformation, which described whether localities would use the crisis to drive systemic change or, alternatively, quickly return to old ways. A guiding question drove the exercise: faced with the COVID-19 pandemic, how can local authorities change and adapt to meet the emerging needs of communities over the next year?

Originally developed as a tool to refine military and corporate strategies, scenario planning enables communities to create and analyze multiple plausible versions of the future. Unlike traditional planning approaches that tend to assume one likely or desired outcome, scenario planning encourages users to embrace uncertainty and imagine multiple endpoints.

Since the onset of the current pandemic, the practice has gained renewed attention and taken on new relevance across many industries, which are all facing uncertainties not accounted for in their routine planning processes. Universities that unexpectedly sent their students packing mid-semester have developed scenarios to determine what the fall semester might look like and how to prepare accordingly for various options. At the onset of the pandemic, hospitals used real-time scenario planning to prepare for different outcomes related to facility supplies, staff capacity, and financial management. Businesses, transit agencies, and nonprofits across the country are using the method to navigate a new baseline of uncertainty.

"This pandemic has helped people understand the purpose and value of scenario planning," said Sarah Philbrick, a socioeconomic analyst at the Metropolitan Area Planning Council (MAPC), the regional planning agency for metropolitan Boston. "Normally people view uncertainties as far-fetched scenarios and think they could never really happen. However, with COVID, people are now able to see how dramatically things can shift in a short amount of time. This is a prime opportunity for practitioners to talk about this method and use it with others."

Originally developed as a tool to refine military and corporate strategies, scenario planning enables communities to create and analyze multiple plausible versions of the future.

Scenario Planning for Local Governments

Scenario planning was first incorporated into urban planning projects in the 1990s and marked the beginning of a gradual shift away from traditional planning, which has largely ignored uncertainty, according to Robert Goodspeed, professor at the University of Michigan and author of the new Lincoln Institute book *Scenario Planning for Cities and Regions: Envisioning and Managing Uncertainties* (Goodspeed 2020). Planning that narrows in on one future can result in plans that are poorly suited for implementation, said Goodspeed, who is also a board member of the Consortium for Scenario Planning, a peer network launched by the Lincoln Institute (see sidebar). For example, inflexible plans have seen homes flooded because they were built in areas that were thought to be safe from storms, public funds wasted on infrastructure to accommodate overestimated growth, and extensive mismatches between affordable housing types and residents' needs.

"Plenty of places are not happy with conventional trends and have sought scenario planning out as a method to envision a more sustainable future," Goodspeed said. "And now, amidst COVID-19, local leaders who have not previously participated in these types of activities are seeing the value, and urban and land use professionals are realizing how all long-range plans need to be mindful of major uncertainties."

Scenario planning for urban planners varies in several ways from scenario planning for businesses. As Goodspeed explains in his book, the primary stakeholder for a business is typically the business itself. "Scenario-based urban planning, in contrast, has many stakeholders whose participation is closely linked with research and technical analysis, and it may use evaluation criteria to compare scenarios," he writes (Goodspeed 2020).

The methodology, which takes two main forms—normative and exploratory—is used most often to help define long-range transportation and land use plans. In a normative scenario plan, the goal is to reach a specific target or "future." The scenarios come into play in how stakeholders choose to get to the future. Each scenario for reaching the desired outcome will have benefits and drawbacks that planners and community members must weigh.

Scenario planning allows participants to gain a clear understanding of challenges and opportunities ahead. Credit: Time's Up Linz via Flickr CC BY 2.0.

With exploratory scenario planning, stakeholders identify "driving forces" and combine these elements into several possible futures. Then, the group outlines appropriate responses for each scenario. "Through exploratory scenario planning, it is acknowledged that the future cannot be predicted, but preparation and proactive action can and should take place," writes Janae Futrell, who previously worked as a consultant at the Lincoln Institute, in a PAS memo for the American Planning Association (Futrell 2019).

In her memo, Futrell cites the example of the Greater Philadelphia Futures Group, a regional coalition formed to identify the various driving forces most likely to shape the region through 2050. For instance, the group has considered how the introduction of autonomous vehicles will affect the metro area. Participants outlined four scenarios that might result from this vehicular

shift and developed strategies that would be successful regardless of which reality plays out. This summer, the coalition will issue a futures report informed by the digital revolution, rising inequality, and climate change, incorporating the pandemic and recent racial justice protests into each scenario's narrative.

Planning departments had already begun to recognize the value of scenario planning for hazard mitigation and climate resilience work, as well as for internal capacity-building exercises. (See page 22 to learn how Lake Michigan communities are using scenario planning to prepare for unknown climate futures.) Now its very premise—embracing uncertainty—turns out to be perfectly suited for the times.

Planning departments had already begun to recognize the value of scenario planning for hazard mitigation and climate resilience work. Now its very premise—embracing uncertainty—turns out to be perfectly suited for the times.

CONSORTIUM FOR SCENARIO PLANNING

The Consortium for Scenario Planning is a community of practice launched by the Lincoln Institute of Land Policy that helps to foster growth in the practice of scenario planning at all scales. Through research, peer-to-peer learning, networking, training, and technical assistance, the Consortium helps communities develop better plans to guide a range of actions, from climate change adaptation to transportation investment. The Consortium also convenes researchers and software providers to develop more effective tools and reduce barriers to entry.

To learn more, visit **www.scenarioplanning.io**.

Adapting the Tool for a Pandemic

"Traditionally, [scenario planning] is used to consider long-term trends and promote big picture thinking," the report from Social Finance explains. "However, in crisis situations such as COVID-19, scenario planning can be a useful technique to help interpret and respond to rapid change, as it allows organizations to anticipate and manage uncertainty" (Social Finance 2020).

Many of the basic strategies of exploratory scenario planning can be useful for looking at pandemic recovery scenarios, with one notable exception: timeframe. In the middle of a pandemic, timelines and expectations can be different. Whereas typical plans that incorporate scenarios might project 30 to 50 years into the future, the day-by-day variation of COVID-19 makes 12 to 18 months a more digestible timeline.

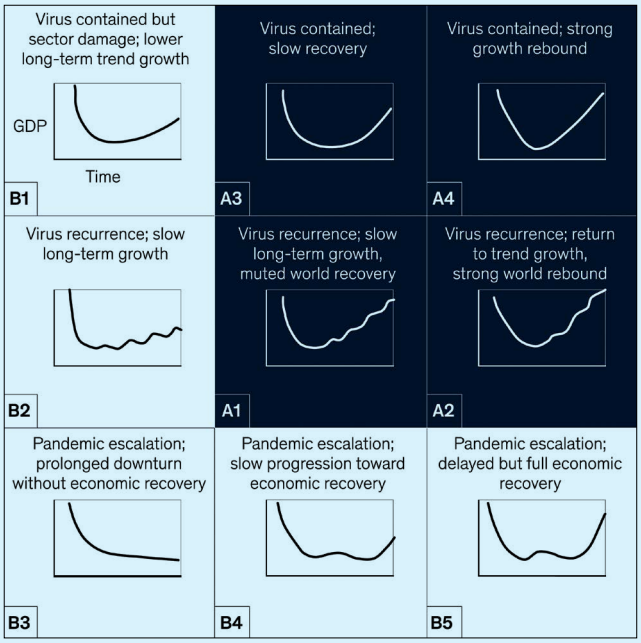
"The pandemic is a tangible thing you are reacting to, so people's current use of the tool is more reactionary instead of the more standard anticipatory approach," explained Heather Hannon, director of the Consortium for Scenario Planning.

Transit agencies, for example, are adjusting scenarios every week and working on the fly to create pop-up bike lanes and parklets. "With fewer staff and constrained budgets, transit agencies are preparing for a staggering number of scenarios," wrote Tiffany Chu, a commissioner at San Francisco's Department of the Environment, in *Forbes* (Chu 2020).

In May, WSP, a professional services firm based in Canada, published "Public Transportation and COVID-19: Funding and Finance Resiliency: Considerations When Planning in an Unprecedented Realm of Unknowns." The report recommends scenario planning as a tool for public transportation staff and includes some of the factors agencies will have to consider, such as higher cleaning and sanitizing costs, higher absenteeism, demands for higher wages, and changing ridership patterns (WSP 2020).

Scenarios for the Economic Impact of the COVID-19 Crisis

McKinsey & Company developed this set of potential economic impact scenarios by analyzing two major uncertainties associated with the pandemic: the spread of the virus (Y axis) and the effects of economic policy (X axis). The scenarios range from one in which the virus escalates and a prolonged economic downturn occurs (B3) to one in which the virus is contained and there is a strong economic rebound (A4). Credit: Exhibit from "Covid-19: Implications for business," June 2020, McKinsey & Company, www.mckinsey.com. Copyright © 2020 McKinsey & Company. All rights reserved. Reprinted by permission. McKinsey continues to update this article at https://www.mckinsey.com/business-functions/risk/our-insights/covid-19-implications-for-business.



Lisa Nisenson, vice president of the national design and professional services firm WGI and a member of the Consortium for Scenario Planning, is also considering how scenario planning can be useful in responding to COVID's impact on the mobility industry. Will transit and shared-use companies rebound? Will telecommuting stick over the long run? Will open streets be temporary?

"Any time you have different alternative ways that the future could unfold, taking a deliberate look at how it could unfold is never a bad idea," Nisenson said. "That said, the ability to figure out how things unfold very much depends on your confidence in the variables. In this case, you want to assemble stakeholders and experts who can describe the variables, the directions the variables could take, and benchmarks for monitoring the situation based on your organization's needs." In a recent mobility plan, Nisenson said, the company identified ideas for 'distancing while in motion,' including bicycling and a popular open-air electric shuttle, that would also address long-term mobility and sustainability goals.

Nisenson added that successful COVID planning can involve a combination of methods that include scenario, anticipatory, and strategic planning, as well as the Delphi method of assembling experts. "This process illuminates one of scenario planning's benefits: stakeholder engagement," she said.

Goodspeed emphasized that COVID scenario planning projects will differ from typical scenario planning projects by bridging unconventional communities. For instance, hazard and disaster staff are often siloed from long-range land use and transportation planners, but now will likely become central to any comprehensive recovery plan.

At MAPC, Philbrick has been working with the housing and economic development teams to sketch out a three- to five-year timeline for economic recovery in the Boston metro area. The project focuses on the possible scenarios for housing demand by income levels based on possible employment patterns and the pace of recovery by sector. "Because none of the many questions we have can really be answered, the only real option is scenario planning," Philbrick said. "Choosing any sort of point estimate when you have very little to base it off of is just irresponsible."

A Nimble Tool for Resource-Constrained Governments

One of the common misunderstandings about scenario planning is that it always requires expensive software and outside consultants. Now, more than ever, municipalities are resource-limited and largely unable to come up with the extra funds needed for such expenses, and may lack the time and resources to look to the future. But Goodspeed and Hannon—who is leading an internal scenario planning process at the Lincoln Institute—said smaller-scale versions of scenario planning can still be helpful, and exploration and experimentation are the keys to a productive process.

"In the current moment, organizations starting from scratch probably still should frame a project to focus on a particular plan or decision, allowing them to dip their toes in the water and explore methods and figure out how to use them effectively," Goodspeed recommended. "For those who already have more experience, this is probably a good time to broaden or deepen their practice. For example, they could incorporate more exploratory scenarios or involve experts from new fields like public health."

Hannon noted that the Consortium for Scenario Planning maintains a list of resources on its website, as well as opportunities for peer exchange and other information (CSP 2020). The Lincoln Institute is also releasing a comprehensive manual in partnership with the Sonoran Institute that will provide users with tools and guidance for managing a scenario planning process. Social Finance has developed a template for those attempting to do shorter-term scenario planning online. The organization suggests tools as simple as online Word documents, Zoom, and virtual whiteboards.

"Planners can do a lightweight version without the burden of consultants or software tools," Hannon said. "Don't worry about a data-intensive version, just get people together and start brainstorming."

"Planners can do a lightweight version without the burden of consultants or software tools. Don't worry about a data-intensive version, just get people together and start brainstorming."

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Great Lakes Communities Use Scenario Planning to Prepare for Rising Waters

By Emma Zehner

THE NATIONAL DIALOGUE about rising waters tends to focus on coastal states like Florida and New York, with inland states largely absent from the conversation. But residents in Michigan, which has one of the longest coastlines in the continental United States, are also contending with changes that are leading local officials to reexamine their coastal management policies. As climate change amplifies Lake Michigan's natural fluctuations and brings increased storminess, communities are beginning to plan for an uncertain future.

Historically, for every decade or so residents have endured high waters, the next has brought retreating levels—and a wave of new lakeside development. This seesawing system, which can involve differences of up to six feet in water levels over the course of a few years, is masking a more gradual pattern of coastal erosion, according to Richard Norton, a professor of urban and regional planning at the University of Michigan. The focus on extremes, he said, has sidelined action on coastal management.

In 2014, Norton and a team of researchers started working with the City of Grand Haven and the Charter Township of Grand Haven, neighboring communities on the southeast perimeter of the lake, to think beyond current conditions and discuss best coastal management practices for the long term. At the center of their approach is a method called scenario planning.

Scenario planning allows communities to plan for an unpredictable future by exploring multiple possibilities of what could happen. The framework—which the Consortium for Scenario Planning, an initiative of the Lincoln Institute of Land Policy, promotes through technical assistance, educational resources, and a network of practitioners—has shown potential in these jurisdictions, which sit in one of the most politically conservative counties in the state and are home to residents who have varying views about the risks of climate change.

Historically, for every decade or so residents have endured high waters, the next has brought retreating levels—and a wave of new lakeside development. This seesawing system is masking a more gradual pattern of coastal erosion. The focus on extremes has sidelined action on coastal management.

A house in Grand Haven Charter Township sits precariously close to the shore in December 2019, following several months of intense storms. Credit: Courtesy of Grand Haven Charter Township.

The Role of Local Planning

Local governments have a unique opportunity to help shape the future of coastal areas. While the National Flood Insurance Program influences private development, local governments make the majority of "public decisions that shape private development in high-risk coastal zones," Norton and his coauthors wrote in an article published in the *Journal of the American Planning Association* (Norton et al 2019).

However, few jurisdictions are fully embracing the role. About 40 percent of master plans from 60 Michigan Great Lakes communities studied didn't include any discussion of coastal area management issues, according to research by Norton in the mid-2000s. At the time, three quarters of the plans hadn't adopted any meaningful coastal area management policies.

Coastal management concerns are often edged out by factors including other planning issues, the role of coastal properties in providing property tax revenues, emotional attachments to properties, and resistance to government regulation, Norton said.

A multidisciplinary and multiuniversity team of researchers led by Norton wanted to see if scenario planning, known as a technical process, could be simplified and adapted to the context of municipalities that lack the technology and capacity to conduct extensive analyses. Funding for the project came from the Michigan Coastal Zone Management Program of the Department of Environment, Great Lakes, and Energy and was supported through a grant under the National Coastal Zone Management Act of 1972. The project was also supported by the nonprofit planning firm Land Information Access Association, which provides technical assistance to local leaders through its Resilient Michigan program.

A few years ago, the team reached out to several towns, including the City of Grand Haven and Grand Haven Charter Township, to discuss the possibility of embarking on a consultant-led scenario-planning process. At the time, both communities were in the middle of updating their master plans. Like most of the state's 122 jurisdictions on Lake Michigan, the two communities have small populations with limited staff capacity.

The communities signed on, and an extended planning process ensued. From 2014 to 2016, local officials, planning commissions, the city council and township board, and residents from the two places took part in over 20 working meetings and presentations.

Weighing Scenarios

Central to the process was the identification of three "climate futures." Researchers created the scenarios, based on a 20- to 50-year planning horizon, by using easily available data, including historic water level data and FEMA maps, and basic GIS analysis. In the "lucky" future, water levels remain low and the community experiences one 50-year storm (as classified by FEMA). The "expected" future assumes average water levels and one 100-year storm. The "perfect storm" scenario is characterized by high water levels and a 500-year storm.

"The process helped people understand that we weren't just looking at the worst-case scenario," said Jennifer Howland, community development manager for the City of Grand Haven.

As a next step, the cross-sector team drew on a variety of off-the-shelf data related to planning and development to outline three options for how the local governments could respond in each climate future. In one scenario, the governments maintained existing structures. In a second, residents were permitted to build out based on what current zoning allows. A third option incorporated a series of best management practices (BMPs), ranging from setbacks in nearshore zones to restrictions on building within wetlands. Combining the climate futures and management options, the researchers presented nine scenarios for local officials and residents to consider. They shared the fiscal, environmental, and land use impacts of each.

In the City of Grand Haven's "lucky" future, for example, if residents continue to build out under current zoning regulations, 207 structures will be damaged. If residents adopt BMPs, this number falls to 59.

A "lucky" future in which the township builds out under the current zoning regulations results in $11.6 million in potential damages in areas that currently house properties bringing in $194,015 in net annual revenue. In the "perfect storm" scenario, building out under current zoning regulations results in $89 million in potential damages in areas that hold properties bringing in $358,000 in annual tax revenue.

Researchers also calculated the discrepancy between the land area designated as high-risk erosion areas by the state and the land area that they calculated would be inundated in the three climate futures. The land area identified by the state was much smaller than the land area identified as high-risk by researchers, highlighting the important role local governments can play in filling the gap.

Management Options	Climate Futures		
	Lucky	**Expected**	**Perfect Storm**
Current Development	Scenario 1A	Scenario 1B	Scenario 1C
Current Zoning Build-Out	Scenario 2A	Scenario 2B	Scenario 2C
BMP Build-Out	Scenario 3A	Scenario 3B	Scenario 3C

As part of the scenario planning process, consultants and local officials developed nine futures for communities to consider. Credit: Richard Norton, as presented at the Consortium for Scenario Planning annual conference in 2019.

"When we first presented the materials, there were looks of shock and surprise, but once people processed the information and understood that these are reasonable futures we should be thinking about, there was less opposition," Norton said. "If we had just gone straight to announcing setbacks, that would have been hugely controversial."

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Local officials also used other strategies to help the conversations along. Howland emphasized that science-based maps and aerial images of historic shorelines made the analysis more poignant for residents. Stacey Fedewa, community development director for Grand Haven Charter Township, said focusing on the weather-related impacts of climate change was an effective way to bring the global issue to the local level.

"If we flood from a big storm, we will be without power, the roads will be flooded, the businesses will be shut down," Fedewa said. "Trucks wouldn't be able to enter. If we are able to bounce back faster by being resilient, businesses shut down less [and] employees come back to work sooner than they would have otherwise."

The sessions were also important in demonstrating that building close to the shore and using armoring measures such as seawalls and riprap can create long-term damage to natural beaches. This "stop nature" inclination, as Norton calls it, is exacerbating erosion of adjacent beaches and contributing to the annual foot of shoreline erosion in high-risk erosion areas.

In 2018, the City of Grand Haven adopted a beach overlay district. Shoreline protection measures are restricted lakeward of the line. Credit: City of Grand Haven.

In their resulting master plans, the two jurisdictions incorporated recommendations from the process to varying degrees. The body of the City of Grand Haven Master Plan includes regulatory and infrastructure policies recommended by the researchers. The city also updated its sensitive areas overlay district and added a beach overlay district based on aerial images presented by the researchers that show the high water mark changing over time. It established new rules for shoreline protection measures in the beach overlay district area, limiting such measures with the exception of specific types of seasonal fencing (City of Grand Haven 2016). A homeowners guidebook helps property owners understand what they can do and provides alternatives (LIAA 2018).

In the township, the planning director and commission included conceptual overviews and policy recommendations in the body of their plan, but chose to relegate the more detailed analyses to the plan's appendix out of concern about resistance in the politically conservative community (Grand Haven Charter Township 2016). The township also considered new proposals to prohibit seawalls—which can interrupt natural sediment transport processes, creating larger waves and more erosion that wears down the walls over time—and to increase the setback for new construction to 200 feet from the high ordinary water mark, a significant change from the current 50-foot setback. The proposals went before voters last fall but did not pass—in part because officials were focused on taking steps to protect homes from record high water levels—and regulatory decisions remain with the current authority, the Michigan Department of Environment, Great Lakes, and Energy.

"Water levels will go back down again," Norton said. "They always have. So how can we help town officials keep this on the agenda when there is not a crisis?"

The Grand Haven waterfront is a draw for tourists and residents alike. The city's new master plan includes regulatory and infrastructure policies aimed at protecting it from the worst impacts of climate change. Credit: H. Michael Miley via Flickr CC BY 2.0.

Scaling the Approach

Norton believes scenario planning is a promising tool for local decision making and thinks the fact that these governments incorporated coastal management policies in their master plans is an important step. "The simplicity of the methods is helpful," he said. "They are focused on decisions: should they adopt setbacks or not?" Norton does acknowledge that even this simplified method typically requires some in-house expertise, such as the ability to manipulate ArcGIS.

He hopes some of the lessons learned, about both scenario planning and shoreline management, can be applied in other communities, ideally with the help of outside consultants who can provide the analysis needed at a reasonable cost or without the need for outside consultants at all. And word does seem to be spreading in the region: Howland has shared the city's work with neighboring communities along the lake and presented at a dune symposium in East Lansing. Fedewa has encouraged Spring Lake Township, north of Grand Haven, to utilize the resources of the Resilient Michigan program.

Norton, who now plans to expand his work to nearby Lake Huron, said scenario planning is an ideal tool to prepare for the uncertainty inherent in an age defined by rising waters, no matter what type. "What we are doing is very applicable in ocean coastal settings too."

Norton, who now plans to expand his work to nearby Lake Huron, said scenario planning is an ideal tool to prepare for the uncertainty inherent in an age defined by rising waters, no matter what type. "What we are doing is very applicable in ocean coastal settings too."

Emma Zehner is communications and publications editor at the Lincoln Institute of Land Policy.

To protect against storms and flooding, Grand Haven provides sandbags and sand to property owners. Credit: Courtesy of Grand Haven Charter Township.

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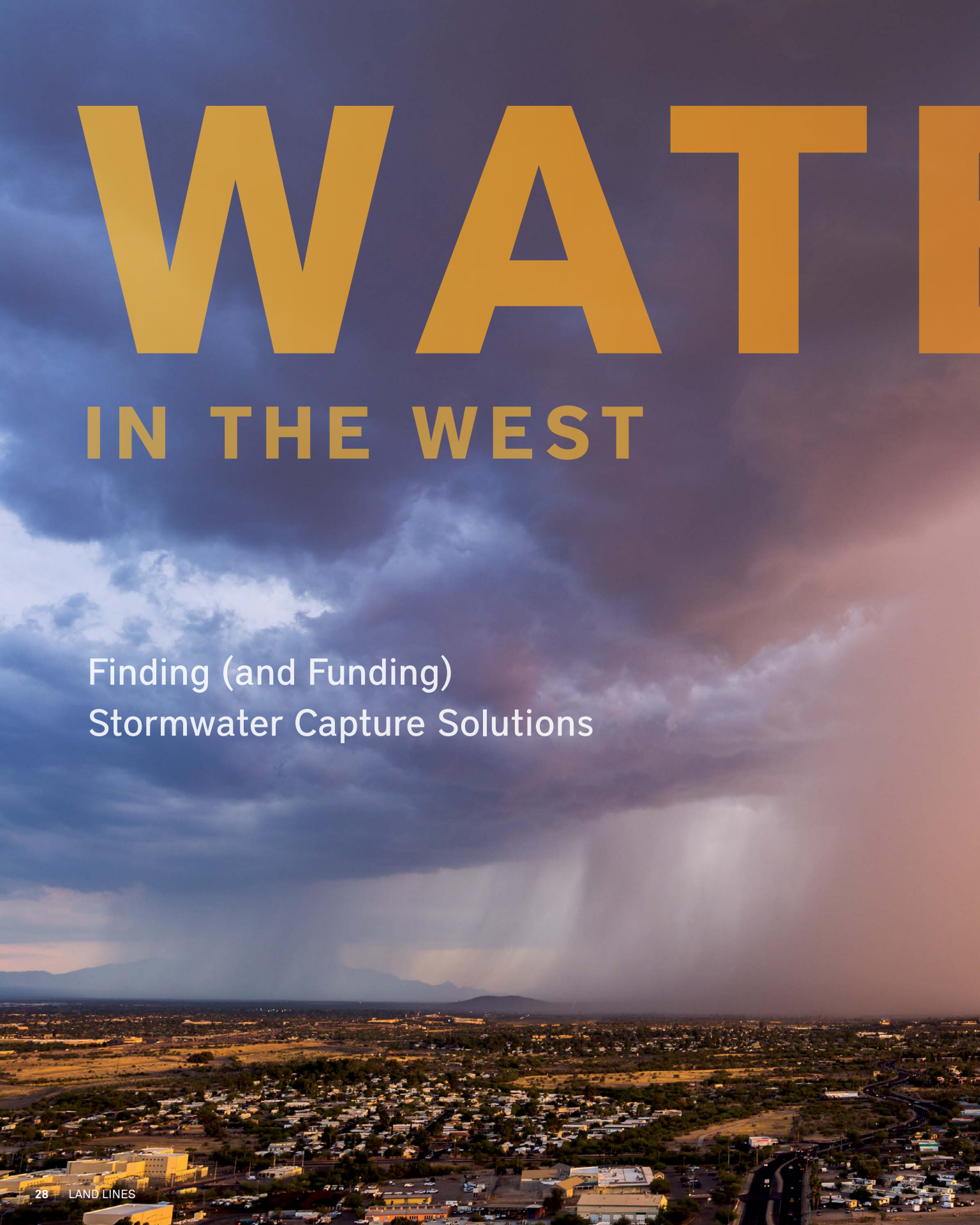
WATE

IN THE WEST

Finding (and Funding)
Stormwater Capture Solutions



By Meg Wilcox

AFTER SEVERAL HOURS of gentle rain in Tucson, water clogs the streets of the modest Palo Verde neighborhood. Traffic chokes a major intersection where an emergency vehicle's flashing red and blue lights signal to cars to detour around a swamped section of road. Rivulets rush along the curbs of side streets, creating pools of water that geyser when cars plough through.

Less than a mile away, at the nonprofit Watershed Management Group's Living Lab and Learning Center, the story is different. Here, a series of tiered, vegetated basins—shallow depressions filled with mesquite trees, brittlebrush, and other native plants—act like sponges, diverting and absorbing the rainwater running down the street. The center's pervious parking lot easily absorbs the light winter precipitation, and downspouts channel the rain drumming on the center's roof into a 10,000-gallon underground storage tank.

Stooping to check the meter on the tank's lid, Lisa Shipek, executive director of Watershed Management Group (WMG), looks pleased. "Five hundred more gallons and it's full. Then it overflows over there," she says, pointing to an adjacent series of rain gardens pulsing with desert life. Prickly pear cacti and giant sacaton grass intermingle with canyon hackberry, desert willow, and velvet mesquite, all native shade trees; pollinator plants like the yellow-flowered and piney smelling creosote, hopseed, and vibrant red chuparosa also populate the gardens.

Straightening to survey the carefully landscaped center—which serves as a demonstration site for the sustainable solutions WMG promotes throughout the desert Southwest—Shipek says proudly, "all of our water needs, including indoor use, are provided by the rainwater we harvest." In this desert city, which receives an average of 12 inches of rainfall a year, finding ways to capture and reuse that water is increasingly important.

Thunderstorm over Tucson, Arizona. Credit: John Sirlin via Getty Images.

The cities of Los Angeles and Tucson both rely on the Colorado River for part of their water supply. Credit: U.S. Bureau of Reclamation.

- Colorado River Basin hydrologic boundary
- Adjacent areas in the United States that receive Colorado River water
- Aqueduct
- River
- Dam

Like other cities across the U.S. West, Tucson is feeling the dual squeeze of climate change and rapid growth. The population of the Tucson metro area, now close to one million, is expected to expand 30 percent by 2050. This is increasing demand for water, even as hotter temperatures and drought diminish supply. When storms come, they are increasingly severe, posing serious flood risks. In response, Tucson and other cities are investing in low-impact development, working with nature to manage stormwater as close to its source as possible.

This type of approach yields multiple benefits, including improving water quality and mitigating flooding, creating green spaces that provide habitat and urgently needed shade, and boosting local water supplies. Tucson's water department has invested $2.4 million in rebates for some 2,000 customers who've installed rain-collecting cisterns or "earthworks" (e.g., vegetated basins and rain gardens) since 2013.

Green infrastructure and **low-impact development** are terms for a nature-based stormwater management method that uses vegetation, soils, permeable pavement, and other elements to absorb and redirect water and to create healthier urban environments.

The rebate program financed half of the $30,000 cost of WMG's underground storage tank, and is among many efforts taken by the city in recent years to promote green infrastructure.

Nearly 500 miles away, in coastal Los Angeles, similar funding mechanisms are changing the landscape of a much larger city. Four million inhabitants strong, Los Angeles boasts one of the country's largest public water systems; like many other cities in the region, it depends in part on the Colorado River for drinking water. With that resource increasingly vulnerable to shortages, the city is looking for more reliable sources of water close to home.

Both cities have led the way on green infrastructure in the West with their comprehensive approaches and investments. When cities invest in projects with measurable local results, their actions can help make the entire region more resilient, says Paula Randolph, associate director at the Lincoln Institute of Land Policy's Babbitt Center for Land and Water Policy.

"The benefit of green infrastructure in the West is twofold," observes Randolph. "One is to capture water and try to keep it in place, let it percolate back into aquifers [for local use]. Two is to sustain the flow of the region's rivers. If there's enough water in an aquifer, if you keep it high enough, you can keep a river flowing."

Tucson: Shifting the Water Supply Equation

Until the 1990s, Tucson relied entirely on groundwater for its water supply. Decades of over pumping led the city to turn to Colorado River supplies via the Central Arizona Project (CAP), an aqueduct system that pipes Colorado River water from its input at Lake Havasu to municipalities and water districts spanning some 330 miles across the state.

Today the city relies on CAP water to recharge its groundwater aquifers, with CAP providing 85 percent of Tucson's supply. Source groundwater contributes only six percent. The remainder comes from reclaimed wastewater that's used for non-potable needs such as irrigation—or for recharging the ephemeral rivers that traverse the city and flow primarily during the monsoon rains each summer, or after other major rain events.

But the Colorado River is an increasingly stressed resource. It provides water to 40 million people and four million acres of irrigated agriculture throughout the West. U.S. Geological Survey scientists predict that the river could lose a quarter of its flow in the next 30 years as climate change shrinks snowpack at the headwaters and increasing temperatures further decrease streamflows (USGS 2020).

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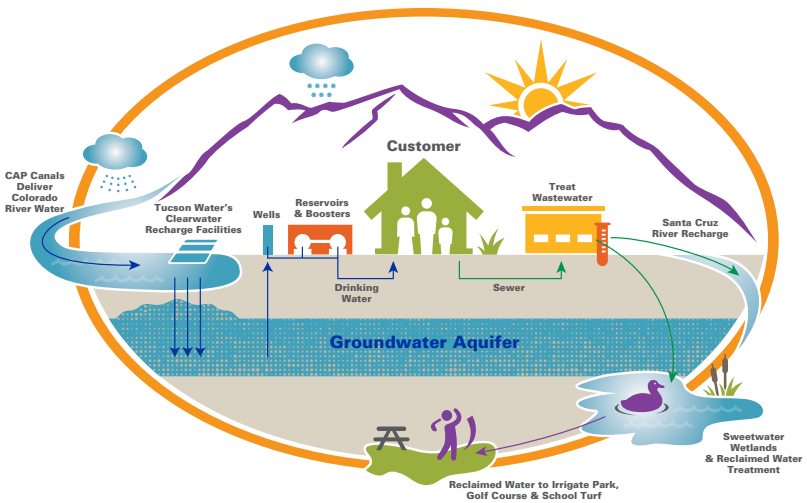
"We are at a crossroads with the Colorado River, and Arizona is in the hot seat because we have taken and will continue to take significant cuts," warns Randolph. That's because Central Arizona has the most junior water rights of the Colorado River basin. As Arizona plans for a drier future and cutbacks of its allotment, as agreed to under the 2019 Drought Contingency Plan between the seven basin states and Mexico, Tucson officials are looking to augment local supplies (USBR 2019).

James MacAdam, superintendent of Tucson Water Public Information & Conservation, says that today the city views stormwater as a significant resource for Tucson's future. "One of the paradigm shifts at Tucson Water is that we now count [stormwater] as a water source in our planning. That's changed in the past five years."



In Tucson, officials are working to augment local water supplies and reduce their reliance on the increasingly stressed Colorado River. Credit: Tucson Water.

Pima County Regional Flood Control District, in fact, estimates that Tucson's stormwater capture potential is roughly 35,000 acre-feet per year, or one-third of the volume Tucson Water delivers today to its 730,000 customers.

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Flood Control District Civil Engineering Manager Evan Canfield says the city has prioritized the benefits stormwater capture could provide. "For the Tucson region, addressing water scarcity and increasing resilience—planting trees in water harvesting basins to help with shade and cooling—are the core benefits that we're looking for," he says. "Water quality concerns are the padding."

There are also real financial benefits at stake: Autocase cloud-based software developed by the Pima Association of Governments shows that every dollar invested in green stormwater infrastructure returns two to four dollars in benefits, including flood risk reduction, property value uplift, and heat mortality risk reduction (Parker 2018).

Over the past decade, the Flood Control District has installed and maintains more than a dozen large projects in the city, such as the $11 million Kino Environmental Restoration Project, which captures stormwater from 17.7 square miles of urban watershed and directs it into more than 100 acres of wetlands and recreational area, while providing up to 114 million gallons annually for landscape irrigation at an adjacent sports complex.

Now Tucson is poised to tap deeper into its stormwater potential. It's passed a number of related measures, including the 2013 Green Streets Policy, requiring the incorporation of green infrastructure into all publicly funded roadway projects; the 2013 Low Impact Development Ordinance, requiring new commercial development to capture the first half-inch of rainwater; and the 2008 first-in-the-nation Commercial Water Harvesting Ordinance, requiring commercial developments to meet 50 percent of their landscaping water needs with harvested rainwater.

Tucson relies on networks of recharge basins located west of the city to manage most of its annual allocation of Colorado River water. Credit: Tucson Water.

Visitors to the Watershed Management Group's Living Lab and Learning Center in Tucson peer into the 10,000-gallon underground cistern the organization uses to capture and store rainwater. Credit: Watershed Management Group, watershedmg.org.

The sum of these measures, says MacAdam of Tucson Water, means that "any time we're building a road or a parking lot, or rebuilding our public and private infrastructure, we now design it in a water-literate way. When Parks is redoing a park, they're incorporating intelligent management of stormwater; when Streets is building a street, they do it in a way that intelligently incorporates and manages stormwater, and so on."

The city recently enacted a novel green stormwater infrastructure fund to help expand and maintain high-priority public projects. The fund will raise about $3 million annually through a small charge on residents' water bills, estimated to cost the average homeowner about $1.04 per month, according to MacAdam. The city has identified 86 potential sites for such projects—many in lower-income neighborhoods that are prone to flooding and searing temperatures of up to 117 degrees in the summer—at a cost of $31 million.

The fund "gets us started," says Catlow Shipek, a driving force behind the local green infrastructure movement who cofounded Watershed Management Group with Lisa, his wife, and is now its policy and technical director. "It's very focused on maintenance because there's currently no dedicated funding for that." The fund, he says, will also help "capitalize on new projects and leverage other departments and agencies to do more."

MacAdam says the fund's approach is to add elements to capital works projects being built through the Parks and Connections Bond, passed in 2018, which allocated $225 million for building bike boulevards, constructing greenways, and fixing up parks. When an old parking lot is being ripped up and replaced, for example, the city will create new basins and curb cuts to channel water into rain gardens that it will plant with native trees and shrubs. The fund will also seek to piggyback off flood control projects.

"When Flood Control buys a vacant lot to bring water off a flooding street in a neighborhood, we can use our funds," MacAdam explained. "They pay for land acquisition and digging the deep basin, and we pay for smaller basins to add vegetation and create a more functional landscape for the neighborhood, and to maintain that landscape over time."

The importance of adding tree cover to the city cannot be overstated, says Randolph. "It's a health issue and a disparity issue," because the hottest parts of Tucson are typically in socially and economically disadvantaged neighborhoods.

"Tucson has done some very innovative things that are not the norm throughout the West, or in Arizona," she adds. "In essence, they've created a master plan where water touches all lives and ecosystems. All of the things they're doing with rainwater harvesting, the rebates, the fund, mean less groundwater pumping, which allows natural systems to flourish and grow."

"Any time we're building a road or a parking lot, or rebuilding our public and private infrastructure, we now design it in a water-literate way. When Parks is redoing a park, they're incorporating intelligent management of stormwater; when Streets is building a street, they do it in a way that intelligently incorporates and manages stormwater, and so on."

Los Angeles: Seeing Stormwater as a Resource

Los Angeles is 10 to 15 degrees cooler on average than Tucson in the summer, though temperatures can vary by as much as 20 degrees across its different microclimates, from beach to hills to hot, flat inland. Lush vegetation in some of the wealthier and cooler seaside communities may give the impression that water is not a concern, but that's not the case.

Like Tucson, Los Angeles receives just 12 inches of rainfall per year. And like Arizona, California faces major water challenges, with climate change intensifying drought while population growth puts pressure on limited supplies. Some California communities are still recovering from the last drought that wrung the state dry from 2012 to 2016. Meanwhile, legacy agricultural pollution in the Central Valley has left one million residents without reliable access to safe drinking water, and the state is just beginning to rein in decades of groundwater overuse through its 2014 Sustainable Groundwater Management Act, which targets critically overdrafted basins.

In Los Angeles, the Department of Water and Power (LADWP) serves four million residents over a 472 square-mile area, supplying more than 520,000 acre-feet of water per year. That supply is largely imported through three aqueduct systems. The California Aqueduct delivers water from the Sacramento-San Joaquin Delta, 444 miles to the north; water is pumped over the Tehachapi mountains and stored for distribution in Pyramid Lake and Castaic Lake north of the city. The Colorado River Aqueduct carries water 244 miles across the Mojave Desert and Imperial Valley from its origins at Lake Havasu, the same source that feeds the Central Arizona Project.

Like Tucson, Los Angeles receives just 12 inches of rainfall per year. And like Arizona, California faces major water challenges, with climate change intensifying drought while population growth puts pressure on limited supplies.

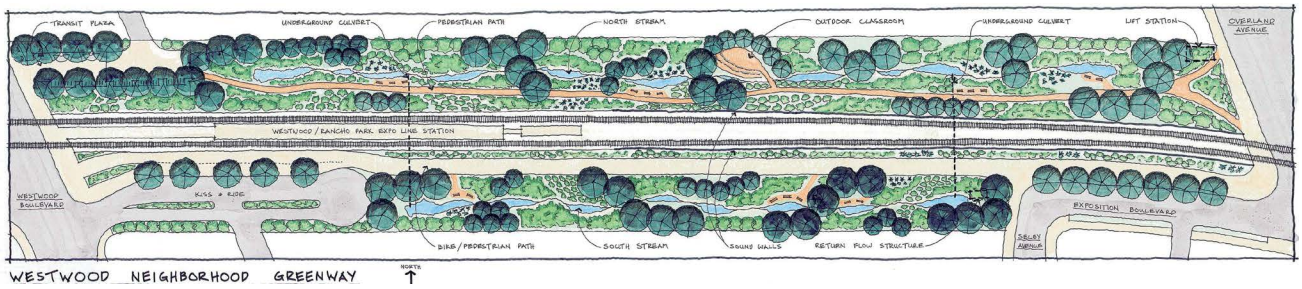
A California pumping plant sends Colorado River water uphill on its long journey to Los Angeles. Credit: NNehring via iStock.

That water is stored in Lake Mathews, about 60 miles southeast of the city. The final aqueduct, the Los Angeles, delivers water from the Owens River Valley in the eastern Sierra Nevada mountains. That system includes a series of eight dams and reservoirs along the 300-mile route. Within the city limits, another nine reservoirs and 110 storage tanks allow for controlled release when water is needed.

Just 14 percent of Los Angeles water comes from local supplies. Under LA's Green New Deal, the city's 2019 sustainability plan, local leaders plan to turn that balance on its head, shifting the contribution from local water supplies—groundwater, recycled wastewater, stormwater, and water conservation—to a whopping 71 percent of its total supply by 2035 (City of Los Angeles 2019). While some southern California cities, like Huntington Beach and San Diego, are turning to desalination—that is, converting ocean water into drinking water—Los Angeles is opting out of this costly, energy-intensive approach, which also harms marine life.

"We want to be more reliable and sustainable on the local level and not depend so much on imported water supply," says Art Castro, manager of watershed management at LADWP. "Climate studies show there's going to be a lot less snow and a lot more rain. That means we'll have less time to capture that snow melt . . . and with less snow and more stormwater, we're not going to have that luxury to store water." It's one of the reasons the city wants to become more self-reliant, says Castro, adding, "the system was built for storage."

Los Angeles is already recharging or capturing 74,000 acre-feet of stormwater per year, primarily through centralized projects like football field-sized spreading grounds and detention basins. Spreading grounds, akin to bottomless cups, are large, sandy basins that overlie an aquifer and allow for rapid infiltration. Water captured in Los Angeles' spreading grounds eventually percolates down some 200 to 400 feet to aquifers in the San Fernando Basin, according to Castro.



The Westwood Neighborhood Greenway, now under construction, is one of several projects funded by Proposition O, which authorized Los Angeles to spend up to $500 million to prevent and remove water pollution. Credit: Westwood Greenway.

A Stormwater Capture Master Plan, published in 2015, lays out how the city can double the amount of stormwater it captures, through projects both large and small (LADWP 2015). Decentralized projects on city streets, in alleys, and on residential properties are a critical component of Los Angeles' stormwater management plans, which address both water quantity and water quality. Stormwater running off city streets eventually makes its way to the Pacific Ocean via the Los Angeles River, polluting some Southern California beaches.

"We have to capture, clean, and infiltrate, if possible, the water moving through a green street system," says Eileen Alduenda, director of the nonprofit Council for Watershed Health, which has played a critical role in the green infrastructure movement in Los Angeles. Alduenda envisions a proliferation of rainwater retention features—like permeable parking lots and driveways, curb cuts, and drought-tolerant landscaping—throughout the city's streets and alleyways, working together to reduce the flow of stormwater to the sea.

Los Angeles County has financed dozens of projects under Proposition O, a funding mechanism that passed in 2004. Projects range from stormwater retention features in public parks and recreation areas to infiltration galleries, catch basins, bioswales, and other structures built into rights of way on residential streets.

A low-impact development ordinance, requiring developers to capture a certain amount of rain (in this case the first three-quarters of an inch) to reduce stormwater runoff, went into effect in Los Angeles in 2012 and is helping spur such decentralized green infrastructure projects throughout the city. Los Angeles County has financed dozens of projects under Proposition O, a funding mechanism that passed in 2004. Projects range from stormwater retention features in public parks and recreation areas to infiltration galleries, catch basins, bioswales, and other structures built into rights of way on residential streets.

This year, new funds will be available for stormwater capture and treatment through Measure W, the 2018 Safe Clean Water Act, a parcel tax projected to raise $300 million per year. The measure allows funds to go toward operation and maintenance (O&M) costs. Having such funds available is critically important, according to Daniel Berger, director of community greening at TreePeople, a local nonprofit that promotes tree planting, rainwater harvesting, and low-impact development.

"One of the largest objections [to implementing green infrastructure] from a government perspective has been the long-term O&M costs, which are certainly higher than for gray infrastructure and are often hard to find dedicated funding for," Berger says. "Measure W is an absolute game changer, an opportunity to really scale things up."

The Value of Nonprofit Participation

In Los Angeles, nonprofit organizations including TreePeople, the Council for Watershed Health, and Heal the Bay were instrumental in getting green alternatives on the city's stormwater management agenda. The Council for Watershed Health and TreePeople collaborated with LADWP and the U.S. Bureau of Reclamation on a three-part study of the potential for groundwater recharge from stormwater infiltration. TreePeople also partnered with LADWP on the 2015 Stormwater Capture Management Plan.

The Council for Watershed Health developed a training program for the City's Native Green Gardener program, a workforce development effort focused on training day laborers how to manage landscapes with unfamiliar native plants and how to maintain and clean features like curb cuts. The Council also managed the city's first large-scale neighborhood project to use green infrastructure for stormwater management, Elmer Avenue in Sun Valley, a low-income neighborhood that regularly flooded.

> "Elmer Ave became a demonstration for not only how you do this technically, but also how you collaborate amongst agencies to ensure you're getting multiple benefits out of any project."

"Elmer Ave became a demonstration for not only how you do this technically, but also how you collaborate amongst agencies to ensure you're getting multiple benefits out of any project," says Alduenda. Los Angeles' Green Streets Committee, which was instituted by former Los Angeles Public Works Commissioner Paula Daniels to coordinate work among all of the involved agencies, was vital to the process, she added. "It was a place where folks who were working on Green Streets projects could talk about issues they were encountering. Inconsistences between departments, or process barriers, could get worked out."

The Elmer Avenue Retrofit Project in the Sun Valley area of Los Angeles saw state, federal, and nonprofit partners come together to transform a streetscape, adding water-management features such as rain barrels and drought-tolerant native plants. Credit: Council for Watershed Health.

The corner of Ninth Avenue and University Boulevard in Tucson in 1996, left, and in 2016. Residents installed curb cuts and native plants. Credit: Reproduced with permission from *Rainwater Harvesting for Drylands and Beyond* by Brad Lancaster.

Daniels created the committee in 2007 when she saw the need for a culture shift within the city's Engineering, Sanitation, Parks and Recreation, and Street Services bureaus charged with developing green infrastructure projects. The bureaus were staffed with engineers, not landscape architects, said Daniels, so the expertise they brought to the job was about mechanical solutions. Daniels invited middle managers, rather than bureau heads, and gave staff the opportunity to "kick the tires on an idea," to talk among themselves and teach each other. She invited their peers from cities with strong green infrastructure programs, like Santa Monica and Portland, to show what was possible.

Nonprofits, says Daniels, were an essential part of that mix. "Nonprofits do a really good job at data collection, extracting the necessary analytics," she says. Their involvement in the first green street project led by the city, on Riverdale Avenue, helped "prove out the assumption that it would improve water quality, and that all the water flow would be managed [as required]."

Nonprofits have also played a key role in Tucson, where organizations and engaged citizens have led the way. Tucson water experts credit permaculture enthusiast and author Brad Lancaster with kickstarting the rain harvesting movement in the 1990s, when he created the first intentional curb cut, which was illegal at the time. Lancaster sliced out a piece of curb and placed a vegetated basin behind it to capture the water running down his Tucson street.

For its part, WMG created the first-ever green infrastructure planning manual for desert cities (WMG 2017). Catlow Shipek says the group identified the need for a how-to manual with practices, schematics, and maintenance information when it discovered that key stakeholders—engineers, city departments, and neighborhoods—weren't speaking the same language. The manual helped create that common language and facilitated better collaboration.

MacAdam confirms that citizens, neighborhood groups, and nonprofits have gotten the city where it is today on low-impact development. "It was decades of continual and concerted action by people, the grassroots," he says. "As a city, we want to take that and build on it, improve it and professionalize it, and make it part of our infrastructure."

The group identified the need for a how-to manual when it discovered that key stakeholders—engineers, city departments, and neighborhoods—weren't speaking the same language. The manual helped create that common language and facilitated better collaboration.

A Solution with Multiple Benefits

One of the challenges Tucson Water has faced in advancing low-impact development is that it doesn't pencil out from a water savings or flood control perspective alone. If you look at these elements in isolation, the costs exceed the benefits, according to MacAdam. Tucson will continue to invest in traditional gray infrastructure for flood control, but MacAdam points out that the low-impact approach "can improve a lot of things: how we do flood control, how we manage our water supplies, how we build our streets to provide multiple public benefits, air quality, water quality, shade and resiliency."

Berger of TreePeople agrees. "No one could argue with a straight face that nature-based solutions will be your most effective from a flood control perspective exclusively," he said. But, like MacAdam, he believes that if you take into account the multiple benefits, "nature-based solutions will rise to the top as the preferred solution in many cases."

Both Tucson and Los Angeles can point to proof that investments in low-impact development pay off in multiple ways. But the economics of urban water management are likely to get more complex, not less, as development and climate change continue to accelerate. "Water is only going to get more expensive," says Randolph. "Each city has to invest in solutions that will keep them vibrant for years to come, and that don't pit people against each other when water prices begin to rise. Tucson and LA are making good decisions for their communities. They're tackling the problem head on."

Meg Wilcox is an environmental journalist covering climate change and water, environmental health, and sustainable food systems. Her work has appeared in *The Boston Globe*, *Scientific American*, *Next City*, PRI, and other outlets.

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Mayor Libby Schaaf, Oakland, California. Credit: Noah Berger.

Mayor Libby Schaaf was born and raised in Oakland. During her six-year tenure, the city has undergone an economic revitalization and building boom and has cut gun violence nearly in half. Schaaf has worked to stabilize rents, decrease evictions, and address homelessness, and was appointed to California's first Council of Regional Homeless Advisors in 2019. She created Oakland's first Department of Transportation, prioritizing projects in underserved neighborhoods and addressing the city's decades-old infrastructure backlog. She also launched Oakland Promise, a cradle-to-career initiative that improves educational outcomes for local students. This spring, Schaaf responded to the coronavirus crisis with a successful lockdown, reconfiguring streets for pedestrian uses and housing homeless people in vacant hotel rooms. She talked with Senior Fellow Anthony Flint about the experience and about the future of cities.

This interview is also available as part of our **Land Matters** podcast series: *www.lincolninst.edu/publications/multimedia/podcast-oakland-aims-build-back-better.*

In the Midst of a Crisis, Oakland Aims to Be the "Silver Lining City"

ANTHONY FLINT: **How did the pandemic unfold for you, and how has your job changed since this all began?**

LIBBY SCHAAF: We were one of the very first places to have to confront this crisis. I remember I got the call from Governor Gavin Newsom, and we were being asked to allow the [Grand Princess] cruise ship to disembark. . . . We have to say forcefully that we are members of an interdependent human community that must put people over profits and that must put health first, and that we must model generosity and the right values in moments of crisis. And so I accepted the request. We made sure to constantly remind people of the historical context of environmental racism that had been visited upon West Oakland [the city's port area] and we also pushed our federal and state partners to [take] extra measures to ensure community and worker safety during the operation. It was very heartening to be able to provide that safe harbor, but it was a very unusual entry for me into the COVID crisis . . . my initial attention was external, to these outsiders that needed help from my city, then [I needed] to quickly pivot internally as we began to see cases unfold right in our community.

I have not been to City Hall but one time in the last few weeks. So my life has changed tremendously on a personal level. I've learned that I'm really bad at cutting my son's hair. I've learned that my husband is an amazing cook and I've learned that our Slow Streets in Oakland are an amazing comfort, as I got to enjoy the first one in my neighborhood recently.

I know that a quarter of my workforce in Oakland has lost their jobs, and it is such a sobering reality. I have shifted a tremendous amount of my time and energy to communications and crisis management. [But I also] want Oakland to be the "silver lining" city. I want us to exploit every opportunity in this crisis to make lasting structural change that needs to be made and needed to be made before the crisis. The crisis is only exacerbating things like structural racism, like economic disparity, and we have an opportunity to not just respond in the moment, but to make some lasting changes and to take advantage of a new level of national awareness. The health disparities by race is something that is finally getting national attention. Let's take that awareness, let's take what is hopefully an elevation of political will, and pass some laws so that we don't see these kinds of disparities again.

AF: You've received a lot of attention for building on the Slow Streets program and extending closures and other measures to accommodate social distancing and encourage biking and walking and using scooters. Do you think this might be a turning point for the public realm in cities everywhere?

LS: Without question: this is a turning point. I really want to shout out to my director of the Department of Transportation, Ryan Russo, who saw the opportunity to repurpose analysis that had already been done to create our bike plan so that he knew in an instant the 74 miles—the 10 percent of our roadways—that were eligible to be shut to through traffic and used as Slow Streets. So again, recognizing that you can repurpose work you've already done in a crisis, is brilliant.

"The crisis is only exacerbating things like structural racism, like economic disparity, and we have an opportunity to not just respond in the moment, but to make some lasting changes and to take advantage of a new level of national awareness."

Credit: Jaegar Moore via Flickr CC BY 2.0.

Oakland earned national attention for closing 74 miles of its streets to through traffic this spring, creating space for physical activity and physical distancing while ensuring continued access to essential businesses. Credit: Oakland Slow Streets.

I know that people are worried about the future of public transit. People are worried, are we going to go back to the car culture where we have solo drivers in their isolated pods spewing pollution and emissions and stressing out everyone because we're all stuck in traffic jams. We cannot go back to that. Slow Streets are . . . a place to give our residents a safe way to have a mental health respite by being outdoors, by having a safe, convenient place right in their own neighborhood to exercise, to send the kids out on their scooters and their roller skates to blow some steam off in a way that is socially distant.

But it's a reminder that the public right-of-way is the public's. It's not just for cars. And we've been underutilizing this precious asset in so many ways. It has been truly one of my favorite silver linings to see the joy of our residents enjoying those Slow Streets. We're experimenting, and government doesn't do that enough. And that's once again a silver lining of this crisis—that people are trying things and the tolerance for risk-taking from our public is much higher, because they realize this is a crisis; we've got to do things differently. We've got to test things out, but we're doing it in a very responsive way. We are getting continual feedback from the public about what they like and what they don't like . . . . We're shifting, we're evolving, but I can promise you that much of this is going to remain once the health crisis is over. People are loving it.

AF: In terms of mass transit, it's really the lifeblood of cities, and its fate is uncertain. How can mobility policies adapt to this new reality?

LS: Well, I want to start with our bus system because they made some quick changes that have been wonderful. And again, maybe things that we're never going to go back on. They stopped charging fares. Boom. What that allows them to do is board people from the back doors of the bus as well as the front; people are on and off faster. They don't have to go by the driver. It's less stress on the drivers, faster operations, less . . . touching and exchange. There are ways that we can kind of socially distance within public transit. Now, that's going to be a lot harder on a BART car. I used to ride BART several times a week and I joked about getting close to my constituents—because you definitely were pressed up against your fellow man . . . that is not something that's going to make sense for some time.

But rather than get people back in their cars, we're excited about trying to accelerate the use of electric bikes and scooters. Oakland a long time ago used to have the nickname "Oaksterdam," mostly because of our embracing of cannabis. But let's be Oaksterdam for bike riding. It's a healthier way of getting around. It's safer. And that is a pivot that we can make. All I know is that we cannot afford to get back into our cars again. That is not an option.

AF: All the economic disruption at a macro level is just staggering, but in terms of cities and downtowns, it's hit some of the basic building blocks—retail, restaurants, office space, residential. How is this likely to alter our urban future?

LS: We've seen construction continue; people are continuing to pull permits. The Bay Area had a significant housing crisis before COVID-19 and arguably we will have an even worse one after COVID-19, particularly for affordable housing and addressing our homelessness problems. So I have been encouraged to see that development continue . . . . We are already working with our business districts to see if they might want us to close those streets off so that restaurants and shops can spread out onto the sidewalk and into the roadway. We know that this virus is far more deadly in interior spaces, and particularly when people remain in a small interior space for long periods of time, so anything you do outdoors is going to be much safer. So why not create more of a marketplace atmosphere that could make some of these commercial areas even more attractive? Cities are not going away. Just because you have to socially distance does not mean you can't do that in a small apartment with someone above and below you and next to you. Cities are efficient. They allow us to deliver services more rapidly. Sprawl is not a healthy response. Smart density and the agility and creativity of cities is what's going to allow us to not just get through this health crisis, but emerge with a more equitable, healthy environment. [Look at] the lessons we've learned about how our planet is benefiting from the lack of car emissions. We've got to keep these lessons and not just go back to business as usual.

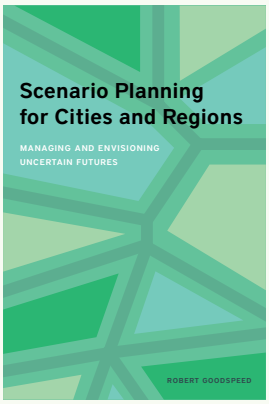
I know it seems like a funny time to sound optimistic. This is a horrid tragedy. Like many people, I have lost loved ones to this disease, and the severity of it is not to be underestimated in any way. And yet we have to see these opportunities. We have to seize them and that is our challenge right now. Anyone who's mayor of a major city has to be a bit on the optimistic side. That's what keeps us going, particularly during times like these.

"I know it seems like a funny time to sound optimistic. This is a horrid tragedy . . . and the severity of it is not to be underestimated in any way. And yet we have to see these opportunities. We have to seize them and that is our challenge right now. Anyone who's mayor of a major city has to be a bit on the optimistic side. That's what keeps us going, particularly during times like these."

A protest on the streets of Oakland in late May. Credit: Annette Bernhardt via Flickr CC BY 2.0.

NEW PUBLICATION

Scenario Planning for Cities and Regions: Managing and Envisioning Uncertain Futures



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To order, visit www.lincolninst.edu/goodspeed.

IN THE FACE OF rapid changes to technology, the climate, public health, and the global economy, a growing number of cities and regions use scenario planning to prepare for an uncertain future. *Scenario Planning for Cities and Regions: Managing and Envisioning Uncertain Futures*, by Robert Goodspeed, offers the first in-depth examination of how urban planners and the communities they serve can use this evolving practice to make better decisions about the future.

Unlike traditional planning approaches that begin with forecasting, scenario planning starts with a consideration of multiple plausible futures. Historically, the planning field has largely ignored uncertainty, resulting in plans that perpetuated the status quo rather than preparing residents for the future. By contrast, scenario planning puts uncertainties at the heart of the process, prompting practitioners to examine key variables like changing climate and weather patterns, uncertain growth trends, and evolving housing preferences. With this focal shift, a city might implement strategies that contend directly with unknown levels of sea-level rise, that direct efforts to maximize affordability, or that use critical natural resources more equitably and sustainably.

Scenario Planning for Cities and Regions examines how this tool can be adapted to a range of planning contexts—and how it can empower practitioners and citizens alike to better address the unprecedented challenges ahead. Intended for urban planners, students, and researchers, the book features practical guidance on scenario planning methods, as well as modeling and simulation tools. It also includes detailed case studies on community planning efforts including the Austin Sustainable Places Project, which used normative scenarios for low-budget, neighborhood-level land use planning in Texas, and the Sahuarita Exploratory Scenario Project, which employed exploratory scenarios to analyze an Arizona town's general plan applied to possible futures. Although it focuses on U.S. cases, the book also describes international applications of the tool, including an ambitious Queensland, Australia, regional planning project, and covers foundational work by Royal Dutch Shell, which developed scenario creation methodology in the 1980s to analyze the global business environment.

Goodspeed also examines the history of both scenario and urban planning, showing how once-distinct fields can combine to create comprehensive long-range plans that account for a wide range of potential futures and build consensus among diverse stakeholders. He demonstrates how scenario planning is uniquely suited to contemporary planning challenges and concludes, "Cities exist as they are, not as we wish they were, and scenario planning offers a good way to comprehend and plan them well."

Scenario Planning for Cities and Regions is "an essential resource for anyone interested in using scenario planning to inform and improve planning and policy making," said University of Akron Emeritus Professor of Geography, Planning, and Urban Studies Richard E. Klosterman. "It combines an instructive history of scenario planning, illustrative case studies, an overview of digital tools for creating and evaluating scenarios, a careful review of empirical studies, and a useful framework for evaluating urban scenario outcomes."

ABOUT THE AUTHOR

Robert Goodspeed is an assistant professor of urban and regional planning at the University of Michigan's Taubman College of Architecture and Urban Planning. He teaches and conducts research in the areas of collaborative planning, urban informatics, and scenario planning theory and methods. He is a member of the American Institute of Certified Planners and serves as a board member of the Lincoln Institute of Land Policy's Consortium for Scenario Planning.

Linking Land Value with Urban Infrastructure Projects

Costa Rica's upgraded 52-mile electric rail network will connect 46 stations in 15 municipalities and is a centerpiece of the country's plan to decarbonize by 2050. Credit: Daniel Navarro, courtesy of Ministerio de Vivienda y Asentamientos Humanos (Housing and Human Settlements Ministry).

Costa Rica has embarked on a $1.5 billion project to expand and electrify a train line serving greater metropolitan San José. Leaders there are making the case that land-based financing tools—including special contributions and charges for building and development rights on the increasingly in-demand land around the train stations—will be instrumental to the project's success. The Lincoln Institute of Land Policy is working with local and national officials and academic institutions to build the capacity needed to implement land-based financing. National leaders are now proposing to incorporate new types of land-based financing tools into national urban development legislation.

To learn more about how the public sector can recover and reinvest increased land value, visit **www.lincolninst.edu/publications/policy-briefs/land-value-return.**

"This link between an urban infrastructure project and the development of land in our cities is something that has never been done in Costa Rica before . . . . It is definitely in our interest to continue this work, because it has strengthened the case for large-scale projects such as the Electric Train."

— **FIRST LADY, ARCHITECT, AND URBAN PLANNER CLAUDIA DOBLES, WHO IS LEADING THE *TREN ELECTRICO* PROJECT**

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