UCLA

BLUE PRINT

ISSUE #4 / FALL 2016
DESIGNS FOR A NEW CALIFORNIA
IN PARTNERSHIP WITH
UCLA LUSKIN SCHOOL OF PUBLIC AFFAIRS

SUSTAINABLE CALIFORNIA

PART 2: WATER

EDITOR'S NOTE

BLUEPRINT
A magazine of research, policy, Los Angeles and California

THIS ISSUE OF BLUEPRINT IS SEVERAL THINGS AT ONCE: It's Part 2 of our sustainability series, following up on the spring look at power with a fall take on water. It's also an opportunity to examine two of Los Angeles' most important political figures — the city's mayor and council president. Finally, it's a look at how power works, and doesn't work, in Los Angeles — whether it's the region's infamous fragmentation and the problems that creates in water prices or the subtleties of political leadership in and around city hall.

As these stories and interviews remind us, Los Angeles is a complicated place to solve big problems, and none is bigger than L.A.'s historic quest for water.

That history can be traced to any number of events, but probably the landmark moment would be William Mulholland's discovery and hijacking of the Owens River at the turn of the last century. Mulholland, the legendary Department of Water and Power chief, left a contradictory legacy: In the Owens Valley, he remains a magnificent villain, and any chance that valley had to become a thriving farmland ended with his acquisition of the land and water rights used to divert the river to Los Angeles. Still, that land was bought, not stolen, and one of the world's great cities would not have existed without it.

As Mayor Richard Riordan, the first Los Angeles mayor to visit the Owens Valley since the construction of the aqueduct, liked to say: "We stole it fair and square." (I was with Riordan on that trip, incidentally. We flew in a Department of Water and Power helicopter.)

The theft, fair or not, also established Los Angeles as a city dependent upon imports. For most of our history, water has come from the Sierras (and from the Colorado River and Sacramento Bay Delta), while power has been generated by coal plants in Utah and Arizona. As Mayor Eric Garcetti notes in this issue, the city has long been in the strange position of flushing out rain that falls here while importing water from far away.

That's changing.

Guided in part by research featured in this issue, as well as directives from the mayor, Los Angeles is committing itself to a water future very different from its past — one of conservation and reliance on local sources. The mayor has called for 20% per capita reductions in water usage by next year, and the DWP is aggressively subsidizing the replacement of lawns with drought tolerant plants, as well as programs to save rainwater and discourage waste.

Los Angeles' history in this area is of grand projects and extraordinary impact — giant aqueducts and aggrieved neighbors. That history gave the city a chance to be. But its future may be more modest, living in closer harmony to the local environment and treasuring the water that is here.

Getting there won't be easy. It will require the leadership of those featured in this issue and the intelligence of the research identified here. It will require new ways of capturing and moving water, as well as new ways of thinking about our relationship to it. But it's possible. As Mayor Garcetti notes, this may be Los Angeles' second "Mulholland moment."

JIM NEWTON
Editor in chief

INSIDE BLUEPRINT

ISSUE #4 / FALL 2016

LANDSCAPE

PROFILE

INFOGRAPHIC

FEATURED RESEARCH

MAP

TABLE TALK

CLOSING NOTE

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LANDSCAPE

DIVERSITY: ON THE SET AND BEHIND THE SCENES

By any measure, David Hudgins qualifies as a member of the Hollywood establishment. With piercing blue eyes and 15 years of notable work, including critically acclaimed shows such as *Everwood*, *Friday Night Lights* and *Parenthood*, Hudgins is well-known, well-liked and well-respected. That could make him defensive about critiques of his business, including the charge that Hollywood has done too little to promote diversity. He's not. Asked whether he agreed that Hollywood is behind on race relations, Hudgins did not hesitate: "Yes," he said, "we have a problem."

The numbers back him up.

According to a recent study by UCLA's Ralph J. Bunche Center for African American Studies, men and women of color in 2014 held lead roles in 12.9% of films and 8.1% of broadcast TV programs — compared with 37.9% of real-life America. People of color held 12.9% of film directing positions and were 3.3% of broadcast show creators. Women were cast in lead roles in 25% of films and 35.8% of broadcast shows — they are, as you probably know, 50% or so of the population. They wrote for 9.2% of films and directed 4.3%.

As the Bunche Center report notes, Hollywood's "homogeneous group of decision makers" is responsible for those glaring differences.

That's more than one problem. It's a workplace issue — how could women and minorities lag so conspicuously behind their white male counterparts in any industry? But in the case of Hollywood, it's also a cultural problem. When American entertainment tells the world that heroes, even superheroes, are white men and boys, it implants a message that reinforces stereotypes. And that's nothing new: "It's traditionally been a business run by white men," Hudgins said. "Think of the Warner brothers. There were three Warner sisters, by the way."

Why, then, would an industry so famous for its liberal politics be so conservative in its social vision? The base answer is money, or at least the perception of it. Proven stars draw audiences, and most proven stars are white, so risk aversion perpetuates discrimination. That leapt to public attention last year, when the list of Oscar nominees included precisely zero black actors. A number of high-profile actors and executives objected, and some launched the #OscarsSoWhite campaign.

Since then, the Academy has tried to broaden its ranks, extending membership to 683 additional people. Of those, 41% were racial minorities and 46% were women.

"We encourage the larger creative community to open its doors wider and create opportunities for anyone interested in working in this incredible and storied industry," said Cheryl Boone Isaacs, Academy president.

Still, that alone won't diversify Hollywood. Hudgins, for instance, notes that diversity is needed through the ranks, not just on screen. Although it is important to have a diverse cast, he said, the people with the most influence are behind the scenes: in film, the producers — and in television, the show runners. These are the creators of the story and the decision makers who choose which version America sees and hears; they are the ones with the power to make lasting change.

Moreover, Hollywood's caution is also misplaced, according to the UCLA study, the principal author of which was Professor Darnell Hunt. "Films and television shows with casts which roughly reflect the nation's racial and ethnic diversity, on average, posted the highest box office and ratings numbers."

Such findings may at last be sinking in. In July, Marvel Studios announced its first female-centric Captain Marvel film. Sony Pictures shocked fans this year by rebooting the Ghostbusters franchise with an all-female cast. Audiences who want to see their identities on screen will soon get more of a chance to do so.

"When I entered the industry in 2003, diversity was not at the forefront of really any discussion with a studio or network," Hudgins said. "Today, it's absolutely at the forefront."

– Shelby Scoggins

WATER TROUBLES IN AMERICA'S BIGGEST CITIES

Manhattan and its four sister boroughs have their problems: 27,000-plus people per square mile elbow one another for resources and space, puzzle over strange emanations from the sewers and wage an ongoing campaign against crime and crooked politics.

Yet when its citizens turn on their faucets, they benefit from some of the cleanest, unfiltered natural water in the nation. That's the result of a sustained commitment to infrastructure, and it has led to complacency — at least compared with the growing vigilance of drought-conscious California. No more.

"California[ns] may point their fingers at [New York City] that we're not doing so much in conservation, but that's not really true," said Cooper Union professor of architecture Kevin Bone, who's also director of the school's Institute for Sustainable Design and a principal at the architectural firm of Bone/Levine. While acknowledging that his state is not "up against the same limits California has," he argues, "New York's done a huge amount in terms of reducing its water use and conserving the water it has."

Bone's SoHo headquarters is tiled with black-and-white prints of the underground tunnels and dams that contribute to NYC's bounty. The office itself is lean and functional, not unlike the tall and slender Bone himself. As he discusses New York's water issues, he highlights both parallels and differences to the issues faced by Los Angeles. Both rely on a web of infrastructure to import water and, though Los Angeles is more prone to drought, both cities are coming to see the primacy of conservation.

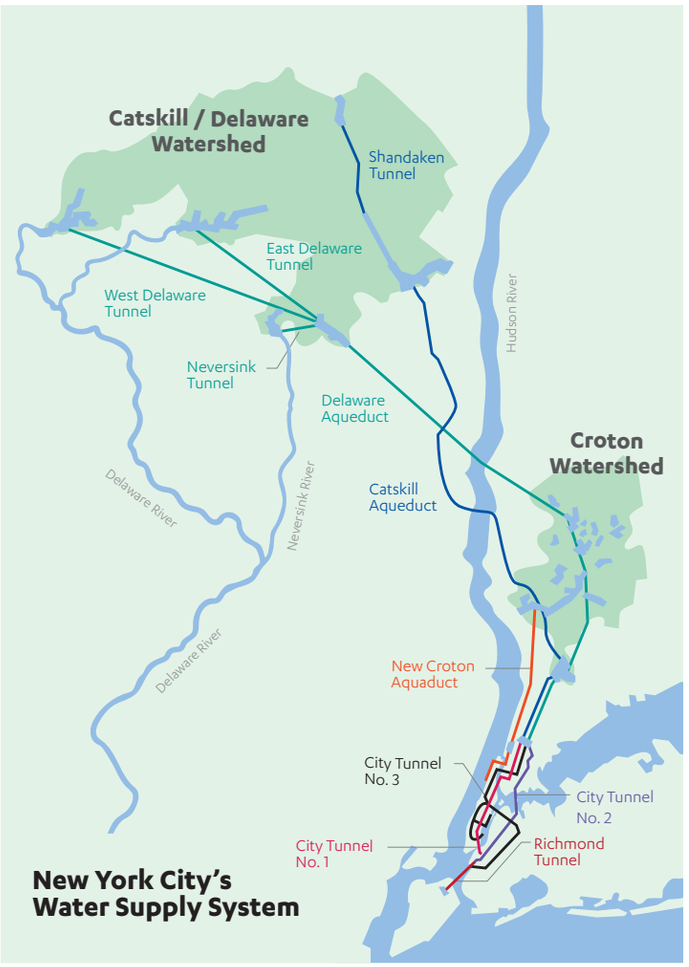
"You have to see conservation as a global or holistic strategy," added Bone, who co-authored and edited 2006's topic-essential *Water-Works: The Architecture and Engineering of the New York City Water Supply*. "You're not just conserving water. You're also conserving infrastructure dollars, energy use... you have to see that all as part of a system."

New York's system is a minor miracle of small-town and big-city cooperation; bipartisanship; and the kind of stubborn American determinism that is so often associated with the settlement of the western United States. After nearly two centuries of relying on well water and conducting crude experiments in early reservoirs, the city began constructing more sophisticated pipelines during the 1840s to import water from north of its borders, starting with Westchester County and eventually via the mountainous — and virtually unpolluted — Catskills region farther upstate. In total, the system that supplies New York's water comprises 19 reservoirs, three main aqueducts and a vast network of tunnels — painstakingly constructed over more than 150 years.

"The older history is fairly contentious," Bone said. "But from about 1840 on, New York City has aggressively designed, built and maintained really good structures to collect and deliver quality water. And it's been a priority through conflict. We've always had something of this agenda to say, 'This is a critical resource for the well-being of the city. What are we going to do to keep the water flowing for the next 100 years?'"

That's been a particularly pressing question over the past decade, as cracks in the city's aging subterranean aqueduct system have threatened to jeopardize its sustainability. Particularly worrisome is the Delaware Aqueduct, which supplies more than 50% of New York's water supply. Leaks are wasting more than 30 million gallons a day.

So in 2013, the city's Department of Environmental Protection (DEP) broke ground on a $1.5 billion restoration and bypass project to reinforce tunnel trouble spots and permanently reroute water around them. (A corresponding project connecting the Catskill and Delaware Aqueducts, completed last year, claimed two lives.) Construction is scheduled for completion in 2020,



but as it approaches its conclusion, the Delaware Aqueduct will have to be shut down for anywhere from six months to a year and a half.

"The general thinking is you push more water through the Catskill Aqueduct, you take everything you can out of the [Delaware] systems," Bone said, "but I don't know that we're ever going to be at a point where we're taking no water from the western side of the Catskill mountains."

Until that time, the onus falls on New York to nudge its residents toward more conscientious conservation habits, or even the notion of temporarily gulping down glasses of cloudier-than-normal H2O. "It's entirely possible," Bone said, though he speculates that comparatively impure water may be less likely than the odds of a devastating infrastructural failure — be it construction-related or even seismically induced — leaving New York bereft of half its supply. "It would be interesting to see what kind of document exists in some commissioner's desk about what we're going to do when we have half as much water."

Still, Bone remains optimistic not only about New York's wherewithal for preventing interruptions in its reservoir flow and persevering in the face of the growing impacts of climate change, but also that the city's efforts can serve as a model for others.

"We are all connected, especially in water," said Bone. The issue may be "infinitely more complicated" in Los Angeles, where overall supply is threatened, but these very different regions, he stressed, have one thing in common: Water, once delivered by planners and their grand visions, now requires the collaborative work of those who use and supply it.

"I think it's important that, like in the better visions of architecture nowadays, it's not just an architect who comes up with an idea and then the engineers implement it," Bone said. "It's the architects and the farmers and the automobile and plastic manufacturers. All these people get together, who are constituents in the water puzzle, and say, 'How can we do it better?'"

– Kenny Herzog

PHOTO BY **CHRISTA RENEE** FOR **UCLA MARKETING**

GRAND CHALLENGE FOR A PROVEN ADVOCATE

The UCLA Grand Challenges aim high: They attempt to bring staff, students, community leaders and experts together to "[solve] society's toughest problems." These projects are vast undertakings, described as "the biggest, most collaborative and potentially most transformative efforts UCLA has undertaken to date." And yet, to some at City Hall or the County Hall of Administration, mention of the challenges evokes curiosity rather than recognition.

Unnoticed by some in government, the first Grand Challenge, already well underway, is tackling one of the most profound issues facing this region — and the world. Its goal: to make Los Angeles County environmentally sustainable by 2050. A region known for importing its water and generating its power thousands of miles away is looking to break with that history and reimagine itself as self-sustaining.

Leading that effort is a figure new to UCLA but well-known in the Civic Center. Mark Gold is the university's recently appointed associate vice chancellor for environment and sustainability. To those in the local and state environmental movement, Gold is better known as the longtime head of Heal the Bay, where his pugnacious determination sometimes irritated critics but also won notable achievements in cleaning up the region's water and beaches.

Gold, importantly, is not a theorist. Brash, impatient and demanding, he's an activist, now lodged at an institution better known for its landmark research than its local engagement. His job, then, is to connect those who can design the future to those charged with delivering it.

"There's just so much new innovation that's occurring here," he said. "How do you make that real? How do you get that to impact society?"

To begin, you write a plan, and that's what the Sustainable L.A. team has done. The Five-Year Work Plan, which was released in December 2015, outlines research projects that will serve as a foundation. The goal is to use the findings of those projects to create an Implementation Plan, to be complete by 2020. That, in turn, will lay out concrete steps toward sustainability by 2050.

A plan leading to another plan may suggest bureaucracy more than breakthrough, but supporters say plans are essential for lining up support and completing the project. Before the Work Plan was complete, Gold said, he felt "a little insincere, like I [was] trying to sell a used car." Now he can point to concrete goals.

The document blends imagination with realism. One project aims to improve the efficiency of offshore wind turbines. Another seeks to develop a device that would both harvest and store solar energy. A third would revamp technologies for treating wastewater. Each proposal imagines specific solutions and offers metrics for analysis and evaluation.

While developing the technology to make these projects achievable is a feat in itself, Gold said the "policy and governance problems are going to be tougher than the technical challenges." Having worked with local government to change public policy during his time with Heal the Bay, Gold understands that making progress will require a "true collaborative effort" with the government.

Internal collaboration is key as well. Most scholars are isolated in their research, but this task is interdisciplinary, and the Grand Challenge thus tests university habits. Collaboration between the sciences and the humanities, or North and South campuses, requires scholars — more than 150 are involved in this project — to speak languages unfamiliar to both.

"People normally work in their cliques and that's it," said Gold, adding that he was pleased with the collaboration that he's seen so far. Gold acknowledged that this is a protracted undertaking, where success will be measured not by one plan or another but by genuine and lasting societal change. Still, he's nothing if not confident.

"I'm not in the habit of failing," Gold said. "I don't really want to start now."

– Kristen Hardy

WHITHER CALIFORNIA'S GOP?

There was a time when Republicans held sway in Los Angeles and Sacramento — when Dick Riordan was mayor and Pete Wilson was governor, or earlier, when Earl Warren commanded the state's politics and Los Angeles was a Republican bastion. In those days, debates over major issues featured typical tensions between the parties, with one side arguing for frugality and the other for human services. Those days are gone.

Today, not a single Republican holds statewide office in California. Los Angeles Mayor Eric Garcetti is an up-and-coming Democrat; Gov. Jerry Brown is a career-capping Democrat. Two Democrats are contesting the state's open Senate seat; no Republican made the runoff. Fourteen out of 15 members of the Los Angeles City Council are Democrats. Only one Republican elected official at any level — local, state or federal — lives within the city limits of Los Angeles: City Councilman Mitchell Englander.

There are no more furiously argued questions in California politics than: How did the Republicans lose their grip? And how can they regain their relevancy? The answers are complicated, and not everyone agrees, but most accept a few points.

> The Democrats have built a bench. In the biggest cities, strong candidates and office holders at the local level have given Democrats a deeper pool to draw upon. Dianne Feinstein was mayor of San Francisco and Barbara Boxer a Northern California congresswoman before achieving statewide positions. Kamala Harris started as a San Francisco district attorney and appears headed for the United States Senate; Antonio Villaraigosa and Garcetti both served on the Los Angeles City Council before moving to the mayor's office and now are eyeing bigger things.

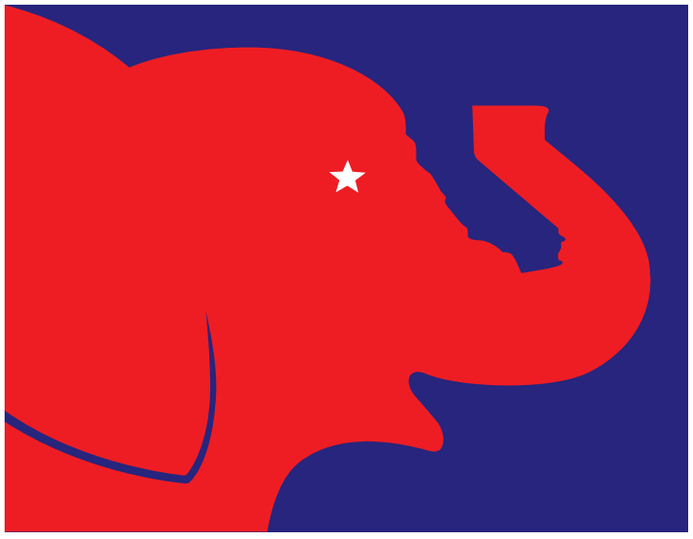
> Republicans statewide have shown recent flexibility in selecting nominees, but it has done them little good. In 2002, most observers believed Riordan, who was pro-choice and favored gay rights, would be a formidable challenger to Gov. Gray Davis. But primary voters preferred Bill Simon, a more hard-core conservative, who was defeated roundly in the general election. Arnold Schwarzenegger was a special case because of his unusual name recognition. More recently, in 2010, Republicans nominated Meg Whitman, who supported abortion rights. Then, in 2014, they nominated Neel Kashkari, who supported abortion rights and same-sex marriage. But both fell to Jerry Brown. Among the reasons: GOP moderates in California get swamped by backwash from their harder-right national party and its more conservative candidates — and there is limited advantage to having an "R" designation on the ballot when fewer than a third of the voters in this state are registered Republicans.

> Republicans have alienated young people and Latinos with their stands on gay marriage and immigration. These may be the party's two most serious liabilities. Starting with Wilson and his support for Prop. 187, which sought to deny many services — including vaccines and public education — to undocumented immigrants, many Republicans have staked out positions on immigration that strike Latinos as hostile to their interests, even to their families. On gay marriage, every passing year shows support growing, especially among young people, for an idea that many Republicans have yet to embrace. The party's intransigence reinforces the notion that it is mean-spirited.

Rob Stutzman, one of California's leading GOP political consultants, concedes that the picture is grim. The party's image, he acknowledges, is that of "Southern white men," a perilously narrow base upon which to build a political coalition, especially in California.

Stutzman is less inclined than some to hold Wilson responsible for the party's difficulty with Latinos. He argues that the former governor's support for Prop. 187 may have been damaging at the time, but that was decades ago, and most young voters probably don't remember Wilson, much less hold a grudge against him. Donald Trump, however, has supplied new reasons for Latinos to doubt the Republican Party — denying benefits to undocumented immigrants is one thing; calling them rapists and building a wall to keep them out is another.

To be successful in California during this election cycle, Stutzman said, Republican candidates have to make the difficult decision to oppose their presidential nominee. "You have to have the credibility to say Trump does not represent my Republican Party," he said. "You have to vote against him."



Looking ahead, the party faces a double challenge: figuring out how to elevate local politicians into higher offices while also hoping to strike lightning at the top. "We need a transformational candidate at the state level," Stutzman said. That was what the self-financed Meg Whitman attempted to be in 2010, only to lose handily to the resurgent Jerry Brown, whose bid for a third term, more than two decades after his second, was aided by strong support from Latinos.

Meanwhile, billionaire Charles Munger has provided financial support for the party, which gives it a foundation to rebuild upon. Next comes the arduous work of reshaping the party's image, identifying openings, recruiting candidates and persuading voters that the GOP represents their interests. Success depends on finding a way back to the center and a return to values and ideas that once appealed to moderates, young people and voters of color. It is sure to be a long project.

– Jim Newton

PHOTO BY **DAVID SPRAGUE**

L.A.'S POWER BROKER

HERB WESSON *IN ACTION*

AT THE THREE-DAY CHILDREN'S CAMP HE SPONSORS AT HANSEN DAM PARK, Los Angeles City Council president Herb Wesson is known by the kids as Chief. One summer day, I saw Chief solve a big problem. A boy wanted to skip the session on kayaks and go swimming instead. No, his counselors said, he had to stick with the program — kayaks first, then swimming.

Chief mixed humor with firmness, and soon the boy was laughing and heading toward the kayaks. It was another quiet victory for a man whose mastery of politics, power and behind-the-scenes maneuvering has made him — at least in my mind — the Not So Secret Boss of Los Angeles, or at least of that patch of intrigue known as City Hall. He's no secret among the city hall crowd, which knows and obeys him. But outside of Civic Center and his district, Wesson is all but anonymous.

In theory, the most powerful person in City Hall is Eric Garcetti, mayor of Los Angeles and its 4 million people. He runs day-to-day operations and shapes long-range policy through his annual budget. And he has a big staff dedicated to implementing his plans and making him famous enough to run for higher office, such as governor or U.S. senator.

But if you want to build a 32-floor high-rise in Hollywood, approve a $100 million bond issue for the homeless or encourage the Department of Water and Power to increase its use of recycled water, see Wesson, the first African American city council president. He heads the 15-member body, which writes the laws implemented by the mayor and votes on the mayor's appointments to city commissions. Among them are commissions that set policy for such crucial tasks as policing the city, running the airport and, of great importance in this time of drought, delivering water and power to Los Angeles residents. As president of the council, elected by his colleagues, Wesson appoints the chairs of council committees, where ordinances are prepared. He also appoints the committee members, deciding whether a colleague gets a committee with "juice" — the ability to attract campaign contributors — or is doomed to obscurity on a committee with little influence.

WRITTEN BY
BILL BOYARSKY

PHOTO COURTESY OF **HERB WESSON**

"I SPEND MY TIME MAKING PEACE. I HOLD NO GRUDGES. NONE."

PHOTO BY **DAVID SPRAGUE**

He does all this with political skills learned from the ground up, on the streets of South Los Angeles' African American neighborhoods. He finished his education with a master's course as speaker of the state Assembly, where California politics were once shaped by two legendary Assembly speakers, Jesse Unruh and Willie Brown.

But these details don't completely explain why Wesson is the boss, just as they didn't with Unruh and Brown. "It's all about your personal relationships," Wesson told me. Like Unruh and Brown, Wesson understands that a political boss must dig deep into the psyches of colleagues and followers and know their desires, weaknesses and strengths. The boss must be willing to punish, as Wesson did by dumping two committee chairs who opposed him — Jan Perry and Bernard Parks. But the boss also must be generous, giving colleagues full credit for accomplishments. That's why it's best for Wesson to stay behind the scenes instead of basking in the spotlight.

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Herb Wesson Jr. stands 5-feet-5, a man of 64, who wears nicely designed, expensive-looking suits, or stylish sport clothes, depending on the occasion. He grew up in Cleveland, Ohio, son of a union auto worker. He dropped out of Lincoln University, a historically black school in Pennsylvania, to come to California and try for a career in politics. Later, he returned to graduate.

In July, we talked about his life and work, first in an interview at his field office, located in the heart of the 10th District, which extends from Koreatown to Baldwin Hills. Then I visited Camp Wesson, the experience he puts together every summer for South Los Angeles youngsters. I watched Chief hang out with the kids as they played, supervised by counselors.

He told me how chance brought him his first political job.

He had met Rep. Ron Dellums, a dynamic, liberal African American congressman from Berkeley, and heard him speak. "I remember turning around to my fraternity brother and saying, 'That's what I want to be. I want to be him.'"

It took a while. First he was a bill collector in Los Angeles. He was a stand-up comic. "I think I got paid for one or two jobs, something like 100 bucks." He also sold waterless cookware. "I would go downtown and approach women and say, 'Can I give you a gift?' If someone would take a gift, I would sell them on inviting me to their house, and they would invite people, like a Tupperware party."

How well did he do?

"Let me put it this way," he said. "In 45 days, I bought a Cadillac."

An acquaintance told him that Rep. Julian Dixon, an influential African American congressman, was looking for volunteers. Wesson made a wrong turn driving to Dixon's office and ended up at the headquarters of Nate Holden, who eventually was elected to the City Council. That's how I first met Wesson. The tempestuous Holden had been accused of accepting a shady campaign contribution. I went to his office to ask him about it. Holden was seated at his desk. Wesson, by then his top aide, stood nearby. Instead of replying, Holden exploded into huge, wrenching sobs. "Chief, chief, can I help you?" Wesson said, fetching a wet paper towel.

As it turned out, Wesson was more than a towel holder.

"Nate gave me a shot when nobody else would, and I did my very best to take advantage of it," Wesson said. "I would work seven days a week." After Holden, Wesson joined the staff of County Supervisor Yvonne Burke. "Yvonne smoothed my edges and really taught me how to control my ego and that the important thing wasn't getting credit," Wesson said. "The important thing was getting the job done." From there, he was elected to the state Assembly, where members were limited to three two-year terms. He rose to speaker, and then returned to Los Angeles when his term expired.

By then he was a power in South L.A. politics. With support from unions, Los Angeles businesses and Sacramento friends, he was easily elected to the City Council.

As he rose to power and learned his way around City Hall, Wesson and his wife purchased a home in Mid-City and a rental property in Ladera Heights. In the process, David Zahnhiser wrote in the Los Angeles Times, he found himself struggling "with a considerably more mundane set of issues: paying the bills on time." Zahniser and Daniel Guss on the website City Watch revealed that Wesson had several default notices saying he and his wife were months behind on their mortgage payments. Wesson said he has caught up on his payments and "we have been working with a financial adviser to get our household finances back on track."

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The stories of two council members — Marqueece Harris-Dawson and David Ryu — show how Wesson wields his power.

Harris-Dawson was an accomplished young African American leader who headed the Community Coalition, which has long fought for improving schools and against the neglect blighting South L.A. With a seat open in the 8th District, Wesson met with Harris-Dawson, heard his campaign plan and decided to back him. "When I come in, I come in big," Wesson told Harris-Dawson. He suggested contributors and met with him weekly to advise him on his campaign. He told Harris-Dawson that he was one of the "next generation of African American" leaders, "so I am going to take the time to walk you through" the campaign.

After Harris-Dawson won, he asked for a seat on Transportation, a juice committee that affects construction and engineering firms and other potential contributors. "Just couldn't give it to you," Wesson told the rookie. Instead, as council president, Wesson made him co-chair of a new committee on homelessness and poverty and told him it was important for a progressive African American to do that job, given the fact that a substantial number of the homeless are black. It turned out well for Harris-Dawson. The committee, at the center of trying to solve L.A.'s homeless crisis, has gained him significant attention.

Ryu was elected to the council over Wesson's opposition. He had been a leader of Korean Americans fighting Wesson's reapportionment plan, which divided Koreatown among council districts and gave Wesson a substantial portion of the area — with its many nightclubs, restaurants and other businesses that are big sources of campaign contributions.

But despite Ryu's opposition, Wesson welcomed him to the council and helped him navigate through the city bureaucracy. "He wants to be able to deliver services for his district," Wesson told me, as we ate lunch at a Hansen Dam Park picnic table. "I spend my time making peace. I hold no grudges. None."

Not everyone is enamored of Wesson's methods. "I think he can be charming. I think he is very slick and is not honest because when the man wants something done, he gets it done," said attorney and Koreatown leader Grace Woo, who ran against Wesson and opposed him in the redistricting fight. "He knows how to count his votes, as he likes to say."

Wesson, the vote counter, knows it takes just eight of the 15 council members to dump him from his job. That would put the brakes on a career that could include a run for county supervisor or mayor. Ambition brought him to his present heights from bill collecting and selling pots and pans. As he looks around the council chamber from his perch on the rostrum, he knows the same sort of ambition burns in some of his colleagues. And as he and the others realize, in City Hall a friendly backslap can quickly turn into a stab in the back. ◤

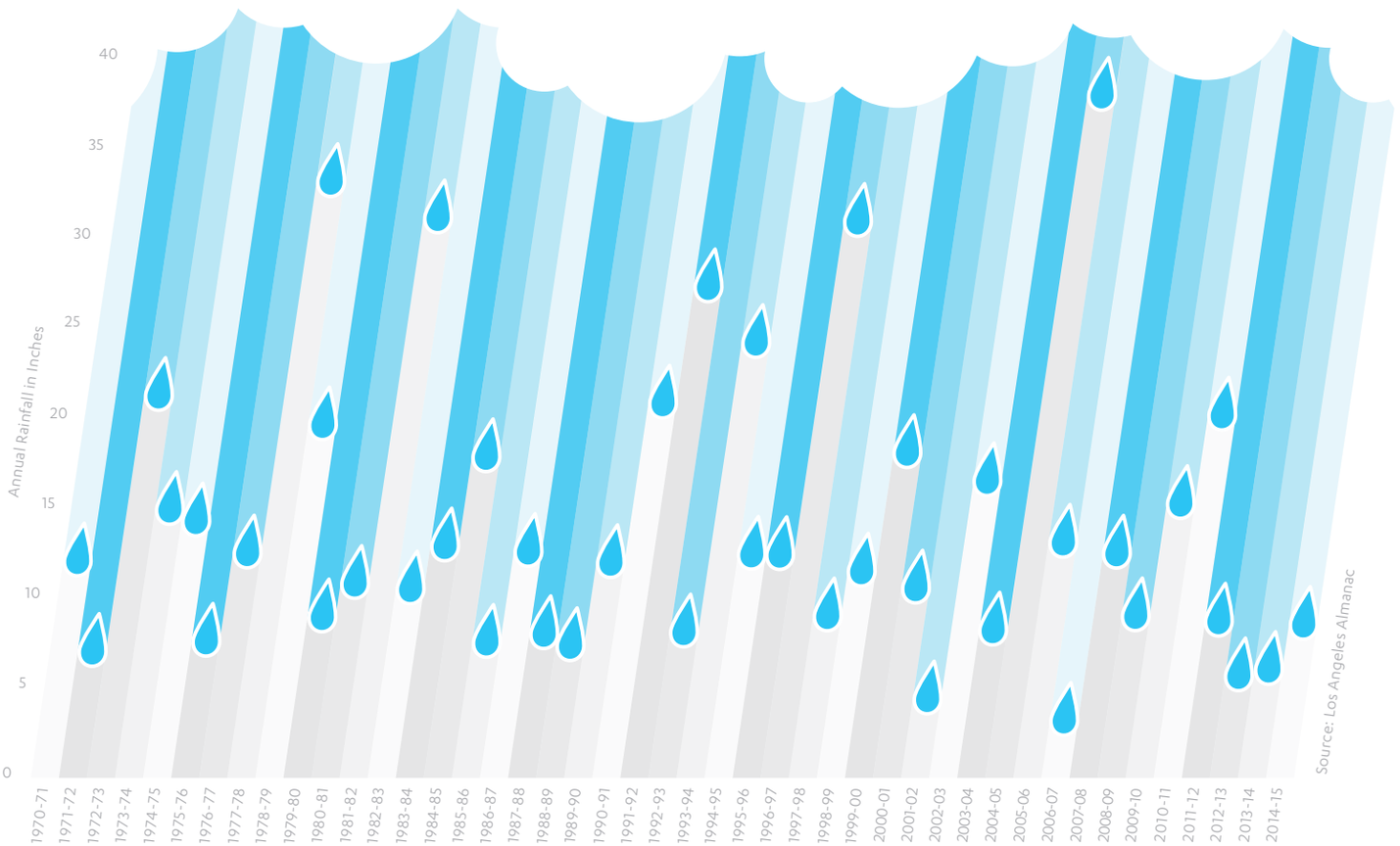
THE WATER SUPPLY:

WHERE IT COMES FROM

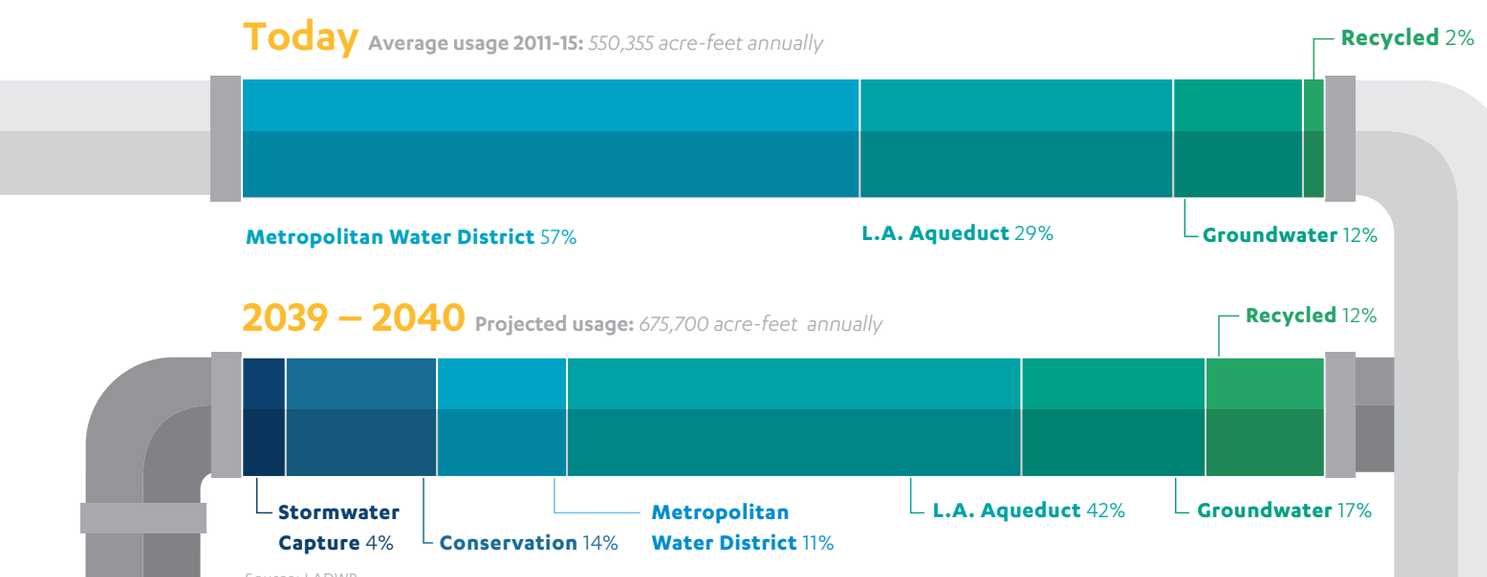
As global temperatures rise, the effects are far-flung: sea-level rise, more extreme weather and more common flooding, to name three. In California, one particularly dangerous effect is a decrease in Sierra Nevada snowpack that supplies water to the state's metropolitan areas.

Seasonal Rainfall in Los Angeles

Los Angeles receives an average of 14.93 inches of rain per year, but that's misleading. As this graph shows, rainfall fluctuates wildly from year to year, meaning that Los Angeles rarely experiences an "average" year. Also worth noting, recent rainfall has been noticeably down; not since 2004-05 has it topped 30 inches.



Los Angeles Water Supply



Source: LADWP

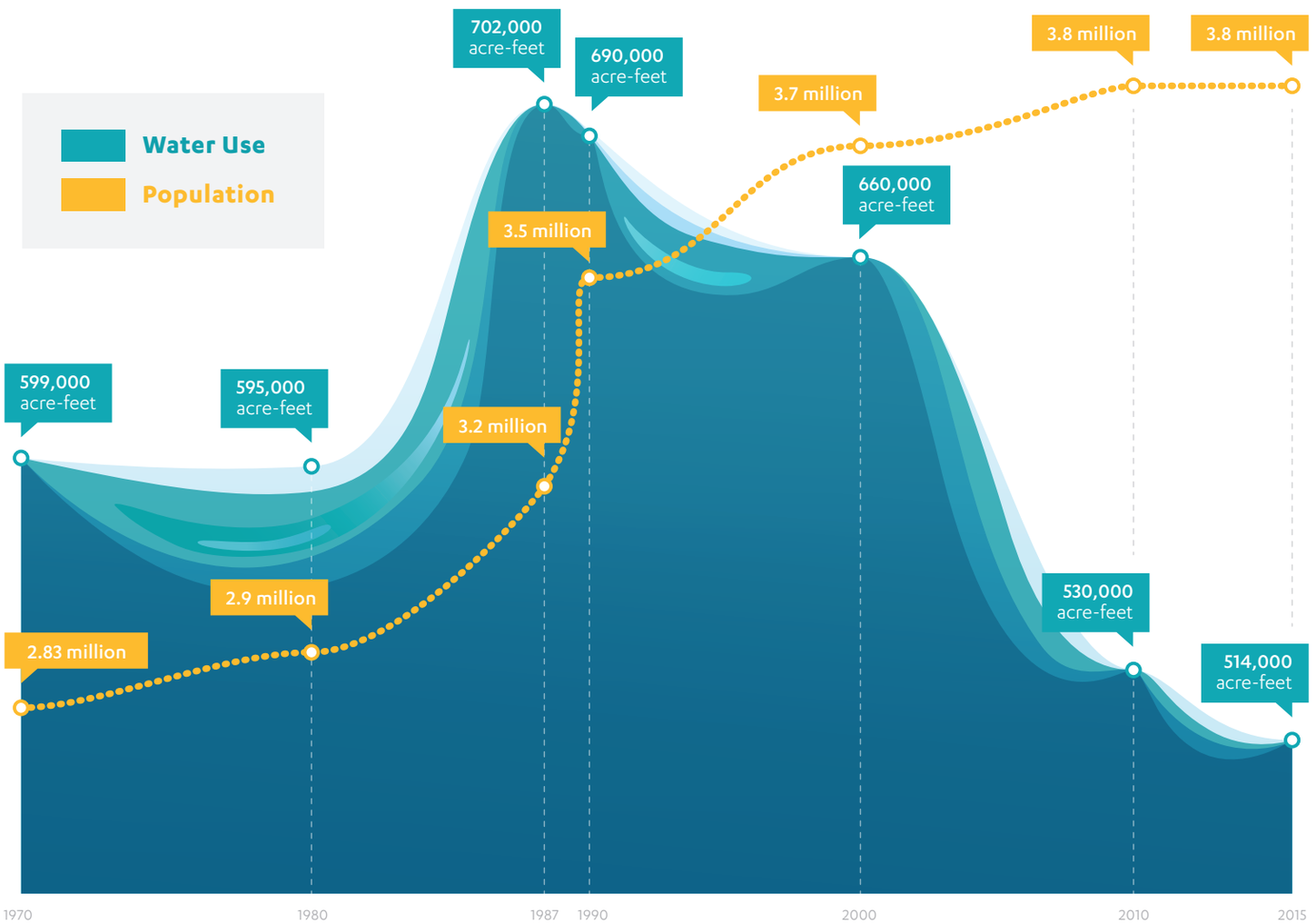
THE WATER DEMAND:

HOW IT'S USED

Angelenos once were regarded, especially by residents of Northern California, as profligate water users, hosing down driveways and splashing in pools. There may have been truth to that, but times are changing.

Water Use Over Time

As this chart demonstrates, Angelenos got the message about the need for water conservation in the late 1980s. Since then, the city's use has declined even as its population has grown.

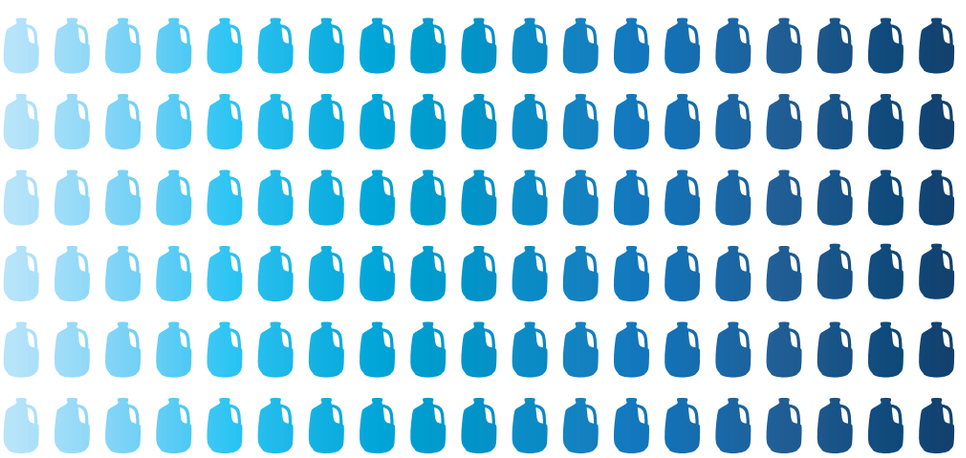


Source: LADWP and U.S. Census

The average person living in Los Angeles uses

114

gallons of water per day.



Source: LADWP

PART I : A PROBLEM

WATER & INEQUALITY

WRITTEN BY
SANDY BANKS

LYNWOOD AND PICO RIVERA ARE BOTH WORKING-CLASS CHUNKS of southeastern Los Angeles County, with modest homes and well-tended lawns gone brown. But the consequences of California's water crisis are playing out very differently in the two cities — both of which owe their creation to agriculture and water's easy availability.

Water bills in Pico Rivera average less than $200 per family a year. In Lynwood, that same amount of water costs a family more than $1,500.

The disparity is striking, but it's not uncommon in Southern California, now stranded in a long-running drought and saddled with an archaic and complex water delivery system. That system and the disparities it has encouraged are the subjects of an ambitious, UCLA-based project aimed at mapping the region's water costs. Known as the Water Atlas, it is providing a template for policymakers inclined to bring reason and fairness to supplying one of humanity's most basic needs.

Pico Rivera's 39,000 residents are served by its municipal system, which draws on groundwater sources and has some of the lowest rates in Los Angeles County. Lynwood is stuck with the privately owned Park Water Company, which purchases water conveyed from elsewhere and has some of the county's highest rates.

"There's a huge inequality in the price that people pay for water," said J.R. DeShazo, UCLA professor and director of Public Policy at the Luskin Center for Innovation. "Our current strategies to protect water and promote conservation are hitting low-income people extra hard."

Coming in at 52 pages of charts, graphs, analyses and recommendations, the Atlas documents that vividly. "Community water systems are the fundamental building blocks of California's water supply network," the Atlas notes. And those systems vary dramatically.

Los Angeles County's 10 million residents get their drinking water from 228 agencies. They range from the giant Los Angeles Department of Water and Power, a public utility with 4 million customers, to the tiny, privately run system that provides water to 25 residents of an Antelope Valley mobile home park.

Some Los Angeles County households pay 10 times as much as others for the same amount of water, depending on which water agencies serve their neighborhoods.

"The questions of justice, climate change and drought are coupled in a very dramatic way," said Stephanie Pincetl, director of the California Center for Sustainable Communities at UCLA. That's particularly true with water, she and others noted, because consumers are unable to decide where they buy it and have no control over its price.

"All these people are captive consumers," DeShazo said. "It's not like they have a choice."

Moreover, these problems are not new. Disparities are being highlighted by the drought, but their roots go back much further. "Through history, water

has always been provided by various authorities that have power. And that power's often exercised unequally," said UCI professor David Feldman, a political scientist who specializes in water management and policy.

That has benefited certain groups at the expense of others, he said. "Water is not neutral; it's subject to plans by engineers ... and political decisions. The policies we make [dictate] who benefits and who pays. "

Faced with the drought, local agencies have launched a host of programs to encourage conservation. Some have raised rates. Others have offered rebates for consumers who rip up lawns or install water-saving devices. Those programs, however, do not reach all people equally.

"Moderate- and upper-income people can cut back because they're consuming a lot of water to begin with," DeShazo said. "They respond to higher prices by watering less, not having the pool, not washing the cars, changing their landscaping. Poor people just have to bear it. They're using water only for essentials; they don't have many ways to cut back."

In addition, many can't tap rebates for conservation projects — replacing lawns with drought-resistant plants, for instance — because they can't afford the upfront outlay. Some have no access to the kind of subsidies that help pay skyrocketing bills. And for many low-income communities things are bound to get worse, as aging water systems need costly improvements and agencies raise rates to cover the tab.

That inequity is turning water management — its access, quality and cost — into an environmental justice issue that state policymakers have yet to address.

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> ***"THE QUESTIONS OF JUSTICE, CLIMATE CHANGE AND DROUGHT ARE COUPLED IN A VERY DRAMATIC WAY."***
>
> *STEPHANIE PINCETL, DIRECTOR OF THE CALIFORNIA CENTER FOR SUSTAINABLE COMMUNITIES AT UCLA*

California has three basic types of water delivery systems: publicly managed utilities; profit-making companies; and privately run, nonprofit mutual districts. The state has legal authority over them but exercises little oversight.

Costs vary because some systems rely on water purchased from outside sources and others tap cheaper groundwater reserves. The Luskin Center study found that private, for-profit systems tend to charge consumers more, as do small systems with fewer than 3,000 customers. And rates are likely to be higher in low-income communities, while water quality is likely to be worse — a phenomenon most shockingly illuminated by the discovery of lead in the water of Flint, Michigan.

Water systems have traditionally been tasked with prioritizing resource management, not addressing issues of equity. Tending to the needs of low-income customers has not been a priority. That may be changing.

"Affordability" is becoming the watchword of resource management now, said UCLA graduate student Greg Pierce, who did much of the research on the Water Atlas project. "It's the most important element; that's where the debate is moving."

Communities in south Los Angeles County have a high concentration of privately run so-called mutual water companies; relics of a rural era when water management was in the hands of small local co-ops. "Maywood has four of these," Pincetl said, "in a city that's the size of a postage stamp."

The century-old mutual districts that have endured are now limping along. Many lack the resources and capacity to maintain their infrastructure, plan for the future or embrace money-saving efficiencies.

"These are districts that are unable to, in a modern, 21st-century way, address climate impact on water supplies," Pincetl said. "I find it puzzling that we can't get over this system that just emerged over time, spontaneous and laissez-faire."

She thinks the small districts ought to be consolidated; "bought out by a larger utility, compensated and put out of business."

But that has been deemed, until now, politically unpalatable. "The state realizes that these small, poor systems are the real problem," DeShazo said. "They create the inequities. ... But consolidation has become a negative solution. It's good for economics, public health improvement and stability, but there's resistance rooted in local politics: 'We don't want that group to join our group. We don't want those people with us.'"

Alternatively, the state could support small struggling districts with money and expertise, invest in infrastructure and strengthen policies that protect low-income ratepayers. But that approach sidesteps the issue, said Pincetl. "Why throw good money after bad?

"Why should we have 200 water delivery companies in L.A. County? Why is that right? Just because they exist? We're gun-shy when it comes to thinking about the right scale for the right purpose."

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In the meantime, there are short-term fixes that could lighten the financial burden for poor families. For instance, researchers argue that every water district should have a customer assistance program that offers subsidies for low-income households, typically funded through surcharges on water bills.

"But in systems with nothing but low-income people, no one can subsidize those households," DeShazo said. "There are a bunch of small systems where everyone is uniformly poor. "

In fact, California's success at cutting water use may make that strategy hard to sustain. The less water people use, the less revenue the providers have, which leads to rate hikes to make up the difference. "That can make customers feel cheated," Pincetl said, "because they are using less and paying more."

That might lead to grumbling among middle-income consumers sacrificing lawns and showers — and then being required to spend more to subsidize the poor.

But subsidizing low-income consumers is not just a step toward environmental justice. It's an embrace of basic economics, said UCI's Feldman, who heads the university's collaborative water study initiative.

"The more you use of something like water, the more you are taxing the system that provides and treats that water," Feldman said. "The delivery, the treatment, the sewage we generate ... it's very expensive.

"Because of the burdens you and I are placing on the system, the principle of equity says in exchange for those burdens, we should probably be paying more. There's a lot we should be thinking about for the long run — but we need to start with that." ◤

PART II: A SOLUTION

HOW WATER MARKETS WOULD HELP

WRITTEN BY
LISA FUNG

LAURA ALLEN WAS FRESH OUT OF COLLEGE, renting a house for the first time and excited about starting her own garden in the backyard. Then she got her water bill.

"It was the first time I had to acknowledge how much water we were using and actually pay for it," she said. "The question for us was, 'Why are we using so much water?' and 'Can't we do something a little differently?'"

This realization led Allen and housemate Cleo Woelfle-Erskine to craft a simple greywater system that allowed them to reuse water from the washing machine by diverting it to their garden and landscaping — and at the same time save money on their water bill.

"It was really exciting and kind of logical, and we wondered why everyone wasn't doing this," said Allen, an elementary school teacher who, in 2007, went on to launch Greywater Action, an advocacy group dedicated to educating people on simple household systems that help reduce water use.

> ***"THE IDEA BEHIND WATER TRADING IS THAT THERE ARE SYSTEMS THAT HAVE LOTS OF GROUNDWATER AND LOTS OF WASTEWATER … THEY COULD SELL THAT WATER [TO ANOTHER SYSTEM], AND BOTH WOULD BE BETTER OFF. IT'S THAT SIMPLE."***
>
> ***J.R. DESHAZO, DIRECTOR OF UCLA'S LUSKIN CENTER FOR INNOVATION.***

At a time when California is dealing with its fifth consecutive year of drought, water conservation and reuse have come to the fore. Some homeowners facing higher water bills have started adopting technologies like greywater reuse, which became legal for landscaping in 2009. Others simply cope with the escalating costs of daily life.

The state's water districts, which supply water to communities, face higher costs for purchasing water imported from the Colorado River or Northern California. Many of those districts are adopting more recycling and reuse practices to increase local water supplies. That sets the stage for the creation of markets that may soon allow for water trading, which cuts reliance on imported water sources, and could ultimately bring down costs for consumers.

The push for urban water markets is partly motivated by rate inequalities from district to district. As noted in the accompanying story in this issue of Blueprint, Los Angeles County has more than 200 water systems, some of which have sky-high rates because they don't have access to local water. So an opportunity exists for districts to end fragmentation that is fueling inequality. Water markets may address it.

"The idea behind water trading is that there are systems that have lots of groundwater and lots of wastewater — more than they need to meet their local demands. They have no other use for it, so it sits there unused," said J.R. DeShazo, a professor of public policy and director of UCLA's Luskin Center for Innovation. "They could sell that water [to another system], and both would be better off. It's that simple."

Simple as it sounds, large-scale urban water trading doesn't exist in Los Angeles County because there is no institution in place to oversee trades and facilitate delivery of water. DeShazo's research focuses on Los Angeles County, where an urban-to-urban water market would be the first of its kind in the country and could serve as a model for other metropolitan areas. DeShazo aims first to identify potential sellers and buyers and determine transportation costs, then propose an outline for a regional water market system. Such a system could lead to new revenue streams that would allow cities to invest in green infrastructure and potentially bring down costs for all.

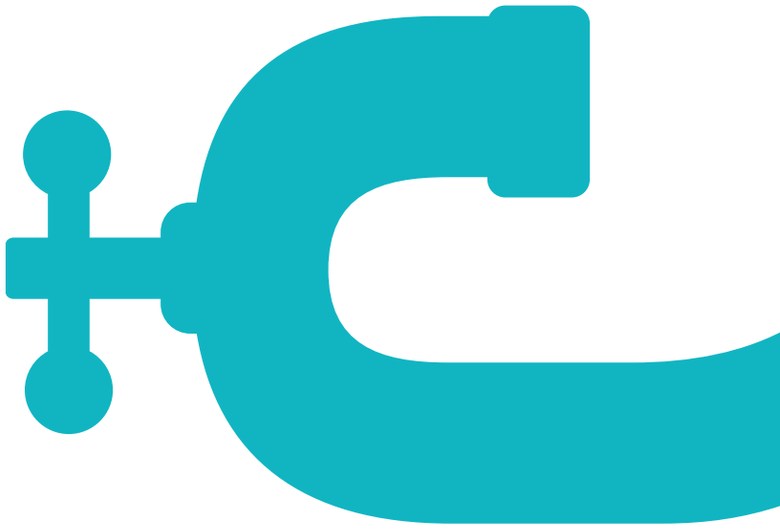
Water trading isn't a new concept. Farmers have been selling unused water for several decades, but these agricultural trades work best when farmers are close to the state water plant or the Colorado River Aqueduct system. The trades also are affected by state regulations tied to the Endangered Species Act, which protect certain species of fish by limiting the amount of water that can be moved during summer months, according to Steve Hirsch, program manager of water transfers and exchanges for the Metropolitan Water District, which is involved in agricultural trades.

But in Los Angeles County, the framework for an urban water trading system is already in place. The region's wholesaler, the Metropolitan Water District, consists of 26 member agencies that get water from the Colorado River or the State Water Project in Northern California, then sell it to the approximately 800 water districts serving the Southland. It already has a pipeline network in place that could facilitate regional trading. It also manages direct pipeline connections and areas with shared aquifers that could be used for trades.

"One idea is to get the Metropolitan Water District to start thinking a little more innovatively and more entrepreneurially," DeShazo said. "If System A and System B are interested in a water trade, the MWD could move the water and charge the districts for the cost of transportation — perhaps with a profit written in."

The MWD already distributes water to all of the systems in L.A. One city may decide it doesn't need its full allocation, while another is seeking more water, so they could work out a "trade." The first city could take, say, half the amount of its water allocation and have MWD redirect the rest to the city in need, while charging a transportation fee.

The MWD also participates in water transfers for farmers and exchanges with other states, such as Nevada and Arizona. But urban water trading is more challenging, says Deven Upadhyay, manager of MWD's water resource management group, because even if agencies were to participate in trades, they still would need imported water. "We do a fair amount of trading, although I wouldn't characterize it as one agency buying water directly from another," he said. "Most of these agencies cannot meet all of their needs simply with their local supplies, which is why they're then connected into our imported water system. We provide the supplemental water that is necessary for them to be able to meet their demands."



DeShazo says a challenge to creating a water market will be getting districts to look beyond their own needs. "They don't think about their water systems as generating value for other parts of the community within the region outside of their jurisdiction," he said.

That could change.

Last year, in response to the drought, Gov. Jerry Brown issued an executive order calling for cities to cut water usage by 25%. In addition, the governor's Water Action Plan, released in 2014 and updated this year, calls for state, regional and local agencies to become more self-reliant by, among other things, increasing the use of recycled water and streamlining the permit process for local water reuse projects.

In Los Angeles, Mayor Eric Garcetti, in his Sustainable City pLAn, called for the city to capture 12 billion gallons of stormwater per year by 2025 on top of the 8.8 billion gallons it already captures and reuses (see this issue's Table Talk with the mayor). By doing so, Los Angeles is expected to reduce imported water by 50% by 2025 and source half of its own water by 2035, according to Matt Petersen, L.A.'s chief sustainability officer. Other Southland cities have announced aggressive goals as well.

To augment local water supplies, cities can invest in water recycling and stormwater capture and reuse. There are two kinds of reuse processes: indirect, which is widely used in California, and direct reuse. With indirect systems, water reclaimed by a city through stormwater capture or wastewater can be treated and purified, then used for landscaping, or it can be put back into the ground, or into a reservoir or aquifer, then treated for use as potable water. The idea behind this process is that physical or biological processes will degrade contaminants in the water during its time in the ground or in a reservoir. According to the EPA, there have been no documented cases of human health problems due to contact with properly treated recycled water.

Experts see great potential in direct reuse. "Engineers have been saying for 10 years that you don't have to waste all that time by letting nature 'kiss it' by putting wastewater back into the groundwater and then taking it out, or putting it in a reservoir," DeShazo said. "You can do direct reuse, where you just take the wastewater, put it in a purifying system to treat it, and it's piped directly to the people who want to drink it."

Safety barriers are set up along the way to ensure purity. "It's cleaner than most groundwater. ... We have the technology to do this, and we can do this fairly cost-effectively," DeShazo said. "The biggest challenge to direct reuse, which is probably going to be one of the most economical recycling technologies, is public acceptance — getting people to recognize that all water was once wastewater."

Australia, Singapore and Israel have already adopted direct reuse. But before it becomes commonplace here in California, drought conditions would have to be much more severe, causing prices to double or triple. At that point, water becomes so valuable that it pays for the system to reuse it.

Until that day comes, there may be resistance, though Mayor Garcetti, among others, argues that the public's skepticism has dwindled in the years since opponents vilified the idea as "toilet to tap."

The benefits of an urban water markets, meanwhile, are easily recognizable. During a drought, there may be cutbacks on imported water, causing shortages that could be addressed through trading. Local water sourcing also makes the state more resilient to earthquakes, which could knock out the Sacramento Bay Delta levies or the Colorado Aqueduct. A market also has the potential to help cities with excess supply raise additional revenue that could be put back into water recycling and reuse programs or used to offset local taxes and lower costs for consumers. Districts on the receiving end of water trades also would see cost savings that could be put to other uses.

For its part, MWD is investing in projects designed to help municipalities bolster their local water supplies. "We run programs where we are incentivizing agencies — we're actually paying agencies to develop local supplies," Upadhyay said. For example, the MWD paid Orange County to develop wastewater recycling that would ultimately be put into the ground to augment its groundwater basin. "What that project did is offset a need for us to deliver imported water to them. By offsetting that need, that imported water is then freed up to be able to go to any other customer in our service area."

In the meantime, municipal and county leaders continue to search for ways to increase local water. The need for more sources trickles down to the consumer level with a push for more greywater adoption. Greywater technology, DeShazo says, is just starting to become more cost-effective and is expected to be written into building codes for new construction in the next few years.

That's welcome news for Miller, of Greywater Action, who in addition to offering workshops for homeowners spends time working with cities and water districts throughout the state to help educate people on water reuse.

"Our goals are to change our relationship to water and how we interact with it. We want people to learn to use water sustainably, appropriately, to make the best use of water," Miller said. "It's very fun and rewarding to know that I'm doing my laundry, and I'm also watering my fruit trees at the same time." ◤

A LIFE LONG QUEST FOR CLEAN WATER

WRITTEN BY
KATHLEEN KELLEHER

"IT WAS A VERY INTERESTING EXPERIENCE FOR ME TO GET OUT OF THE LAB AND TO HAVE TO SOLVE REAL ENGINEERING PROBLEMS ... IN THE MIDDLE OF A CRISIS."

ERIC HOEK, CO-FOUNDER OF LG WATER SOLUTIONS AND FOUNDER OF NANOMEM CONSULTING

IT STARTED IN THE SHOWER. Eric Hoek was 11. He noticed that the water smelled. The odor was strangely sweet.

His father, a conservation biologist and ecology professor at Rutgers, and others in their community soon discovered why. The well supplying water to their New Jersey neighborhood — indeed, the entire aquifer — had been contaminated by toxic waste. It was life-altering.

In personal ways. "We couldn't take showers or drink the water for a couple of months," Hoek said. "Obviously, we showered. But we had to haul water in, because exposure is bad. It absorbs through your skin."

And in public ways. The municipal water and sewer provider solved the problem; and the experience, in the 1980s, left its mark. From then on, whenever Eric M.V. Hoek saw dirty water, he looked for ways to clean it. Water has always been a part of his life's work.

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Hoek, 44, now has two small children of his own. He attended Penn State for a bachelor's degree in civil and environmental engineering, then UCLA for his master's, and finally Yale for a doctorate in chemical and environmental engineering. After teaching at UC Riverside, he came to UCLA in 2004 as a professor of environmental engineering. He co-founded UCLA's Water Technology Research Center and has studied water treatment for 20 years, using membranes to filter out impurities, including microfiltration, ultrafiltration, nanofiltration and reverse osmosis, in which water passes through pores smaller than a nanometer — or less than one billionth of a meter.

In 2005, his inventions helped create NanoH20, now LG Water Solutions, which makes Quantum Flux reverse osmosis membranes. He also founded NanoMem Consulting, a nanotech membrane water consultancy company. In 2009, he was introduced to actor Kevin Costner, who had been inspired by the Exxon Valdez oil spill to invest in Department of Energy centrifugal technology that separates oil and water. Costner asked Hoek to explore other uses.

"I am a membrane guy," he told Costner, "so I will see what it can do."

Hoek's lab tests showed that the centrifuge was capable of restoring water to 99.9 percent purity, and he designed a special membrane to filter out the last few parts per million of oil.

In April of 2010, British Petroleum's Deepwater Horizon oil rig exploded in the Gulf of Mexico, killing 11 people. Oil gushed from the sea floor for 87 days, creating the largest ocean oil spill in history. Hoek, by now a consultant to Costner's Ocean Therapy Solutions, which was later renamed Blue Planet Solutions, flew to the gulf with a restoration team.

Sunshine was baking the oil, and waves were mixing it with chemical dispersants and natural organic matter. During a test, the emulsion "had a viscosity like peanut butter," Hoek told the Guardian, and it couldn't be pumped from skimmers onto vessels equipped with Ocean Therapy's centrifuges. "In real-time, during the spill clean-up efforts, we learned how to apply emulsion-breaking chemicals," Hoek recounted in an email to Blueprint. British Petroleum bought more than two dozen of the centrifuges. On some days, the water was too "full of sticks or peanut butter," he told the Guardian, but on others, the pumps could deliver it. "I can't think of a case," Hoek told Blueprint, "where we couldn't process the recovered materials after applying some emulsion-breaking chemicals."

"It was a very interesting experience for me to get out of the lab and to have to solve real engineering problems where you are in the middle of a crisis," he said. When he returned to UCLA, Hoek said, he solved the oil-water viscosity problem completely. Although the New Yorker, in a lengthy account of the gulf disaster, said Ocean Therapy's centrifuge system had been "impractical for this spill," a report by British Petroleum called it a success. Centrifuge technology, Hoek said, is one of the most important contributions to oil-spill response in the past 20 years.

In 2011, Costner and another investor offered Hoek the backing to start a company of his own. Hoek closed NanoMem Consulting and created Water Planet, Inc. It has grown from three to 20 employees in five years. His timing could not be better. Saving and recycling water is California's most pressing mission as the state's drought enters its fifth consecutive year.

Water Planet's mission is to treat the most stressed and difficult wastewater. Hoek and his team specialize in "polishing" water produced by oil and gas companies during petroleum extraction. Industrial WaterWorld, a publication that reports on managing industrial water usage, says billions of gallons of contaminated water are produced every year in the Bakersfield area alone, which could be cleaned and used in industrial processes, agricultural rinsing and irrigation. Hoek sees a mutually beneficial relationship between oil companies and farmers: Oil companies need to dispose of vast quantities of wastewater, and farmers need vast amounts of water to grow crops and rinse down their operations.

Plants in Wasco and Lost Hills, using Water Planet technology, are expected to recycle a total of 4 million gallons of water a day at their peak. Frances Spivy-Weber, a member of the California Water Resources Control Board, said Water Planet cleans wastewater to a "high quality," better than many of its competitors. Dundee Kelbel, manager of Sweetwater Tech Resources, a Tucson-based treatment company that uses Water Planet at Wasco and Lost Hills, says 90 percent of dirty effluent is treated to three levels: clean, cleaner and cleanest. Clean water goes back to oil companies for reuse. Cleaner water goes to farmers for rinse-down operations. Farmers use the cleanest water to irrigate.

"The water cleanliness needs to match or exceed the regulation quality of ground irrigation water," Kelbel said. "That is the stuff growers would normally get from water storage districts or California aqueducts. Our target is to beat that, so the end result is water that would improve the overall quality of ground irrigation. Water Planet's technology has the ability to treat for that level and exceed it."

At present, produced water is a largely untapped resource. Jonathan Bishop, chief deputy director of the Water Control Resources Board, said the extraction of one gallon of oil produces about 10 gallons of wastewater. Very little of it is treated to regulation standards and being recycled, Bishop said. "Hazarding a guess, I would say less than 5%. We would like to see more of that." Most of the rest of oil- and gas-produced wastewater is injected into deep, salty aquifers. Some is used for more oil extraction. A small percentage is dumped into ponds where solid waste settles and the water evaporates, leaving a sludge that is hauled away for disposal in designated landfills.

"There are all sorts of things pushing oil and gas companies to have more reuse," Bishop said. "The rules are more stringent for disposal now. As the price of water goes up, the relative price of water reuse goes down. A need and desire for industry to clean wastewater looks better and better."

Certainly treating wastewater is essential in edging California closer to a more sustainable water management strategy. "Recycling and reusing industrial wastewater is ultimately about preserving fresh water resources for the drinking water supply, instead of using fresh water for industrial uses like dust suppression, which you can use reclaimed wastewater for," Hoek said. "We can typically treat industrial water to very high levels for less than it would cost to dispose of it, or to purchase new fresh water."

Two and a half years ago, Hoek left UCLA to devote his full attention to Water Planet. The company has just introduced award-winning technology and a new membrane. He says they are "game changers."

The technology, called IntelliFlux®, is an artificial intelligence software control and automated treatment system that performs at peak efficiency — nearly impossible to maintain under human supervision. It is expected to reduce the cost of energy, labor and chemicals. In April, IntelliFlux® and Water Planet won the Water Technology Idol Award at the Global Water Awards.

The membrane, called PolyCera®, was developed in collaboration with UCLA Nobel Prize winner Richard Kaner. It is a hydrophilic, permeable skin that acts like a ceramic but has the durability and lower cost of a polymer. It uses advanced polymeric materials that won Kaner the Nobel in chemistry. With fellowship funding and a $50,000 award from the National Water Research Institute, the membrane was developed in Kaner's lab.

"We have two patents pending on the AI (artificial intelligence) algorithms and another on the hardware design (IMS-5000) being used in a range of applications in oil and gas process and produced water recycling," Hoek said in an email. Water Planet has licensed nine patents from UCLA, including the patent for PolyCera®, which was tested at a site in Texas so remote that there was no fresh water and no infrastructure for wastewater treatment. The super-membrane cleaned wastewater successfully, and the water was reused in industrial processes.

"Everything that we do kind of fits into this category," Hoek said. "Reclaim some part of the waste so that you are minimizing fresh water that otherwise would be used for drinking."

Water Planet is conducting three pilot studies at a wastewater treatment plant for a Southern California water district. Hoek did not identify the water district. "It is about protecting our (intellectual property) and data," he said. "Our team wants to keep it quiet until after we are finished." The studies are expected to be completed in October. The goal is to help the district meet state reuse standards and to improve efficiency, cost and water purity.

"Our expectation," Hoek wrote in an email, "is that having smaller pore size but higher permeability offers better water quality than state of the art. From these tests, we will develop more unassailable data demonstrating the energy, chemical and cost reductions due to PolyCera® alone, IntelliFlux® alone and combined."

Time will tell. If the district likes the results, Water Planet will be on the map in Southern California. For Hoek, it is satisfying to see his fledgling company grow into a successful corporation. But what Hoek does is more than a business. Saving water, for him, is a way of life.

RICHARD KANER, A NOBEL PRIZE WINNING CHEMIST AT UCLA, WORKED WITH ERIC HOEK TO DEVELOP A NEW MEMBRANE FOR RECYCLING WATER.

PHOTO COURTESY OF UCLA NEWSROOM

MAKING CLIMATE CHANGE REAL

WRITTEN BY
MOLLY SELVIN

WHEN YOU HEAR THE WORDS "CLIMATE CHANGE," Alex Hall wants you to think of your grandchildren first, and only afterward about polar bears stranded on melting ice floes, or about flooding along the Florida coast.

Hall, a UCLA professor of atmospheric and oceanic sciences, said it will be the grandchildren of millennials who, by midcentury, will face many more extremely hot days in the Los Angeles Basin, along with more wildfires, a thinner snowpack in the Sierras and less water for the city.

He and his colleagues at the UCLA Institute of Environment and Sustainability can demonstrate how this will happen. Computer models from their two-year study, in collaboration with scientists at UC Irvine and elsewhere, have put numbers to free-floating concerns about climate warming and continued drought. Hall's projections are sobering, even scary. But information is power, and his numbers create motivation. They show a path to achieve the ambitious sustainability goals that state and local policymakers have established to secure the future for your grandchildren — and theirs.

"These findings are of tremendous importance to the city and the region," said Matt Petersen, chief sustainability officer for the City of Los Angeles. The UCLA research vividly describes the likely impact of increased heat, continued drought and extreme fire risk, Petersen said, and the models have already pushed city leaders and individual residents to respond.

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Hall, 44, given to a close beard, a loose tie and an easy smile, credits three people with motivating him to study the atmosphere and the oceans: his father, a scientist; an inspiring undergraduate professor, who taught Hall at Pomona College; and ultimately the adviser for his doctoral dissertation at Princeton.

With funding largely from the U.S. Department of Energy, Hall and his associates have drawn from 30 existing models of the Earth's climate and imposed their data on Los Angeles County under two scenarios. In the first, which he calls "business-as-usual," lawmakers fail to make any significant changes between now and midcentury to limit greenhouse gas emissions. In the second, which he calls "mitigation," world leaders act together to transform energy production to drastically reduce if not eliminate carbon emissions by 2041-2060. "Probably unrealistic," he concedes, but the mitigation scenario offers an optimal benchmark.

Using 1981-2000 as a baseline, Hall and his collaborators focused on changes in four key climate elements: temperature, snowfall, wind and fire, and precipitation. Their modeling enabled them to predict changes in each of these atmospheric components down to the neighborhood level — in 2-kilometer grids. Nothing like this had been done before.

Under both business-as-usual and mitigation, Hall said, "Warming is inevitable." During August, generally the hottest month in Southern California, average temperatures under business-as-usual will rise as much as 5 degrees Fahrenheit by midcentury, much higher than the hottest summers during the baseline period. Although August temperatures will not climb as high under the mitigation scenario, UCLA's model shows that the L.A. region will still be hotter than in past summers.

But the number of extremely hot days — with temperatures of over 95 degrees — will spike dramatically under business-as-usual, particularly in the San Fernando and Santa Clarita Valleys — and even along the coast. Both central and coastal locations will see two to three times the number of extremely hot days. Higher elevations and inland areas will see three to five times the number of extremely hot days.

Warmer temperatures will cause precipitation to fall more often as rain than snow. Hall's group predicts snowfall in the San Gabriel, San Bernardino and San Jacinto mountains will drop by half, resulting in drier, more combustible forests and lower water supplies.

Regional wind patterns will shift, bringing fire danger earlier. Historically, major blazes have occurred during October, when extremely dry desert air pushed westward toward the coast. But as the L.A. Basin warms in the coming years, there will be fewer such Santa Ana episodes in October and fewer fires fed by those winds. Instead, hotter temperatures will stoke more and larger blazes during July, August and September. An example is the 2009 Station Fire north of Los Angeles, which started in August. It charred 160,577 acres and resulted in the deaths of two firefighters. Researchers at UC Irvine predict that hotter conditions will cause an average of 130,000 acres to burn annually, almost double the current 76,000 acres.

Hall's models see no significant change in the amount of precipitation in the region. But less snowfall and higher temperatures in local mountains will reduce stream flow, cause more evaporation and, ultimately, decrease the amount of mountain water available for municipal use.

Hall and his colleagues are completing a separate analysis focusing on the Sierra Nevada Mountains, the source of 60 percent of L.A.'s water. "We realized that we couldn't tackle water use in Los Angeles in a holistic way unless we understand the regions where L.A. gets most of our water," he said. Those results, soon to be published, worry him. The "remote water resources that we rely on are quite vulnerable," he said. "There are pretty dramatic changes in store for the Sierras."

"REMOTE WATER RESOURCES THAT WE RELY ON ARE QUITE VULNERABLE. THERE ARE PRETTY DRAMATIC CHANGES IN STORE FOR THE SIERRAS."

ALEX HALL, UCLA PROFESSOR OF ATMOSPHERIC AND OCEANIC SCIENCES

Hall's conclusion: "Adaptation is inevitable. We must respond to these changes." That means relying more on local water sources and stepping up conservation and use of renewable water. Increasing conservation means redoubling individual efforts. It also means transforming the region's water and power infrastructure to meet the challenges of a new age.

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City officials have taken this to heart. Last year, Los Angeles Mayor Eric Garcetti released the city's first-ever Sustainable City plan, based in part on the UCLA findings. The plan establishes short- and long-term targets for water conservation and reuse. It calls for more reliance on solar power; better energy efficiency in appliances as well as in homes and commercial buildings; and reductions in greenhouse gas emissions. For example, the L.A. plan calls for cutting per capita use of potable water 20 percent by next year 2017, a goal the city is close to reaching. The plan also calls for decreasing the city's purchase of imported water by half in another nine years.

These are daunting but achievable goals, said Nancy Sutley, chief sustainability officer for the Los Angeles Department of Water and Power. "Much of the city's future planning is based on demographic projections," she said. Hall's work has demonstrated that "we have to add in this third element: What is the climate going to be like and what will its impact be?"

The DWP has long offered a smorgasbord of rebates and incentives to nudge residents and businesses toward water and energy conservation — for example, by landscaping with drought-tolerant vegetation, planting more trees, capturing rainfall, installing solar panels, buying electric vehicles and upgrading to more efficient air conditioning units, LED light bulbs and more effective insulation.

The UCLA research also is "incredibly important in terms of the investments we make in infrastructure and services," Sutley said. The DWP is building and retrofitting facilities "that we expect to be functioning in 50 years," she said. While the region's existing power and water infrastructure was constructed during an era of reliable rains and Sierra snowpack, future facilities must anticipate an increasingly hotter and drier climate.

To cut its reliance on imported water, DWP is developing more local supplies. It is spending hundreds of millions of dollars, for example, to capture and treat rainwater underground in the massive San Fernando Valley Groundwater Basin. Water that once ran down sewers and out to sea will be stored and recycled for a variety of uses, including to supplement the city's drinking water supply. Orange County has successfully recycled local brownwater for about a decade, but Los Angeles has been slower to take this step.

On the power side, the DWP recently completed its divestiture from the Navajo Generating Station in Arizona, decreasing the department's coal-generated electricity by 25 percent. The move represents a major step toward the utility's goal of eliminating coal from the city's power portfolio by 2025.

PHOTO BY ISTOCK.COM/SOLIDAGO

ENCOURAGED BY SUBSIDIES FROM STATE AND LOCAL AGENCIES, MANY CALIFORNIANS HAVE PULLED UP LAWNS AND REPLACED THEM WITH DROUGHT-TOLERANT GARDENS.

Moreover, by 2029, the DWP says it will replace an ocean-water cooling system at its Scattergood Generating Station with air cooling equipment, further reducing the city's greenhouse gas emissions and better protecting marine habitats.

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Regionally, the Metropolitan Water District, which supplies just over half of L.A.'s water, is working with the L.A. County Sanitation District to build a next-generation advanced treatment project in Carson that will recycle and store wastewater clean enough to drink. This plant could be "a total game changer" for local water supplies, said Mark Gold, who oversees UCLA's Sustainable L.A. Grand Challenge.

The Grand Challenge links researchers from several disciplines to develop technologies, strategies and policies to address major problems that impact the region and beyond. It aims high: to transition Los Angeles to 100 percent renewable energy, 100 percent locally sourced water and enhanced ecosystem health by 2050.

Health officials in cities throughout the county are working with Hall and his team to help elderly and low-income residents tolerate hotter temperatures — for example, by increasing the number of cooling centers in malls, libraries and community centers, where people without air conditioning can go during heat waves.

It is important to increase public awareness, said Angelo Bellomo, deputy director of health protection at the Los Angeles County Department of Public Health. Climate change is "not a hopeless problem," Bellomo said. "There are things that individuals can do." Hall's fine-grained heat projections, he said, encourage the county and local municipalities to plan ahead, each according to its own conditions — which will differ, for instance, from Glendale to Canoga Park to Santa Monica.

Hall makes the same case. "A lightbulb goes off when people see this work, because it informs them about what climate change will do to their own neighborhood," he said. "It changes discussion from polar bears and global mean temperatures to something much more local and much more meaningful."

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Every person is important in L.A.'s response to climate change. Since arriving at UCLA in 2001, Hall has become an enthusiastic "dry gardener." He landscapes his Miracle Mile home with native plants and has installed gutters and rain barrels to capture rainwater. That kind of change is crucial. "We use more than half of our water," he said, "to irrigate plants that are not appropriate to this climate on life support."

He also tries to minimize his driving; on most days Hall commutes to Westwood by bus or on his Brompton folding bike.

The changes he has made in his own life make him optimistic about responding to the warmer climate his modeling foresees. "The hope with this type of project is that it makes the conversation about practical things — how do we cope with twice as many severe hot days in a certain locale?

"That is not valuating," he said. "It's just a problem that needs a solution."

It's a much easier conversation, he said, than wrestling with "deeper questions about how prosperous should we expect to be, or how many resources we have a right to consume." ◤

CALIFORNIA WATER WORKS

RESEARCH BY
NONA YATES

The California water system is a vast and complex network of federal, state and local projects and agencies that supplies water to more than 38 million people and 10 million acres of agricultural land. The water must be moved from where it is found (primarily in the north) to where it is needed (primarily in the central and southern parts of the state). The delivery system includes reservoirs, pumping stations, dams, lakes, aqueducts, canals and more. It is an engineering marvel — and sometimes an environmental mess. Most experts agree that a hotter and drier future will require more effective management of water resources.

Central Valley Project

Operated by the U.S. Bureau of Reclamation, the CVP extends for 400 miles from the Cascade Range near Redding to the Tehachapi Mountains near Bakersfield. With nearly two dozen dams and reservoirs and 500 miles of canals and aqueducts, it provides water to about one-third of the agricultural land in the state, as well as nearly 1 million households.

Metropolitan Water District

The MWD brings 1.5 billion gallons of water each day to more than 19 million people in six Southern California counties via the Colorado River Aqueduct and the State Water Project. It also is the largest distributor of treated drinking water in the United States. The MWD serves more than 300 cities and unincorporated communities.

State Water Project

The largest state-built delivery system in America, it is run by the Department of Water Resources. The SWP begins at Lake Oroville on the Feather River, picks up water from additional lakes and rivers and brings it through reservoirs, canals and pipelines to the Sacramento-San Joaquin Delta, where the water is pumped to the 444-mile California Aqueduct and channeled to 25 million people and 750,000 acres of farmland throughout the state.

All American Canal

Eighty miles long, this gravity-flow canal brings 3.1 million acre-feet of water annually from the Colorado River to nine cities and towns and a half million acres of farmland in the Imperial Valley, where groundwater is unsuited for domestic purposes.

Salton Sea: A breach in canals during the early 1900s created California's largest lake. Because it had no outlet, it grew salty and is now 50 percent more saline than the ocean. Nonetheless, it supports more than 400 kinds of birds. Inflow may be curtailed next year, but some scholars and water experts want to save the lake.

WaterFix

Gov. Jerry Brown wants to burrow two tunnels 40 feet wide and 35 miles long under the Sacramento-San Joaquin Delta to deliver water to farms and homes in the San Joaquin Valley and Southern California. Proponents say the tunnels will help control salinity and water flows that harm fish. Opponents say the diversions will further harm fish and protect the water supplies of Southern California and Silicon Valley.

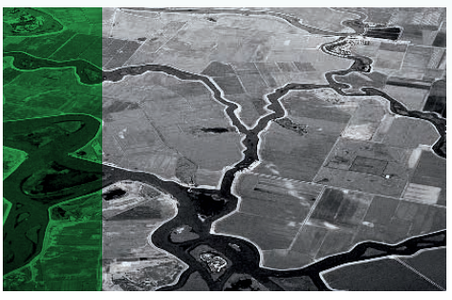
Runoff

Billions of gallons of runoff flush from California out to the Pacific after storms. Los Angeles captures 8.8 billion gallons annually. Mayor Eric Garcetti has outlined a plan to increase that amount to 50 billion gallons by 2035. Some experts say that more than 200 billion gallons could be captured each year statewide.

Desalination

The state's biggest plant, a $1 billion installation, opened last December in Carlsbad. Some 15 other projects have been proposed, from San Francisco to the Mexican border. Santa Barbara might restart its desalination plant, taken offline in 1992. Southern California Edison operates a desalination plant on Catalina Island that can produce 200,000 gallons of water a day. Environmentalists worry about brackish wastewater and killing sea life.

Sacramento-San Joaquin Delta



This is the largest estuary on the coast, where the Sacramento and San Joaquin rivers meet. It is the hub of California's water system. Water from the CVP and the SWP flow through here. Agriculture and human consumption compete with an ecosystem rich in wildlife (even salmon from the Pacific), causing a decline in the delta. Long-term solutions are elusive.

Hetch Hetchy Reservoir

In 1913, San Francisco won the right to dam the Hetch Hetchy Valley, considered a rival to Yosemite Valley in beauty and grandeur. After decades of controversy, the Hetch Hetchy was flooded, and water began streaming to the city in 1934. Some conservationists want the dam removed and the valley restored.

Los Angeles Aqueduct

Designed by William Mulholland, it carries water more than 200 miles from the Eastern Sierra into Southern California, driven entirely by gravity. The Los Angeles Department of Water and Power, which operates the aqueduct, has been ordered by courts to mitigate environmental damage caused by diversion of streams.

Mono Lake: Water level must be maintained at 6,392 feet above sea level to protect bird breeding and stream habitat.

Lower Owens River: Sixty-two miles are being re-watered, along with surrounding habitat.

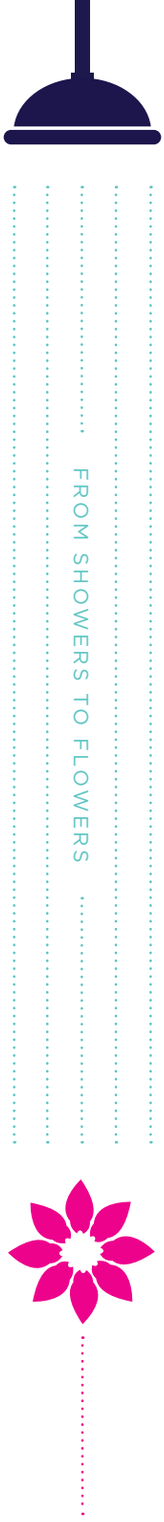
Owens (Dry) Lake: It was once the worst source of air pollution in the nation because of blowing toxic dust. Mitigation efforts were enhanced when the Lower Owens River resumed water flow.

Colorado River Aqueduct

Owned and operated by the Metropolitan Water District, it picks up Colorado River water at Lake Havasu, Arizona, and takes it 242 miles to Lake Mathews in Riverside County, from where it is distributed among the MWD's 26 member agencies. Competing demands and diminishing supplies are causing environmental harm to the river, which is expected to worsen as climate change impacts watersheds.

Sources: California Department of Water Resources; California State Water Project Atlas; California Water Atlas; Imperial Irrigation District; Los Angeles Department of Water and Power; Los Angeles Times; Metropolitan Water District; The Nature Conservancy; New York Times; Pacific Institute; Public Policy Institute of California; Sacramento Bee; San Diego Union-Tribune; Sierra Club; Southern California Edison; U.S. Bureau of Reclamation

PHOTO BY **DAVID SPRAGUE**



LOS ANGELES' MAYOR ON HIS CITY'S 'SECOND MULHOLLAND MOMENT'

ELECTED IN 2013, ERIC GARCETTI, 47, IS THE YOUNGEST MAYOR IN MODERN LOS ANGELES HISTORY. Smart and easygoing, he glides through public appearances and speaking engagements, often in both English and Spanish. To his supporters, he is a model of intelligence and promise; to his critics, he can be frustratingly hard to pin down. All of that was on display in this recent interview with Blueprint Editor-in-Chief Jim Newton.

They met in Garcetti's City Hall office, freshly decorated in bright lights and modern art. Gone are the heavy furniture of the Richard Riordan years and the electronic photographic images that Antonio Villaraigosa displayed of himself with luminaries. The quarters today are sunnier, more whimsical, self-consciously modern. The office, in other words, suits the mayor.

Blueprint: We're here to talk about water, but water — availability, conservation, storage — of course is related to climate change. What do you make of the fact that a sizable chunk of the American population, including the Republican nominee for president, denies the fact of climate change, or at least resists the notion that humanity is responsible?

Eric Garcetti: There are fewer and fewer who resist the notion that climate change is happening, and it's less relevant whether humanity is responsible. I believe that, of course, this is man-made, but as long as you accept the reality of parched deserts, rising seas, higher temperatures, it's a problem that, no matter what your ideology, has to be solved.

BP: Do you believe there is the political will nationally to take the kinds of steps that will be necessary to, say, hold temperature increases to less than 2 degrees Celsius?

EG: Human beings are survivalists. We will have the will we need to survive. The question is whether we do that in an even worse situation — when migration flows and conflicts and deaths are occurring as a result of climate — or will we do it when it's only somewhat bad, like now.

And I must say that going to Paris [for the international climate summit], I haven't felt that kind of power in a room, maybe in my life. We had a mayor from Mauritania next to a mayor from Korea next to a mayor from India next to a mayor from Europe next to me. There was so much power and consensus.

Look at the Chinese and the speed with which they went three years ago from saying, "We're a developing nation. We're not sure about this," to the climate leaders' summit that we hosted here, where they not only met their goal for 2030 but announced before Paris that two of their cities would meet the goal by 2020.

That wasn't political pressure from us. It wasn't the old debate of developed nations vs. developing. That was a panic that most human beings are beginning to feel and that governments are beginning to reflect.

BP: And they have the benefit of a command economy, so there's no vote. They can move quickly.

EG: I think about that all the time. If I could just [he snaps his fingers]. Done. Antonio would have had a million trees planted in a month. [Mayor Villaraigosa famously promised to plant a million trees and never was able to achieve that, a disappointment that haunted him to the final days of his tenure.]

BP: Let's turn to L.A. and water specifically. This is a city historically dependent on imported water. You've set a goal of self-sufficiency by 2050. How do you get there?

EG: I describe this as our second Mulholland moment. First we had to make peace with our past, and after literally 99 years, now 100, of fighting, we made peace with the Owens Valley and Owens Lake. That was really important, both to get more water and to deal with the issues there.

I think we all recognize the successful, but somewhat perverse, engineering system that every drop of water that falls outside the city gets engineered here in a very complicated, brilliant and complex way, but every drop of water that lands here gets rushed out to the ocean.

That's the change. We have, actually, plenty of water. I don't say that to be Pollyanna-ish or trite. We really do have enough water for our economy, for our drinking, for our showering, for our landscaping — even to accommodate growth. [But] there's still a tremendous amount of waste of water. If we, in our city operations, could in two years reduce by more than 30% our water usage, [then] we're showing that. We can meet that goal (a) just by reducing, and (b) by reusing, recycling. The equivalent of 60% of our water gets washed out to the ocean and treated every day. It's almost drinkable. It's not full of bad things. It's just a little more saline. It's very complicated to have a series of pumps and pipes to push that back to the entire city, but we could share that with the South Bay, with a water district there.

We're looking at rebranding: from "Toilet to Tap" to "Showers to Flowers," to do what Orange County and a lot of other places did a long time ago, but for stupid political reasons, we've kind of avoided that. I think we'll do it through a combination of reuse, recycling and reduction.

BP: When you say "stupid political reasons," my sense is that "Toilet to Tap" was wrapped up in Valley secession. Is that gone now?

EG: Yes. Nobody says it anymore. Look, a small fraction of the water you're drinking anywhere was in somebody's toilet or somebody's shower.

BP: It's all molecules.

EG: Nature does that...

BP: Do you regard the city's acquisition of water from the Owens Valley in the early 20th century as a theft?

EG: Of course it was. It's a theft of water, at least from Mother Nature, if not from people. We always move resources. We generate power from coal that causes cancer and asthma rates to increase on Navajo land. I was the first person to lead divestment from the Navajo plant, and now we're completely out of it.

Human beings bring resources to wherever there are human beings, so it [the Owens River diversion to Los Angeles] might not have been unjustified, but it certainly had a huge and permanent ecological impact. The Owens Lake will never be again.

It was very important for us to make right what was wrong. We couldn't be Los Angeles today without Mulholland's vision, but people died from dam collapses, the ecology of entire areas was lost. Whatever we can do to make that better, we now have the tools and the wisdom to do it. That's what makes this an exciting moment.

BP: I grew up in the Bay Area, and what we were taught was that L.A. stole Northern California's water and then wasted it. It never occurred to me until later that San Francisco gets its water from the Sierras, too.

EG: I always tell my friends in San Francisco: "It's a dry city. You steal your water, too. It's just a shorter route."

BP: Talk about the city's goals for water use.

EG: Right now about 15% of our water is local. We're never going to get to no imported water, but by 2025 we're going to reduce by half the amount of water we import, and we're trying to get to 50% local by 2035.

PHOTO BY **DAVID SPRAGUE**

PICTURED HERE IN HIS CITY HALL OFFICE, MAYOR ERIC GARCETTI DISCUSSES LOS ANGELES' EFFORTS TO CONSERVE WATER.

BP: How does that water get used?

EG: Fifty percent of our water is landscaping. You want to look at your house. People say: "I'm taking shorter showers." That's awesome, but let's go through it. Fifty percent is landscaping. Half of what's left is dishwashers and your laundry, and half of that is your toilets and your showers.

We've taken up 30 million square feet of grass in Los Angeles and helped pay for that in the last two years. When Jerry Brown set a goal, it was 50 million for the state. Of the land, we're probably 2% to 3% of the state, and we've been responsible for 60% of his goal. And we've done that incredibly quickly. We've paid people to do that.

The biggest next thing, I think, is going to be cisterns. What Australia did for its historic drought is capture big amounts of water, keep it stored and use it throughout the year for landscaping. We have a couple pilots that DWP already paid for, some lucky winners in the Valley, where we've installed them. They're smart systems, so you can control them from your phone. On days when they're going to overflow, you can actually put the water back into the front yards. We make sure there are swales, so then it goes back into the aquifer, not into the storm drains. And when it's dry, the cisterns let water out according to what the need is.

BP: You mentioned DWP. What's the role of the DWP in encouraging conservation? You could imagine using rates as a tool. Charging more for water would encourage people to use less of it. But there are political consequences to that. How do you see the DWP and rates playing a role in conservation?

EG: First, rates are really important. I don't care what the criticisms are. That has to be a part of it. We've just created a four-tier system; it used to be a three-tier system. So now [for] the super-users, there are consequences. They get letters. They'll get a visit. And then they'll get an allocation, and if they go over that, they're going to pay fines. We didn't always have those tools, or even know who the super-users were. Now we do.

Second, for the lower users, we're going to see an increase of 2.4% per year for water and power for the next five years, which is manageable, I think, for people's budgets. But more importantly, that will give us the resources to expand these programs. And I always tell people: It's not how much the water rate is; if we bring your water bill down, who cares that the rate went up 2.4%? Your bill is 10% less because you changed the grass out, or otherwise reduced your use.

It's a combination of money and Jewish guilt. Shame your neighbor if you see the sprinkler on too long, but we'll also pay you to plant a beautiful, flowering front yard that isn't just turf.

I also think that, finally, [it's important to] coordinate a one-water strategy, which is something that I've brought together. It's not just DWP but also the Bureau of Sanitation, because we have one agency that brings water in — that's the supply — and one agency that does the two types of piping out: sewer and storm drains. We've really brought them together. We just won an award for being the most integrated. Some people, Mark Gold [longtime water conservation advocate, now spearheading UCLA's Grand Challenge on sustainability] and others, have said: "Let's create just one board." I think there are reasons not to do that. Sanitation does other things, like trash pickup, that would make it tough to merge the two agencies, but at least they're thinking like one team now.

We're doing that at Tillman. We take the wastewater, and we don't bring it to a drinkable standard yet, but we take it for golf courses in the Valley or Griffith Park. We do that at Hansen Dam, too.

We're taking parks and building water-retention cylinders, using money from Prop. O. Every open space, green space. We're doing that with alleyways.

Water shouldn't just be the responsibility of Water and Power or Sanitation. The Fire Department: They use a lot of water to test and clean equipment. You might see the lawns in front of the stations looking a little browner now. The Library Department — each one of them has a role to play. Once they all own it, these goals are doable.

BP: When people talk about threats to water supply, the idea of an earthquake that would take out the levies in the Sacramento Bay Delta looms as the existential one. Do you support the governor's plan to build the tunnels to help avert that potential catastrophe?

EG: In general, I do, though I'm very conscious of the environmental impact. I haven't taken a formal position. Put it this way, I'm open to conversation with the governor, but it's a little yesterday. I don't need help from Sacramento, and I don't need to consider threatening the environmental health of the Delta. I think we can do this ourselves.

It makes some sense if you freeze-frame today, but maybe it will become unnecessary, at least from an urban perspective. They can have an agricultural debate over whether they need it in the Central Valley.

BP: Last question: Have you been able to reduce your own water use at Getty House [the mayor's official residence]?

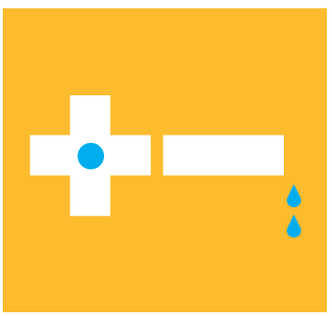
EG: Absolutely. I think we cut water use by more than 30%. We've had 12,000 people come there. Amy [Wakeland, the mayor's wife] has done an amazing job making it an active space. And it may not be a 30% reduction from my predecessor, because Antonio might not have had 12,000 people to the house...

BP: And Richard Riordan didn't even live there.

EG: We turned off the fountain. We're one of the first homes in the Hancock Park/Windsor Square area to get rid of grass in the front yard and in the parkway. We did it in the back yard, too. All the sinks have little signs from the Drop campaign. It is something that we have lived out in both my work and home environments.

"THERE ARE FEWER AND FEWER WHO RESIST THE NOTION THAT CLIMATE CHANGE IS HAPPENING, AND IT'S LESS RELEVANT WHETHER HUMANITY IS RESPONSIBLE."

CLOSING NOTE:
Solutions Worthy of This Challenge



AS THIS ISSUE OF BLUEPRINT MOVED INTO ITS HOME STRETCH, a member of our superb design team, searching for visual themes to unite the magazine, asked a natural question: Is the tone of this issue positive or negative?

Normally, that's a fairly simple one to answer. But this time, it's more difficult, and for a particular reason.

Viewed as a problem, the challenges facing Los Angeles and the rest of California regarding water are dizzying and dismaying. Start with the obvious: There's lots of water in California, but it's in places where there are few people, and there are lots of people in California, but they live in dry areas. Over the centuries, the answer to that problem has been to build gigantic, mind-boggling conveyance systems that siphon water out of mountain rivers and lakes and pump it thousands of miles west and south, sometimes over mountain ranges, to the farmers and cities that need it. That's expensive, fragile and environmentally destructive, but it makes places like San Francisco, Silicon Valley and Los Angeles possible.

The state is growing, so it needs more water all the time. The snowpack, meanwhile, is dwindling, yet another victim of climate change.

That would be the negative.

But then one looks at the research featured in this issue. One group of UCLA researchers has painstakingly mapped water prices in Los Angeles County and revealed troubling inequities; another group of researchers from this university and others has proposed a solution — the creation of water markets that would more effectively distribute the region's water. The result would be more fair, more efficient and a better use of a scarce resource. Policy makers take note: Here is a problem and a solution all wrapped up in six pages of Blueprint.

Those are policy issues, but there are scientific matters to address, too. Happily, that's happening. Alex Hall has mapped the region and presented policy makers with sobering options for what this part of the Earth could look like if they act quickly and forcefully, or what it will look like if they fail to act at all. And Eric Hoek — the self-described "membrane guy" — is developing new technologies to make better use of the water we already have. His solutions could extend the water at society's disposal, lessening the crunch caused by climate change.

That's the positive.

Other work across California and beyond has demonstrated that science and policy makers can comprehend solutions, even if they require rethinking some of the basics that we've become used to.

The challenge of climate change is unlike any other confronting humanity at this juncture. Broad, urgent, collective action may yet save the planet for people; failure to act could result in nothing short of human extermination. That's a choice that should focus the attention. The research in this issue underscores the depth of the problem and also suggests ways to begin addressing it.

– Jim Newton

UCLA BLUE PRINT

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SPECIAL THANKS

Special thanks to Lisa Horowitz, the chief copy editor for Blueprint, whose sharp eye makes this magazine what it is.
– Jim Newton

DO YOU HAVE SOMETHING TO SAY?

Blueprint's mission — to stimulate conversation about problems confronting Los Angeles and the rest of California — doesn't stop on publication day. We urge you to continue these conversations by contacting us or our contributors or by reaching out directly to the researchers whose work is featured here. We also hope you'll follow us on the web, where we'll showcase exclusives and link to ongoing debates in these fields. You can find us online at **blueprint.ucla.edu**

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