Los Angeles Urban Forest Equity Assessment Report

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01 Objectives

The purpose of this report is to describe perspectives of the Los Angeles region's urban forest by those individuals and organizations actively involved in its management. With a focus on urban forest equity, the individuals represent a diverse array of organizations that are attendant to and intersect with the biophysical, social, and/or policy dimensions of trees in the region. A central aim of this report is to support current and future actions that aim to address historic policies and programs that have created a landscape of inequitable access to neighborhood trees, forests, and green spaces, along with the critical green-infrastructure/ecosystem services, such as public health and safety protections, they provide. Through direct interviews with members of a dozen organizations and a review of salient documents, this report reflects a 'first phase' of the Urban Forest Equity Visiting Scholars program, which is sponsored by several organizations, some of whom were part of the interview process. Future phases will build on this report to identify processes and outcomes to further inform actions to address inequities in forest distribution, physical designs, and community-based participation. Important to note is that this report is co-produced with City of Los Angeles staff and members of several community-based organizations (CBOs), who consistently meet to discuss topics relevant to forests in the Los Angeles (LA) region.

Aside from the Objectives, Acknowledgments, and Appendix, this document is divided into four substantive sections. The first 'sets the stage' with a description about the characteristics and background, including historical aspects that frame the need for undertaking this Visiting Scholars program. The second describes the approach we took in developing this document, and the 'key findings' from the series of interviews and the documents we reviewed. The third section offers a series of recommendations that are divided into specific sections that underscore procedural, engagement, and policy dimensions of this work. We finish the document with conclusions that aim to support the next stages of this program. Important to note, is that this document aims to develop recommendations that are community-centered, draw on the latest principles in urban forestry, and recognize the fundamental role of diversity, equity and inclusion in addressing historic disinvestments in some areas of the city. As such, this document aims to steer future engagement and policy directions, though also recognizes that the specific operational elements are outside the scope of the present assessment. While some organizations may play more significant roles in decision-making roles, we note that the responsibility of managing the region's forest is wide-spread and will require a collective impact model – i.e. the forest is everybody's responsibility and different sectors, neighborhoods, and organizations will need to act with coordination and intention – for improving equity goals.

02 Background

The LA region's urban forest is a result of decades of active management of landscapes, and deliberate social and institutional processes. Among one of the many actors, the City of Los Angeles has set ambitious targets towards expanding the urban forest and recognizes the need to invest particularly within historically disinvested neighborhoods. Well documented are the extensive 'ecosystem services' provided by urban forests, including improvements in air quality, temperature modulation, stormwater capture and infiltration, and myriad social and cultural benefits. Earlier reports about the region's urban forest, including those by City Plants, TreePeople, and several researchers at universities and other organizations already draw attention to the [often] invisible and heroic 'work' done by trees.

Yet, also evident is the inequitable distribution of the urban forest, and hence those who actively benefit from its presence. With approximately ten million trees covering 11% of the region, all communities do not share these benefits equally. Tree assessment data shows that there are dramatic differences in tree canopy with 18% of the County of Los Angeles's and 25% of the City's land covered by tree canopy. However, approximately 20% of the City's tree canopy is concentrated in just four neighborhoods[1], and other cities in the region have varying levels that also concentrate canopy in wealthier neighborhoods. What's more is that according to a 2017 USC study, virtually every neighborhood in the City experienced a ten-year canopy reduction of 14 to 55 percent[2]. Today, affluent neighborhoods have greater tree canopy, which is a trend not unique to LA, and rather one that is a consistent pattern across the United States.

Distributional Inequities

What made these patterns and how might they be overcome? Increasingly evident is that these patterns of canopy distribution and loss are not purely by coincidence. Many areas lack adequate tree canopy -- such as the North Eastern San Fernando Valley, South and East Los Angeles -- due to a series of consecutive policies that were championed by local authorities, and further codified through Federal actions through the 20th century. As the region grew rapidly in population and infrastructure during the early 00s, decisions to disinvest in neighborhoods where people of color resided, established a pattern that is replete in the urban studies literature, including this statement from a pertinent article the journal Urban Geography (Wolch, Wilson, and Fehrenbach, 2005)[3]:

[1] Five block groups, one in Pacific Palisades, one in Los Feliz, two in Brentwood, and one in Shadow Hills, contain 18% of the City's total tree canopy. Less than 1% of the City's population resides in these areas making it clear that much of the City's tree canopy is not found where the people live (Galvin, Mike, et al. TreePeople, 20, pp. 1–9, Los Angeles County Tree Canopy Assessment).

[2] Lee, S.J., T. Longcore, C. Rich, and J.P. Wilson. 2017. Increased home size and hardscape decreases urban forest cover in Los Angeles County's single-family residential neighborhoods. Urban Forestry and Greening 24.

[3] Jennifer Wolch, John P. Wilson & Jed Fehrenbach (2005) Parks and Park Funding in Los Angeles: An Equity-Mapping Analysis, Urban Geography, 26:1, 4-35.

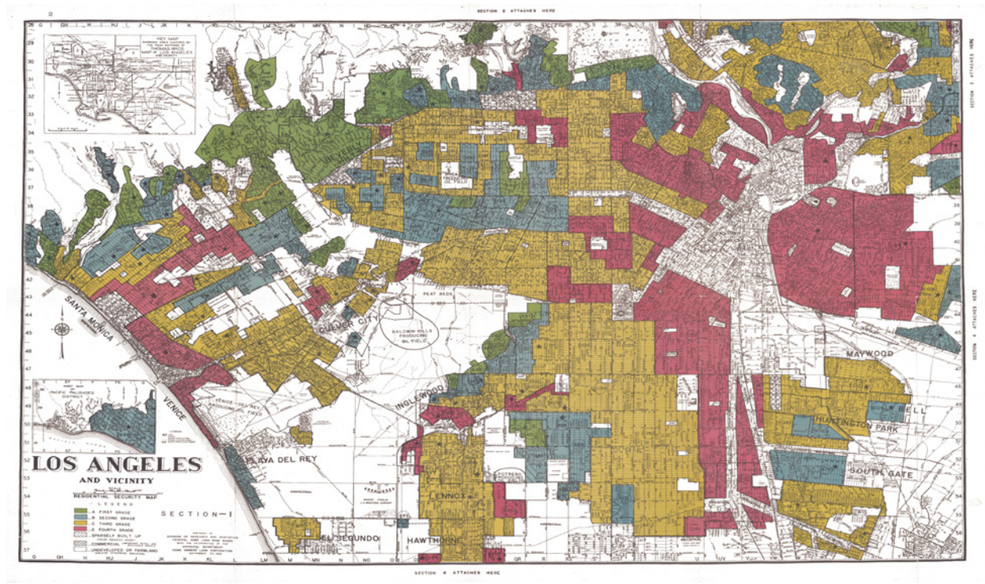

Figure 1: 'Redlining' map of the City of Los Angeles. Source: Mapping Inequality, Univ of Richmond

"In Los Angeles, low-income and minority areas have had a history of undesirable land uses, especially industrial installations with their attendant pollution of air, water, and soil. For example, the City of Los Angeles' 04 zoning code, the first in the nation, protected the affluent, predominantly Anglo Westside from such industrial uses. Higher density housing, commercial, and industrial activities were allowed to locate in the city's eastern and southern areas in which lower income workers, including people of color, were concentrated. Public parks, as well as other urban services were, however, disproportionately targeted to other parts of town."

These racist laws reflected a 'colonial-settler' approach[4] and leveraged the land use planning system and those in positions of power to separate communities. These decisions were codified by the Federal government during the 30s in a series of laws that gave locally authorized segregation policies the needed legitimacy and legal authority. The federally-backed segregation policies, which are commonly referred to as 'redlining', divided residential neighborhoods and concentrated services, including the provision of green spaces, to wealthier and whiter neighborhoods. Evidence from the Mapping Inequality project at the University of Richmond indicates that over 68% of the City during the 30s was considered 'declining' or 'hazardous' according to the redlining maps. As a result of the inability to build wealth through home and property ownership, communities that lived in these 'declining' or 'hazardous' areas were left without green spaces and other social services. Recent evidence suggests that those policies may have been instrumental in creating an inequitable distribution of green spaces and climate extremes that communities experience today[5].

Soon after the racially driven laws of the 30s, the Federal Highway Administration laid plans of interstate commerce (and backed by the Department of Defense) to establish a highway system that would further entrench disinvested communities with long-lasting impacts. Using conventional cost-benefit analysis as a decision-making tool, planners identified those areas with the least cost for constructing freeways, arterials, and other supporting infrastructure. The least costly areas where freeways were subsequently constructed were, not surprisingly, located in historically disinvested neighborhoods. As a result, the creation of the interstate highway system divided communities and landscapes, further fracturing the social ties and physical spaces for expanding green spaces.

Several other factors may also affect the distributional inequalities of tree canopy in Los Angeles. For example, the era between the 60s and 90s was marked by aggressive policing and public policy that precipitated criminogenic conditions, entrenched disinvestment, and compromised

[4] Libby Porter & Oren Yiftachel (20) Urbanizing settler-colonial studies: introduction to the special issue, Settler Colonial Studies, 9:2, 177-186.

[5] Hoffman, J., V Shandas, and N Pendleton, 2020. The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 Urban Areas. Climate 8(1), 12.

"Los Angeles was an urban forest watershed ecosystem being profoundly mismanaged as a drain as declared by the Army Corps of Engineers and carried out by LA County Public Works Flood Control. Ignorance of ecosystems and nature services drove this decision."
-Accelerate Resilience Los Angeles

urban tree canopy. Anecdotal evidence indicates that trees were viewed as a barrier to surveillance tactics employed by police in disinvested areas. Trees obstructed direct vision -- similar to transportation planning policies -- and their removal was a part of public health and safety measures. Other possible factors may include the competition for limited physical space, and the increasing dominance of private real estate in driving development processes and occupying areas with pavement that might otherwise contain green space. Nevertheless, our purpose here is not to identify the myriad interacting factors that prevent a seamless expansion of tree canopy, rather to suggest that a century of deliberate and concerted actions to seal the landscapes and surfaces and divide neighborhoods, cannot be undone overnight.

Today, overcoming and contending with decades of destructive urban planning decisions that created the current landscape will require deliberate and concerted action. The decisions to establish a network of freeways, for example, have created an iconic image of the Los Angeles region as intrinsically automobile-dependent that is reified through popular media and iconography, and other regular experiences for those living in or visiting the region. The car culture has also resulted in a landscape that is dominated by asphalt and pavement in the form of parking[6] and other ancillary spaces dedicated to vehicles. The City devotes an area larger than the land size of Manhattan just for parking and over 7,500 miles of streets. These residual spaces absorb and amplify solar radiation, creating urban heat islands (UHIs), making neighborhoods much hotter, generating vast amounts of air pollution, and making shade and healthy air a condition for the privileged[7]. The work to meet the tree planting goals, amidst these massive historical legacies is formidable. Further, finding spaces in areas that are covered with asphalt and concrete pose a more of a daunting infrastructure, social, and financial challenge. We posit that only through centering disinvested communities and areas in policies, engagement, and direct support can these pernicious issues find an equitable resolution.

Towards a More Equitable Distribution of Tree Canopy

In the past few years, regional partners are increasingly acknowledging and confronting the past practices, current perceptions, and accelerating progress to ensure that communities, landscapes, and policies are more intentional about centering historically disinvested areas. Driven in part by the City's Green New Deal framework and other regional initiatives, ambitious goals to increase tree canopy in areas of greatest need by at least 50% by 2028 are afoot. These aim to grow a more equitable urban forest that provides cooling, public health, habitat,

[5] Manville, M.. "Parking requirements and housing development in Los Angeles." In Shoup, D(Eds), 2018. Parking and the City, Routledge, New York.

[7] https://www.nytimes.com/2019/12/01/us/los-angeles-shade-climate-change.html

[8] Garcetti, Mayor Eric. 2019, L.A.'s Green New Deal Sustainable City Plan (page 120), plan. lamayor.org/sites/default/files/pLAn_2019_final.pdf.

[9] County of Los Angeles, Chief Sustainability Office, 2019, Los Angeles Countywide Sustainability Plan, ourcounty.lacounty.gov/wp-content/uploads/2019/07/OurCounty-Final-Plan.pdf.

energy saving, and other benefits[8]. In addition, the City has committed to plant and maintain 90,000 trees citywide by 2021. Concurrently, the City has pledged to update and align policies and procedures to grow and protect public and private trees. Other entities in the region, including the County and several dozen cities, are also working aggressively towards a tree inventory that identifies low canopy corridors and neighborhoods.

Although the City's first City Forest Officer oversees and monitors these goals, the effort will inevitably require extensive support from all City bureaus, community-based organizations (CBOs), and others aiming to prepare for a hotter and drier climate. This work is also supported on a regional level through the Los Angeles County Sustainability Plan, functioning as a long-term strategic plan with an equity focus as well as biodiversity targets[9]. As a first step, the County is working towards creating and implementing a Countywide Urban Forest Management Plan to prioritize resilient, climate-appropriate trees, understory vegetation, and native biodiversity. This plan seeks to conserve mature trees and properly manage resources to ensure that trees thrive in the urban (and urbanizing) environment. The concomitant involvement of City, County, CBOs, and others is instrumental to meeting these goals, and this report sheds light on some of the opportunities and barriers that are present. What currently needs to be done to expand tree planting in an equitable manner? What role do CBOs play in that process? What enabling mechanisms can municipal partners provide? These are some of the questions that this report attempts to address, though, admittedly, it's the first phase of the Visiting Scholars program. The authors of this report asked people at the forefront of this work about these questions, and the perspectives contained within the interview responses help to shape an agenda for aligning and identifying possible directions.

Over two months, the primary authors of this report conducted a series of interviews with individuals who represent municipal agencies and nonprofit organizations that were identified through a collaborative process overseen by City Plants. Questions for the interviews were generated in a process that included a 'core organizing body' that consists of LA City staff, and several CBOs who were responsible for creating the Visiting Scholars program. After providing a first set of questions, the primary authors of this report fielded suggestions for improving, revising, and adding elements to the initial round of interviews. As the interview questions were being finalized, City Plants staff reached out to individuals and identified dates and times when specific members could participate in the interview. In all cases, interviews consisted of more than one person, and sometimes as many as eight people participating.

All participants were identified by CityPlants as directly responsible and actively involved with tree planting efforts across the LA region.

The interview protocol consisted of a structured approach containing all the agreed-upon interview questions (Appendix A). The questions ranged from general to specific topics, though aimed to solicit responses around three themes about interviewees': (1) involvement in managing the urban forest; (2) perspectives about the challenges and opportunities for expanding the urban forest; and (3) promising practices for engaging historically disinvested communities in tree stewardship. The interviews were conducted by both of the primary authors, lasted approximately 45 minutes and were conducted via Zoom™, a video-conferencing platform. We also provided opportunities to elicit feedback about any emerging themes that were brought up during the interview process. Prior to commencing interviews, all participants consented to voluntarily participating in the interview in their professional capacity, and that they could be removed from the analysis at any time, including after the interview was complete. They were also notified that they would not be identifiable and would be anonymized. All interviews were recorded, kept on a secure server, and only used by the primary authors for content analysis. Of the 13 organizations who were identified, a total of 12 participated in the interviews (Appendix B). A total of 36 people represented these organizations.

The authors of this report analyzed the responses based on a two-part framework: convergent and divergent themes. To the extent possible, these processes followed conventional grounded theory approaches that sought to identify specific narratives that emerged directly from the responses to specific questions. Codes were created based on specific statements, and codes were iteratively revised and fleshed out through an emergent process. No software was used in the analysis, though all themes were later 'triangulated' with accompanying notes, and discussions about responses. Rather than report responses by question or individual code, we sought to identify dominant themes, which would help to frame the recommendations that we construct as a result of these findings. The two-part framework allows us to distinguish between those responses that were consistent across most or all of the interviews, and also those that were anomalous. The process aimed to develop a consistent inter-rater reliability that supports the signification of themes.

03 Approach and Findings

CONVERGENT THEMES: BARRIERS

Funding the Future

Not surprisingly, every one of the interviewees identified funding as an overwhelmingly important component in addressing the historically derived, inequitable distribution of the City's urban forest. Participants remarked and recognized funding as one of the biggest barriers, though it was mentioned in three distinct ways. First, funding is inhibiting widespread mobilization and implementation towards urban forestry goals. A common statement from the interviews was, "Without reliable funding to engage communities and maintain the existing trees, we will continue to lose the canopy at alarming rates." While this was not the first mention in relation to urban forest management for the City — it's consistent with previous reports[10] showing decades of divestment and protracted city budget cuts have led to considerable consequences[11]. The sustainability of funding sources remains an open question and deep concern to many urban forestry units[12] and reflects nationwide trends where average municipal spending on urban forestry, as measured by investments per tree, has fallen more than 25% since 80. These corroborated findings were repeatedly described by members who are directly engaging with operations and maintenance of the City's trees. Per the City's Controller, the City has spent significantly less on tree maintenance on a per-tree basis than other cities such as New York, Santa Monica, Pasadena, and Sacramento.

Second, getting a tree into the ground still remains a massive challenge, and the onus is largely upon the cities and County to make this happen. There is a severe gap in funding with no dedicated funding source for trees. That being said, the Los Angles Department of Water and Power has long supported tree planting in Los Angeles. Other local non-profit organizations are endeavoring to fill the void (ie. City Plants, TreePeople, North East Trees) through grants-driven programmatic work. Such a dynamic puts pressure on the private sector and philanthropy to step up to address the funding shortfall, which can be idiosyncratic and create delays in establishing trees and their subsequent care. Recent reports also indicate that insufficient funding leads urban forest managers to default to risk management to avoid liability, resulting in gradual tree canopy decline[13]. Several cities in the region have since adopted a preventative maintenance approach.

A third component of the convergent theme of funding emerged when participants commented that it is easier to procure funding for planting than maintenance or care of urban trees. Participants in the study

[10] City Plants, 2018, First Step: Developing an Urban Forest Management Plan for the City of Los Angeles, 17.

[11] Ibid.

[12] The past era saw maintenance efforts plummet due to budget cuts, leading to a restructuring of the city's urban forestry efforts in recent years (City of Los Angeles Bureau of Street Services. 2015. State of the Street Trees Report. Los Angeles, California, U.S.).W

[13] Ndayishmiye, Erik, and Matthew Stieg. Edited by Deborah Bloome et al., TreePeople, 2017, Public Trees for Public Good: An Assessment of Urban Forestry Management and Practices in Los Angeles County, 35.

"Trees need to be seen not as a luxury but as essential on every corridor."
-LA Great Streets Program

converged over the notion that current funding programs are often too constrained to encompass the full range of maintenance and care facing the City's urban forest. Capital can sometimes be applied to tree purchases and planting, though rarely for maintenance. Because many disinvested areas lack available spaces for expanding tree canopy due to the built out infrastructure (e.g. utilities, concrete, roadways, etc.), the funding necessary to redesign roadways for accommodating trees can be cost-prohibitive. Current cost-benefit analysis and funding systems do not account for this reality. Additionally, the long maintenance cycle for tree care by the city can often compel adjance property owners to take an active role in watering, pruning, and other maintenance. Yet, these additional costs can further exacerbate existing inequities, specifically on communities who may already be financially challenged. Areas that are low income are also those areas needing the most attention, and with limited municipal upkeep. These areas will see fewer trees and likely higher levels of mortality and morbidity of those trees that are planted to support the existence of parkways. A precursor to supporting green infrastructure, these same areas lack capacity to gain important funding eligibility to rebuild streets and adjust infrastructure. Current funding does not account for this reality. Currently, the maintenance of the urban canopy largely falls upon the adjacent property owner, which can exacerbate challenges in equity because the financial burden of tree care can be cost-prohibitive for low-income community members. Ironically, areas that are low income are also those areas needing the most attention, and without municipal capacity to provide maintenance and care for those trees, these areas will see fewer trees and/or higher levels of mortality and morbidity of those trees that are planted.

Coordination and Collectivization

Many interviewees cite the daunting challenge of coordinating urban forest management programs in a region spanning 88 municipalities between incorporated and unincorporated areas was instrumental to meeting the aforementioned goals. The range of approaches to expanding and maintaining tree canopy varies by jurisdiction with some advancing highly prescribed approaches (e.g. Santa Monica), while others remaining silent about canopy management. As such, not all jurisdictions prioritize tree planting, which presents a challenge when it comes to securing institutional support and advancing a coordinated approach.

It was widely noted that the current goals and milestones (ex. 90,000 trees by 2021) have been useful in establishing shared objectives and attacking the complexity and nuance of urban forest challenge. To this end, these targets alone do not fully account for the political and cultural

"We need to find better ways to navigate competing priorities for space, because space is what is ultimately limited but most valuable (for planting)."
-StreetsLA

challenges underpinning them.

Another major advantage that we observed across the interviewees was that many respondents are 'speaking the same language' when it comes to describing the challenges and opportunities inherent in expanding an equitable urban forest. We noted several specific topics on which interviewees noted related challenges, opportunities, and initiatives. Some of the most pertinent ones include:

1. Public municipalities must set precedents and fulfill the leadership role that they occupy;
2. Necessity to identify where policy goals align;
3. Initial steps are good and genuine, but don't go far enough;
4. Mindshift is required in which trees are seen as an integral part of city fabric and urban infrastructure;
5. Ultimately, an equity-driven agenda for the urban forest requires an augmentation of social and political wills;
6. Unified approach required in terms of streamlining planning documents -- interviewees admit to conflicting municipal policies around planning and other building guidelines, including zoning, that can infringe on the City's own capacity to advance planting goals;
7. Community-based public campaigns are necessary to demonstrate need to expand urban canopy;
8. Partnerships with private sector and external environmental organizations may be necessary; and
9. The hiring of a City Forest Officer and engagement in the Urban Forest Equity Visiting Scholars program may be a signal that the City's management of the urban forest is increasing in priority.

Others noted that the City could benefit from more integrated urban forest planning with responsible authorities readily known accessible. At the same time, others also noted the importance of decentralization of activities so that local control of forest management can enable efficacy among communities. The interviewees shed light on the fact that several questions still remain about the appropriate scale of managing the diverse entities and their different perspectives on the urban forest. If coordination is not possible, then perhaps a collective approach that documents the different approaches may be necessary, we note.

Community Responsiveness

Across all the interviewers was a consistent theme about the strategies and tactics for engaging community-based organizations, seen as a

core constituency or advocacy group, in the management of the urban forest. Of specific mention was the need to support and empower community stakeholders to participate and shape the tree planning and maintenance process. Perhaps this was because the City already has a history of community-led tree planting initiatives in racially and ethnically diverse neighborhoods (ex. Great Streets Program, Transformative Climate Communities in Watts, Pacoima, and region).

Within the engagement theme, several specific areas emerged to define the challenges and opportunities currently facing the City and relevant stakeholders. Some of these include:

1. In historically disinvested areas of the city, communities may be facing engagement fatigue (defined as overextension) -- some respondents report that the engagement strategy is taxing and time intensive for community members. Not surprisingly, some communities are engaged frequently, often in a transactional manner, and with limited follow-up;
2. Involvement of individuals and smaller groups needs to strike a balance between tailored approaches that require extensive time and resources with those that are more generalizable across diverse communities;
3. Involving communities in tree planting in public areas versus private areas have very different approaches to engagement. While the private areas have the greatest potential for expanding the urban forest -- in part because most of the City is privately owned -- engaging communities in public plantings can help to advance a cultural change that can help to engage others, including private property owners;
4. Local CBOs, including culturally-based groups and neighborhoods associations have an important role -- as a local champion -- to play as trusted partners for engagement and understanding immediate needs of community members;
5. Length of engagement matters (allows for caring of trees)
    a. Methods of outreach should tap into existing neighborhood assets
    b. Engagement is much more than the tree, and must build long-lasting connections;
6. Partnerships with similar, yet not identical mission statements. Need to expand the stakeholders who are actively engaging communities in relation to the urban forest. Consider, for example, members from the cyclist, affordable housing, and public safety communities;
7. Accessibility: All engagement needs to be bilingual (e.g. Spanish) at minimum and respond to local interests of specific residents
    a. Some mentioned the need for allowing for specific, culturally specific trees, and the simultaneous advantage of engaging community members while expanding canopy;
    b. Enabling diverse models of engagement and approaches can

"We need to get serious about having a racial equity lens and making all of our public expenditures based on communities with the greatest needs."
-LA Great Streets

also help to build personal connections to tree planting work, similar to approaches taken by several CBOs.

8. Employment and workforce training opportunities for local ambassadors and anchor partners. Ability to compensate local community partners' work and outreach is important to building trust.

While several interviewees mentioned the importance of 'educating' the public about the importance of urban trees and forests, we note that these approaches may further a colonial-settler mindset. We posit that historically city-sponsored programs have burdened communities in a myriad of ways, and although trees may be seen as 'moral good,' such programs may be rightfully seen with suspicion by community members. Rather than leading with education, and the importance of the climate crisis, we suggest advancing a collective and co-managed approach that meets communities needs first, and developing a discovery process for the role that greening the neighborhood might offer. We make further mention in the 'Recommendations' section below.

Maintenance and Care

Across the board, interviewees identified the importance of water as a major constraint in the context of expanding tree canopy. While not a surprising result in a semiarid climate like southern California, watering concerns emerged in response to questions about barriers to expanding tree canopy. Some mentioned the importance of watering trees in the first few years as a means for increasing the likelihood of survivorship; and others described the mechanics of how watering might get accomplished. Of note from researchers is that lack of water specifically or maintenance more generally may be responsible for the fact that many street trees do not reach their full aging potential, and on average reach about one-third or one-half their normal life span.

The concern of watering also brings up several related questions about equity. The current reported maintenance cycle for the City of Los Angeles is 20-30 years according to LA County reports, which may not address the ongoing needs of any species of urban trees. While interviewees noted the importance of watering, unclear was the process about how an expansion in tree canopy will couple with [at minimum] five years of successful watering and maintenance in order to increase survivorship. Would adjacent property owners be responsible for the watering and care? Neighborhood or local community associations? Simply expanding tree canopy, some noted, without the necessary [water distribution and maintenance] supports will result in potential loss of capital and labor resources.

"We are not there to decorate, we are there to address and heal community pain."
-Accelerate Resilience Los Angeles

Interviewees were quick to respond to the potential means for addressing the watering challenges with several specific suggestions. We note that these suggestions can be categorized into three general areas. First, improving code enforcement for conservation of existing tree canopy, which often does not require as much water and/or maintenance. Whether identifying large, mature trees, and/or native species, respondents saw the lack of enforcement of existing code as an important barrier to addressing current concerns. Second, prioritizing low income, historically disinvested areas as priority for expanding tree canopy, since resources are limited, and attention and stewardship of new planting can potentially achieve greater support. While tree giveaways might be a viable option, their subsequent maintenance, which falls upon the recipient of the tree, poses additional barriers. Research on human behavior within California communities suggests that outdoor water is very elastic to price changes, which might occur during times of drought or increased water scarcity[14]. For lower income communities, water shortages and related price increases will likely lead to a rapid loss of water potential for newly planted trees[15].

Finally, current policies do not seem to be expanding tree canopy at a pace to keep up with their loss. The two-for-one replacement policy, for example, some interviewees noted, is not sufficient and poses severe risks to large canopy trees. Development and redevelopment are ostensibly taking out more trees than they are replacing. In fact, since 2000, many neighborhoods in the LA region have seen a tree canopy reduction of 14 to 55 percent, and street trees are lost at highest rates, due, in part to sidewalk repairs and street widening projects[16]. Interviewees noted that even the NASA Endeavor Space Shuttle 12-mile voyage led to the loss of street trees in neighborhoods of South Los Angeles. Some experts suggest that a recent program approved by the Los Angeles City Council to allow developers and homeowners to pay fees to tear out street trees—instead of replacing -- will exacerbate the problem. Some respondents asserted that these fees remain far too low and let private developers off the hook without sharing in responsibility for urban forestry outcomes.

DIVERGENT THEMES

Our interview analysis indicated several areas where respondents provided divergent views about specific questions. Divergent views suggest that an equal number of interviewees stated one preference that was conceptually opposed to responses from others. One of the first areas we characterized was enthusiasm and messaging. In terms of this theme, respondents were unequivocally enthusiastic about trees and their importance in the urban landscape. While some noted aesthetic

[14] Juneseok Lee, Stephanie A. Tanverakul; Price elasticity of residential water demand in California. Journal of Water Supply: Research and Technology-Aqua 1 March 2015; 64 (2): 211–218. doi: https://doi.org/10.2166/aqua.2014.082.

[15] Schwarz K, Fragkias M, Boone CG, Zhou W, McHale M, Grove JM, et al. (2015) Trees Grow on Money: Urban Tree Canopy Cover and Environmental Justice. PLoS ONE 10(4): e0122051. https://doi.org/10.1371/journal.pone.0122051.

[16] Lee, Su Jin, et al. "Increased Home Size and Hardscape Decreases Urban Forest Cover in Los Angeles County's Single-Family Residential Neighborhoods." Urban Forestry & Urban Greening, vol. 24, 2017, pp. 222–235., doi:10.1016/j.ufug.2017.03.004.

"All of this tree planting is just sand against the tide if you don't have mechanisms to put a barrier in place to removing big trees that already have had generations of effort put into keeping them alive."
-UCLA

roles and others the ecosystem services, unclear was the overall messaging of the role of trees to the general public. In a region known for freeways and other built infrastructure, what is the role of a healthy urban ecosystem that extends beyond large tracts of greenspaces, parks, or natural areas? Respondents used several different terms to reference trees, including 'canopy.' 'greening,' 'open space,' 'forests,' and other related terms. Without consistent messaging about trees, communicating across diverse audiences may pose some challenges.

The notion of 'Right Tree, Right Place' came up many times during the interview process, often in relation to a response that tree planting practices have been uniform in the past, and that current approaches emphasize diversity, micro-geographies, and urban conditions. Although a general understanding of these terms is present in documents and other supporting literature, the exact meaning of these terms is difficult to ascertain from the interviewees. Some referenced the species of tree, including the importance of native versus non-native species, evergreen versus deciduous versus flowering. Others mentioned public versus private spaces. Others spoke at length about the importance of planting trees that are able to withstand the coming climate crisis, though did not mention the specific species (or climate conditions) that may be the 'right tree.' Other definitions related to making strategic investments in place, providing a sense of community, comfort, and social cohesion. Identifying a more consistent communication system for unpacking the notion of 'right tree, right place' may help communities better understand the considerations that underscore future plantings.

A third area of divergence is in relation to collective versus individualistic models of action. These responses were specific to the question about effective strategies for reaching out to communities for expanding and supporting tree plantings. A collective model -- often consisting of groups engaging in the process for expanding tree canopy -- some suggested would be more effective because they are generalizable and can scale across the region. Examples of collective approaches mentioned included engagement of community-based organizations, neighborhood associations, and other collective decision-making bodies. Others noted that individual approaches -- consisting of tailored approaches that respond to specific locations and individual preferences -- would prove more effective. Examples of individualistic models included door-knocking campaigns, tree giveaways, and identifying specific locations where trees can be planted. In both cases, respondents noted lack of clear evidence about the effectiveness of each, though did generally mention that both approaches may be necessary to meet the ambitious goals set forth by the City. We note that mechanisms to balance the breadth versus depth of community involvement was a constant challenge mentioned by many interviewees.

"There is a considerable and rapid loss of the urban forest in single family residential neighborhoods in Los Angeles that one can attribute to both bigger houses (mansionization) and illegal and legal expansion of lots."
-UCLA

Finally, a couple of other divergent themes worth noting include the role of ecological considerations and the question of green infrastructure. By ecological considerations we refer to the fact that some respondents were keen on advancing a diverse palette of native trees, while others focused on characteristics of trees, regardless of their endemic nature. The divergence between native and non-native is not unique to the City or region, though will need further discussion about which will best suit the needs of the City, community, and local ecosystem. Several noted that having tree characteristics such as providing ample shade, landscape aesthetic, and an ability to withstand longer and hotter summers were ideal. Others noted a need to select trees that provide culturally relevant fruits, such as avocados; and yet others mentioned a wish to replicate the historic watershed of the region, which was unique among respondents, though not unlike other programs[17].

In terms of green infrastructure, several respondents identified the importance of considering trees as an 'essential part' of the functioning of a region, similar to roads, sewer systems, and buildings. Nevertheless, the placement of grey infrastructure often follows set planning guidelines, most times directly embedded in the code, though the placement of trees and other forms of greening is less clear, and may not abide by the same rules as other infrastructure projects. While the framing of trees as 'essential' was a consistent message among interviewees, unclear was the extent to which their placement would follow well understood design guidelines. Although pipe networks and roads may be highly prescribed, some noted that trees did not fall into such distinguishable and precise applications. Some commented, for example, on the importance of large corridors that connected a network of green, while others suggested clusters (or patches). Minus such prescriptive guidelines, advancing tree canopy expansion may be more about the persuasions of the developer and/or designer, than necessarily following code.

[17] http://uswateralliance.org/sites/uswateralliance.org/files/publications/2015-01-30muni_ag_wp_0.pdf

04 RECOMMENDATIONS

"Us, as the city, figuring out a better system for maintaining our trees could really help. My sense is that there are conflicting policies around planning and building department rules and guidelines which make it hard for trees to fit in."
-LA Mayor's Office

Our aim in this report is to present a set of observations resulting from analysis of interviews with a dozen organizations and their representatives. While the above narrative highlights some of the convergent and divergent themes, they also suggest opportunities and challenges to expand tree canopy in historically disinvested communities. We offer these themes as a means for advancing a series of recommendations that can help to center a community-based, equity-driven agenda for further greening of the LA region. We note that as authors and researchers we are not actively or intimately involved with the practice of tree planting in LA, and cannot fully appreciate the extent to which some of the recommendations below are actionable. Rather, these serve more as reflective observations -- based in a series of questions -- that aim to improve dialogue about the specific mechanisms for advancing tree and forest equity around the region. We begin by describing the convergent financial challenges mentioned by interviewees, and then identify specific recommendations that build on this overarching theme.

Equitable Financing

By the City's own admission, it needs to take the lead on pinpointing sustainable funding sources and streams. This lack of funding may reflect a low prioritization and statement of value in relation to expanding tree canopy, though it may also suggest a need to find creative means for improving funding options. The big question becomes how does the City procure new funding and how is it distributed equitably. We suggest that the City is well positioned to champion funding strategies -- both internally and externally -- that enable the planting and maintenance of the existing and forthcoming trees.

As one interviewee indicated,

"You have competition between individual government entities (city, county, other players). Who gets the money? Is it the city that has the best equipped staff to write the grant proposal? Very often, yes."

From the perspective of urban forest equity, planting trees in higher income neighborhoods and roadways is generally more cost-effective, due to physical constraints that are generally more challenging in lower income areas. For example, across the U.S. and within the LA region, wealthier areas generally contain larger parkway strips, larger lots, and more expansive open spaces that reduce costs for planting, and therefore require fewer financial resources for expanding urban forest

canopy. On the other hand, lower income areas with greater amounts of impervious surfaces, greater development densities, and fewer areas for immediately planting trees, pose greater infrastructure constraints, which can exacerbate inequities in the consideration of costs when expanding tree canopy[18]. The removal of asphalt and/or concrete requires financial and labor resources, while the higher ambient temperatures in highly sealed areas may decrease survivorship of newly planted trees, without adequate water and/or maintenance. As such, the need for greater financial and maintenance support for planting trees in historically marginalized areas of a city will likely create challenges in decision-making processes. What options do decision makers have for advancing an equity-based approach to expanding tree planting? How might conventional applications of cost-benefit analysis make way for measurement systems that include longer term, and socially and ecologically informed approaches? The sections below begin to flesh out some other dimensions of these questions, which will also need to be addressed when advancing a socially equitable approach to tree planting.

[18] Drescher, M., 20. Urban heating and canopy cover need to be considered as matters of environmental justice. Proceedings of the National Academy of Sciences Dec 20, 116 (52) 26153-26154; DOI:10.1073/pnas.17213116

Maintenance and Co-ownership

Alongside financing tree canopy, another dominant theme in our analysis of the interviews focused on the issue of maintenance. While generally caring for trees in the public right-of-way was the primary theme, an important part of this conversation centered on the responsibility of watering newly planted (or existing) trees. In a semiarid climate that is expected to increase in temperatures, watering is the determining factor in the ultimate success or failure of a planting program. While many of the interviewees acknowledged an ambiguity over the responsibility for watering, other reports corroborated similar notions[20]. The lack of clarity about who will maintain newly planted trees can pit the City against residents and community-based organizations. Additionally, with limited funding for establishment care[21], plans to expand canopy will need to consider alternative options for ensuring adequate maintenance and explicitly identify relevant responsibilities. With a generally understood ‘establishment period’ for new street trees suggesting a minimum five years, expanding tree canopy into disinvested areas of the City will also require a time-horizon that integrates responsibilities with an enforcement plan. The vastness of the City can pose severe limitations for municipal managers or arborists to take on full responsibility, and engaging community groups may ultimately prove more effective. These considerations suggest a need to develop systematic neighborhood-based maintenance and responsibility plans that are co-produced by those directly involved in tree care. These plans will need to revolve around several questions,

"[It's time to] flip the planning process, let residents become the planners of their own communities."
-LA Great Streets Program

including: What mechanism will allow municipal decision makers to support communities with financial and logistical needs for maintaining public, right-of-way trees? How might community-based responsibilities for tree care engage local organizations through incentives and/or other supports? What systems of accountability and enforcement are necessary and socially acceptable for ensuring an equitable distribution of responsibilities?

Trees as Inclusive Infrastructure

Well understood across the country, and further corroborated by the interviewees is the notion that street trees are one of the most overlooked strategies for improving public health[22]. For several decades, urban forestry researchers and practitioners have been focusing on educating the public about the role that trees play in improving the public's health. With climate change and extreme heat as a major concern in the coming decades, urban forestry managers will need to assess the extent to which earlier messaging has been effective. Some argue that the message has been loud and effective, yet if public funding for trees continues to decline, then others argue that budget priorities do not reflect the receptivity of earlier messages. A few interviewees indicated that the messaging is not reaching the 'right people', likely referring to those who are directly involved with decision making. Others noted that while the public health benefits of trees are important, other priorities prevail, such as roads and houses.

Perhaps the messaging is not about trees, rather in thinking about the 'multiplicative benefits' that can be gained from including trees in other municipal projects. As one interviewee from the Mayor's office noted, "One of the areas where we have money to spend is on stormwater management projects, or multi-benefit projects." A city with compelling climate goals[23] should view trees not just as an environmental priority, but as a crucial public health investment[24]. If trees can be treated as an essential part of the street—much like the city's similarly sized network of street lamps, which have a dedicated installation, maintenance, and replacement budget -- then they can more effectively be coupled with other infrastructure programs. One interviewee noted that "Trees are the most cost-effective way to cool down the urban environment." In other words, trees become one of the best technologies for fighting climate change.

Measures of success in such programs would not necessarily be limited to the total number of planted trees, rather, they might consider how many trees are doing well a decade later, and the experience of community members in areas where trees were recently planted.

"Making the connection to public health is going to be one the best ways to mobilize the underserved and under resourced communities of color."
-TreePeople

De Guzman, Edith, et al. "Inspiring Resident Engagement: Identifying Street Tree Stewardship Participation Strategies in Environmental Justice Communities Using a Community-Based Social Marketing Approach." Arboriculture & Urban Forestry, vol. 44, no. 6, 2018, pp. 291–306.

[20] City Plants, 2018. First Step: Developing an Urban Forest Management Plan for the City of Los Angeles.

[21] Piana, Max & Jack-Scott, Emily & Troxel, Blake & Ashton, Mark & Murphy-Dunning, Colleen. (2013). Stewardship Success: How Community Group Dynamics Affect Urban Street Tree Survival and Growth. Journal of Arboriculture. 39. 189-6.

Designing an inclusive green infrastructure program would integrate community perspectives within measure of success, thereby ensuring that tree plantings are coupled with other benefits that are directly attributable to adjacent residents.

What's Realistic? Replicability and Scalability

The tension between individual outreach and collective approaches is similar to managing individual trees versus a whole urban forest. The concerns about scalability and replicability are not surprisingly an important element of the LA region, given its vast spatial geography, complex social and institutional systems, and ambitious climate and canopy goals. Central to this issue are questions about how to expand work being done on the individual tree, and scale to the whole urban forest. Doing so will require consideration about the short, medium, and long-term plans for achieving the overarching goals. We offer a few suggestions in the following paragraphs.

The first is to begin with a series of 'easy wins' with existing projects, where different city bureaus identify potential mechanisms for expanding tree canopy. We heard from all the organizations involved in these interviews that trees were an important part of their agenda, and the City and regional partners seem well-positioned to make rapid organizations to identify those dimensions of their work where, without additional budget or policy revisions, they can help to advance the conversation. One immediate and relevant example that was mentioned in several interviews was the expansion of tree canopy and connectivity along transportation corridors, particularly where pedestrians frequent. Such an approach is consistent with the Mobility Plan 2035, and the interviewees were generally supportive of such an approach. While coordinating such an activity across municipal and community-based organizations may require considerable effort, the achievements may prove to offer a model for many other regions facing similar challenges.

Another opportunity for scaling and replicating tree planting efforts is to start small and grow big. While advancing a city or region-wide program can be daunting on many levels, perhaps beginning with a neighborhood association or within a council district with a 'pilot program' is a means for attracting attention. Several mentioned the idea of 'Watts Rising', which is a project that received funding from the State of California Strategic Growth Council as part of a Transformative Climate Communities program. Watts Rising, they noted, embodies several of the elements of such a pilot program that can be studied with academic or community-based partners, and potentially adapted and scaled to other parts of the region. The structure of a neighborhood scale model can increase the extent of interactions among residents, while also establishing important groundwork to advance future plantings. In addition, some pilot projects may meet criteria of success more effectively than others and identify those promising practices for advancing equity-based outcomes and balance oversight with community autonomy. Ensuring a robust [social and ecological] data collection process during such pilot programs will be important, as will formative and summative evaluations of such programs.

[22] McDonald, Rob, et al. The Nature Conservancy, 2016, pp. 4–29, Funding Trees for Health.

[23] Walker, Alissa. You Can't Be a 'Climate Mayor' If You're Making More Room for Cars. 6 Apr. 2018, archive.curbed.com/2018/4/6/17010042/climate-change-mayor-infrastructure-highways-parking.

[24] "How Urban Trees Can Save Lives." The Nature Conservancy, 30 Oct. 2016, www.nature.org/en-us/what-we-do/our-insights/perspectives/how-urban-trees-can-save-lives/?src=r.global.healthyair.

"It just seems like it would make more sense if the city could just say: the sidewalk is public property, the street is public property, we will manage the whole right-of-way (including the sidewalk and gutter). We just have to figure out how to pay for it."
-Council District 15

Building Multi-generational Coalitions

Even with the limited lifespan of an urban tree, most will live to see at least one, and in some cases two or more generations of people. Urban forest managers noted the importance of long-term planning and the fact that, if successful, a tree will grow (and age) along with adjacent household members. At the same time, a tree planted today must survive decades of hotter and drier conditions, making its survivorship relatively challenging. Multigenerational coalition-building may be a means for anchoring a youth-led engagement program that supports curricular needs while preserving the canopy for years to come. Enlisting younger members of the community to engage community members may be an effective approach, and might include several programs and resulting benefits such as:

- Create a youth-centered Urban Tree Corps, representative of own communities
- Enlist in door-to-door campaigns
- Engagement should feed into education and economic (job) opportunities
- Opening new career pathways
- Youth will drive approach and spread awareness
- Attach cultural significance and meaning to work
- Expand the definition of green jobs and workforce training

While several interviewees suggested the importance of finding novel approaches, some of which may already be in place, in which case expanding their reach may prove effective. Some of these approaches suggested the creation of a 'resident forester' program that could follow the lead of several other related programs, including the 'stormwater stewards program' or the 'Neighborhood Emergency Teams,' which are popular in several US cities.

[23] Walker, Alissa. You Can't Be a 'Climate Mayor' If You're Making More Room for Cars. 6 Apr. 2018, archive.curbed.com/2018/4/6/17010042/climate-change-mayor-infrastructure-highways-parking.

[24] "How Urban Trees Can Save Lives." The Nature Conservancy, 30 Oct. 2016, www.nature.org/en-us/what-we-do/our-insights/perspectives/how-urban-trees-can-save-lives/?src=r.global.healthyair.

An important consideration will be aligning the purpose of each program to the overall goals for the regional tree canopy. For example, in areas with limited tree canopy, a multi-generational program might develop green jobs for expanding canopy, while those areas with more canopy may involve an urban tree corps to provide maintenance alongside registered arborists. The types of programs that can help to achieve tree planting, establishment, and maintenance goals will likely determine the form that a multi-general program will take.

Reclaiming the Right-Of-Way

Across the board, interviewees were consistently discussing the 'public right of way' as an issue of equity. Even if most of the LA region is privately owned, public spaces play an essential role in supporting the expansion of tree canopy. Yet, those neighborhoods that have been historically marginalized from funding and/or disinvested in other forms can have narrow parkway areas, and limited spaces for expanding canopy. The amount of space dedicated to vehicles has only grown over time, adding to the challenge of finding suitable planting spaces. This work is further complicated by the fact the multiple agencies govern the public right of way. The 2015 settlement to commit $1.4 billion over 30 years to make sidewalks compliant to ADA standards, provokes serious consideration about the role of trees in the public right of way. Some trees can damage sidewalks, and are often removed as a result. As noted by members of the LA Urban Design Team, "For the majority of projects we see, we have limited ability to encourage more trees." As such, the capacity for expanding tree canopy, particularly in areas with limited canopy will require creative approaches.

Some cities have experimented with removing concrete and widening sidewalks, which allow for larger tree wells; others have integrated safety measures, such as curb 'bump outs' or extensions to allow for trees. Recently, the COVID- pandemic indicates that many restaurants are occupying public right-of-way and streets for increasing spaces available for physical distancing. If we can cede areas to private businesses, then perhaps similar approaches can be taken for expanding tree canopy. Such an idea was expressed by another member of the LA Urban Design team, who noted, "If we could cede more parkway space for trees, and less for cars, that would be a huge win for the city." To address challenges from community members, such programs could be coupled with innovations that increase the experience of ownership among neighboring residents. A couple of such programs might consider: Levers and/or incentives that support a favorable water rate or subsidy for qualifying households and which would contribute to infrastructure improvements for accommodating trees;

Invest in the creation of time-based, 'green equity districts', which aim to accelerate the expansion of tree canopy into disinvested areas -- similar programs exist for the maintenance of streetlights (e.g. neighborhood assessment district) – and perhaps also coupling a transaction fee (percentage) on home sales [within those districts] that would be available for community members who qualify (e.g. lower income, historically disinvested area, etc.).

05 CONCLUDING CONSIDERATIONS

Anybody working within the LA region can quickly observe the tensions between the gray and green infrastructure. The opportunities and challenges for advancing an equity-centered approach to expanding tree canopy are innumerable, yet the creation of the first City Forest Officer, and active and engaging community-based organizations and individuals, offers immediate opportunities to advance such approaches. Expanding tree canopy will require at once a recentering of the priorities that help to undo the decades of racist and highly inequitable construction of the existing landscape. Public policy is the core of the priority setting, and only through active engagement with community groups and development of political will, can the region transform the current distributional inequities of tree canopy, and all the related challenges that these inequities create.

An urban tree equity agenda will need to demonstrate its value to enable community members to do more than they ultimately would have been able to accomplish without it. Disinvested communities in the region want more equitable policies, living-wage jobs, higher household incomes, safer neighborhoods, affordable housing, a more usable and connected urban network, pedestrian infrastructure, more frequent transit service, better funding for schools, and specific initiatives to engage youth and families, among other things.

Showing the value of an equity-based tree program that helps to advance these well-known needs will create an immediate and region wide constituency for making LA more sustainable via action at the neighborhood scale. This report then, is about how to develop such a program in the LA region, and relies on insights from members from the community. We have been able to take a deeper look into core concepts underlying the notion of pursuing regional equity through the lens of trees and urban forests. We've learned that current city and regional policies lack alignment and can amplify inequities, left unchecked. If such an agenda is, in fact, a departure from past practices, it would need to be more than just trees[25].

[25] Framed another way, if community members are viewed as passive recipients of greening efforts, consumers of new parkway trees, rather than producers of green results, then little would have been accomplished towards realizing the potential of a community commitment to making help to make the region unique and a thriving place to live.

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07 APPENDIX

A. Interview Questions

Q1: What is the perspective of your organization, please tell us how you interact with and/or engage with LA's urban forest, if at all?
Q2: What do you think are the most important factors that impact the location for planting trees in the city?
Q3: Of the list of factors, what would you prioritize as the top three most important and the bottom three least important?
Q4: What are the barriers that you perceive for expanding the tree canopy beyond these locations?
Q5: How can the city help advance those goals (e.g. incentives, policies, opportunistic, etc.)
Q5a (if time allows): As an urban forest manager, do you consider the characteristics of the species being planted so that the species mix (now and into the future) optimizes urban cooling potential? If so, what characteristics do you consider?
Q6: Do you have advice or suggestions for helping to support and/or engage residents in underserved neighborhoods?

B. List of Respondent Organizations

Accelerate Resilience Los Angeles, Board of Public Works, City of Los Angeles, City Plants Collaborative, Council District 15, Department of Recreation and Parks Forestry Division, LA Great Streets Program, Los Angeles Region Imagery Acquisition Consortium (LARIAC), LA County Sustainability Team, LA Sanitation & Environment, Mayor's Office of Economic Opportunity, Mayor's Office of City Services, Mayor's Office of Sustainability, Office of Forest Management, StreetsLA, TreePeople, UCLA Institute of Environment & Sustainability, Urban Design Studio in the Department of City Planning.

CAPA