



**FINAL REPORT**  
CITY OF PARAMOUNT  
TREE CANOPY PRIORITIZATION



Loyola Marymount  
University  
Center for  
Urban Resilience

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## AUTHORS & ACKNOWLEDGMENTS

### Acknowledgments

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All images are courtesy of project partners or the City of Paramount's website.



### Thank you, Paramount!

We are grateful to all of the participants from the City of Paramount who helped plan and participate in the tree summit. We hope this project helps you in further growing Paramount's urban forest.

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## EXECUTIVE SUMMARY

The Loyola Marymount University Center for Urban Resilience, TreePeople, and the Gateway Cities Council of Governments partnered to conduct tree canopy prioritization in the City of Paramount. This process utilized high resolution, high accuracy tree canopy data as a foundation to engage the public in identifying their priorities for tree planting in the city. Analysis of tree canopy data showed that the City of Paramount has 15% existing tree canopy cover. The analyses also found that Paramount has great opportunity to increase its tree canopy, with 45% of the land area of the city shown to be Possible Tree Canopy. However, 32% of the possible area is in places with impervious surfaces, such as concrete or asphalt, that would require modification to be a good place for trees.

The project partners held a series of planning meetings with the City of Paramount and conducted multiple forms of outreach to engage community participation in a virtual “tree summit,” which took place on June 10, 2021. Participants were presented with the numerous ways that their city could benefit from increased tree canopy, engaged in a discussion and several interactive activities about their personal experiences and values around trees, and were invited to take a survey to choose their top ten priorities for tree planting.

There were 37 surveys collected, with the majority (73%) of respondents indicating that they were residents of Paramount and a smaller number (39%) indicating that they work or study in Paramount. Respondents had the opportunity to vote to prioritize 20 specific tree benefits across eight categories. Participants identified “Improve Air Quality and Reduce Noise,” “Beautify Neighborhoods,” and “Increase Equity for Residents” as their top priority categories for tree planting. Among the specific benefits, the highest priorities were Air Quality, Low Tree Canopy, Park Improvement, Heat, and Toxic Release Sites. Each of the benefits voted on by participants was associated with a spatial variable (e.g., “Heat” was associated with high-resolution surface temperature data available through NASA).

Using the results from the survey, priority weightings were calculated for each spatial variable at the parcel level. These rankings were mapped to provide a visual of where participants’ combined priorities are located. The results revealed that the highest tree planting priority areas for Paramount were in the the central eastern, southeastern, and northwestern parts of the city. Many of these areas border the I-710 or I-105 freeways, reflecting priorities to improve air quality and reduce noise. The lowest priority areas were mostly located in the central southern part of the city. In addition to the maps, tables were produced to provide rankings for each individual parcel in the Possible Tree Canopy boundaries. This dataset includes a comprehensive listing of over 7,000 parcels in the City of Paramount, along with their priority score and percent of possible area for increasing tree canopy.

The survey also asked participants about their demographics and their perceptions of tree planting and care in Paramount. Responses to the demographics questions showed that some groups were not represented or under-represented in the survey results. For the perceptions questions, there were 90% who agreed that planting more trees is a priority, though 60% believed there are barriers to planting and 92% recognized that there are barriers to taking care of the trees in Paramount; in particular, Land Ownership, Land Availability and Water-related barriers.

This project can help guide the City of Paramount in future urban forestry strategies. The City may look to focus their tree planting efforts in high priority locations that also rank high on the Possible Tree Canopy - Vegetated scale. The City may also consider educational campaigns and incentives to reach out to specific communities and to increase tree canopy on private lands. Finally, the City may wish to pursue funding programs to help replace some of the impervious surfaces with tree canopy.

## PROJECT OVERVIEW

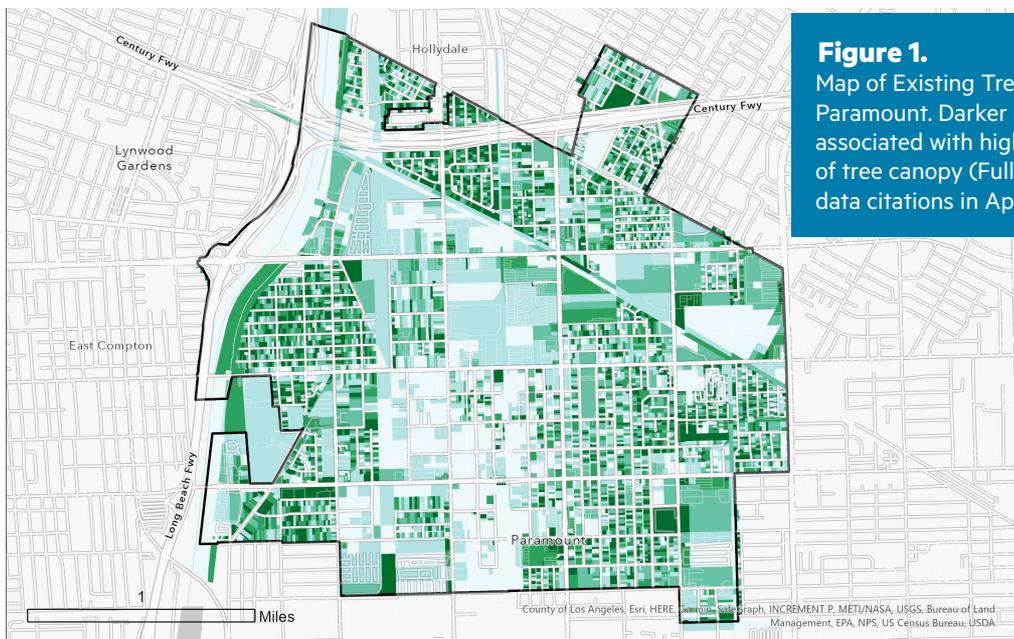
# Background

The Gateway Cities in Southeast Los Angeles County is a densely-populated region with many under-resourced, low-income, and transit-dependent residents. This population experiences increased vulnerability to extreme heat days and temperatures that are expected to accelerate with climate change. Urban heat can be mitigated with relatively inexpensive nature-based solutions, allowing residents to continue trends toward increased sustainability and usage of active transportation, while protecting public health and critical infrastructure. For example, TreePeople's Los Angeles Urban Cooling Collaborative found that one in four lives lost during heat waves could be saved in Los Angeles if we strategically increase urban tree canopy and cool surfaces, especially in low-income communities and communities of color (de Guzman et al. 2020).

Urban forestry is one strategy to increase cities' resilience. In addition to reducing the urban heat island effect, urban trees can help prevent flooding and runoff, and remove pollutants before water enters rivers and oceans. Trees filter air pollutants, which can improve air quality and produce public health benefits. Increasing the urban forest has also been associated with socio-economic improvements, such as reduced crime and improved social interactions (NRC 2013).

Many of the benefits that trees provide are correlated with the size and structure of the tree canopy, which is the layer of branches, stems, and leaves of trees that cover the ground when viewed from above. Recognizing these benefits, numerous cities have goals to increase tree cover, which often come without implementation plans or considerations of equity. Including community stakeholders in planning and using accurate data to inform decision-making is a way to increase the success of urban forestry programs and thus the resilience of communities.

Loyola Marymount University's Center for Urban Resilience, TreePeople, and the Gateway Cities Council of Governments partnered with the City of Paramount to conduct a community-based tree planting prioritization process with residents and other city stakeholders. This follows an established approach (Locke et al. 2011) that has previously been implemented in the Cities of Commerce and Lynwood (LMU CUREs & TreePeople 2019, LMU CUREs et al. 2020). Participants were able to vote on the benefits of trees most important to them individually, and then this information was compiled to produce a collective map of priority locations for tree planting.



**Figure 1.**

Map of Existing Tree Canopy for Paramount. Darker colors are associated with higher percentages of tree canopy (Full-sized map with data citations in Appendix)

PROJECT OVERVIEW

# Tree Canopy Data

Data acquired from the Los Angeles County Tree Canopy Assessment (Galvin et al. 2019) were used to provide a baseline understanding of the existing and possible tree canopy in Lynwood, CA. This countywide assessment combined 2016 spatial imagery and LiDAR data to produce an 8-category land cover analysis (Figure 2) from which the tree canopy assessment could be derived.

The tree canopy assessment is a parcel-level analysis of both *Existing* (the land currently covered by tree canopy) and *Possible* (the land area where it is possible to plant new trees—excluding roads, buildings, etc.). An example of how this is mapped is shown in Figure 3.

Possible Tree Canopy combines *Possible Vegetated* and *Possible Impervious*. The Possible Vegetated area includes grass and shrub areas where it may be possible to plant new trees, and the Possible Impervious includes asphalt or concrete surfaces, other than roads or buildings, where it may be possible to plant new trees if improvements are made.



**Figure 2.** LA County data used for this project combined high resolution imagery (top left) with LiDAR data (top right) to produce a land cover classification (left)

**Figure 3.** An example of tree canopy cover calculated at the property parcel level



## PROJECT OVERVIEW

# Paramount's Environment

The City of Paramount is located on 4.84 square miles in southeast Los Angeles County, CA. In 2016, the City was found to have elevated levels of hexavalent chromium due to industrial activity, and is still under regular monitoring by the South Coast Air Quality Management District. Paramount is home to 54,000 residents and situated within three highway corridors: I-710 to the west, I-105 to the north and CA-91 to the south. The City has two large stationary sources regulated by the state's Cap-and-Trade program. Information from the California Communities Environmental Health Screening Tool (CalEnviroScreen 4.0) shows that the majority of Paramount is classified in the highest categories of pollution burden, ranging from 83%-99%, meaning that residents of these communities are most affected by many sources of pollution and are especially vulnerable to pollution's effects (CalEPA OEHHA 2021). Increasing Paramount's tree canopy is one way to help mitigate some of the impacts of these environmental burdens.

The City of Paramount already has shown a demonstrated commitment to the environment. This is evident in the recent adoption of the City's first Climate Action Plan (CAP), and through many other programs and initiatives that can be found on the City of Paramount Environmental Information Portal. Particularly relevant to this report, Paramount has been recognized for its work on urban forest management, earning a 2019 Green Leadership award from the Los Angeles County Board of Supervisors and being named Tree City USA by the Arbor Foundation for the past three consecutive years (Figure 4). Paramount maintains an urban forest of 8,000 trees on City-owned land.

**Figure 4.**

Paramount has been recognized as Tree City USA by the Arbor Foundation



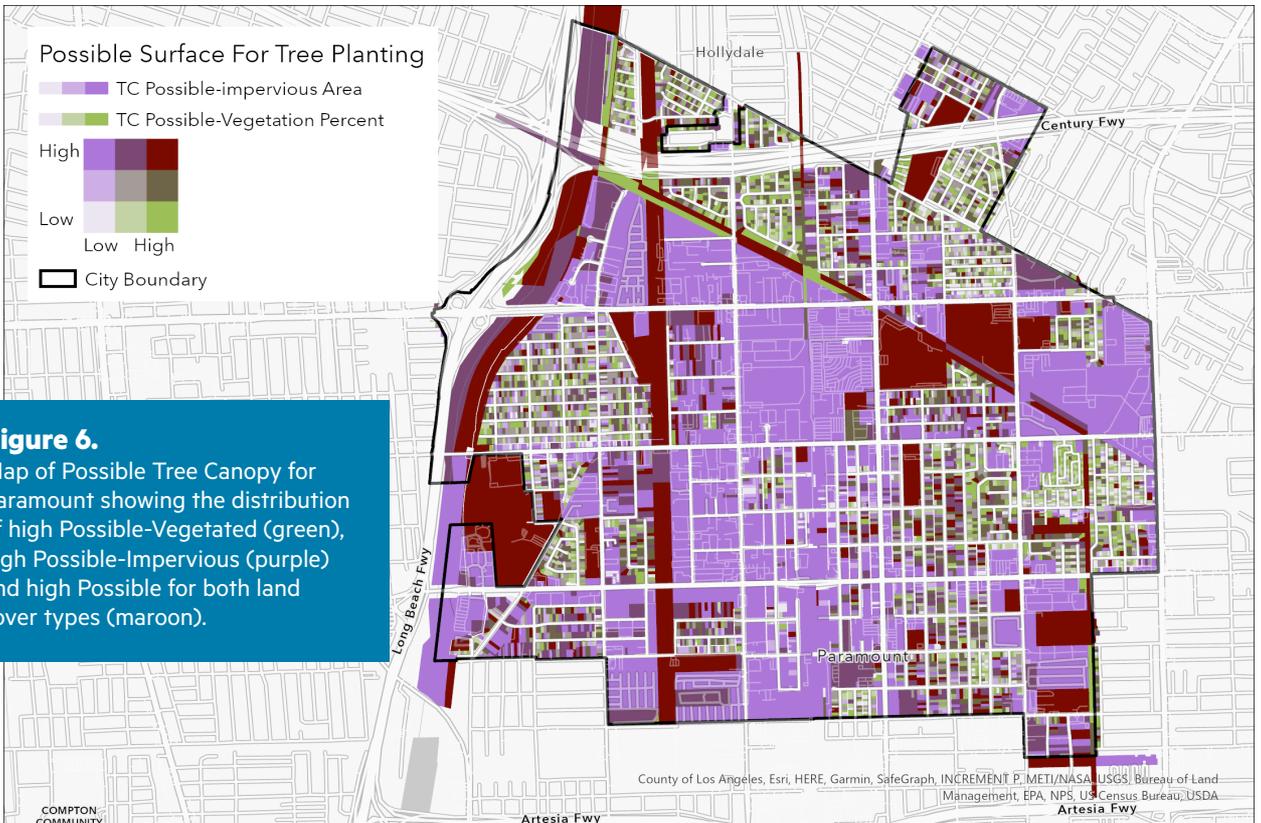
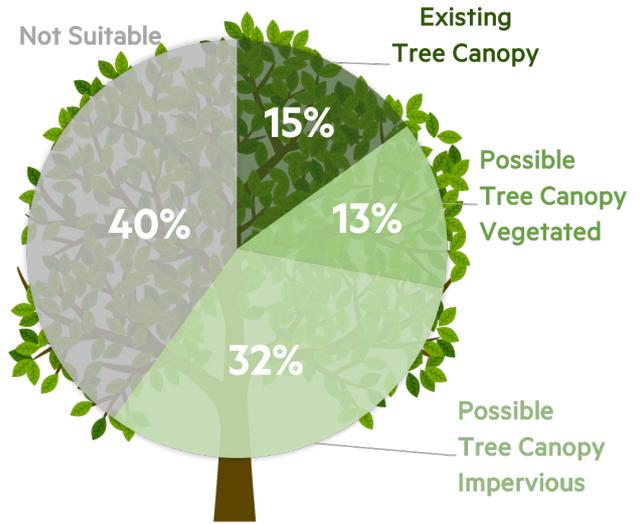
**PROJECT OVERVIEW**

# Paramount's Tree Canopy

As shown in Figure 5, Paramount was found to have 15% of its land area covered by Existing Tree Canopy, with 45% of the land area found to be Possible Tree Canopy. The remaining 40% of the land area was deemed “not suitable,” meaning that these areas are highly unlikely candidates for tree planting—typically roads, rails, or buildings are found in not suitable areas. For comparison, at 15% Existing Tree Canopy the City of Paramount is below the 18% average tree canopy cover found across Los Angeles County. However, it is aligned with the 15% average tree canopy cover found for the Gateway Cities.

Of the 45% of land area deemed to be possible tree canopy, only 13% is categorized as vegetated, with the remaining 32% categorized as impervious. Figure 6 shows how the possible tree canopy areas are distributed in Paramount.

**Figure 5.**  
Tree canopy metrics for Paramount, CA



**Figure 6.**  
Map of Possible Tree Canopy for Paramount showing the distribution of high Possible-Vegetated (green), high Possible-Impervious (purple) and high Possible for both land cover types (maroon).

## PROJECT OVERVIEW

# Community-Based Prioritization

The data on Paramount’s Existing and Possible Tree Canopy provided one layer of information about the urban forest. To help the City of Paramount develop priority locations for future tree planting, the project team of LMU CUREs, TreePeople, and the COG partnered with the City to conduct a collaborative tree canopy prioritization process, which consisted of three stages: 1) planning with City partners, 2) a public “tree summit” to gather community input on priority locations for tree planting, and 3) development of maps and a report to the City.

The aim of this process was to engage residents and other stakeholders to provide their input on where the City should prioritize areas for increasing tree canopy based on desired benefits: for example, reduced impervious surface, mitigation of flooding, or vulnerable populations. By combining tree canopy data with other spatial data of interest, each participant was able to choose their personal priorities, and see how those compared to the priorities of the group. The final map can be used by the City of Paramount in

their decision-making about where to plant future trees. This type of joint knowledge production can contribute to successful implementation of programs and increased community resilience.

To conduct this process, the project team worked closely with the City of Paramount (Figure 7). Due to the COVID-19 pandemic, all meetings and most community engagement occurred virtually. Five meetings were held throughout March, April and May 2021 with City staff, including the City Manager and staff representatives from the departments of Planning and Public Works. The project team also provided a briefing for the Paramount Vice Mayor. The goals of these meetings were to better understand the history of urban forestry in Paramount; to gain insight on the urban forestry goals and current priorities; and to hear any concerns or other information that could help guide the project. The content of these meetings served to inform development of community engagement plans and the Paramount Tree Canopy Survey.



**Figure 7.**

Screenshot from a project planning meeting in Spring 2021 with representatives from the project team and the City of Paramount.

**PROJECT OVERVIEW**

# Paramount Tree Summit

The public tree summit was held on June 10, 2021. Project partners promoted the events through their websites and social media channels, and TreePeople offered a free fruit tree to those who attended to incentivize attendance. The tree summits were led by TreePeople and LMU CUREs, and included a welcome from the City of Paramount’s mayor as well as participation from City staff. Goals of the events were to introduce the project to the public, to discuss the value and benefits of tree canopy, and to survey participants on their priorities for increasing tree canopy in Paramount. Participants were guided through a number of interactive experiences, including an opportunity to identify an important tree in their life and a word cloud exercise (Figure 9).

Participants were then directed to the Paramount Tree Canopy Survey, where they could choose their priorities for tree planting (Figure 8). Members of the project team were available to answer any questions for the approximate 5-10 minute duration of the survey. The tree canopy survey was offered in both English and Spanish, and was shared by TreePeople at the Paramount Farmer’s Market for an additional three weeks after the summit to encourage completion. The full survey can be found in the Appendix.

**Figure 8.** Examples of priorities that could be chosen by Paramount Tree Canopy Survey respondents.

I Want to Plant Trees To...	Specifically, I Want to Improve...	This Means the Tree Planting Team Will...
Beautify Neighborhoods & Promote Outdoor Activities	Low Tree Canopy	Plant trees on streets with few or no street trees, to beautify the neighborhood & provide shade for pedestrians.
	Park Improvement	Plant trees in parks to promote community recreation and health.
	Pedestrian & Bicycle Routes	Plant trees along pedestrian and bicycle routes to promote active transportation and community health, following the Bellflower-Paramount Active Transportation Plan.
Improve Air Quality & Reduce Noise	Air Quality Index	Plant trees in areas with the poorest air quality scores to help improve the air quality.
	Toxic Release Sites	Plant trees near facilities that emit toxic pollution to help reduce the impacts of the pollution.

## How do you want to see trees benefit your community?

**Figure 9.** Results from a word cloud exercise at the Paramount Tree Summit. Participants identified “clean air” and “shade” as important benefits of trees.



**STUDY FINDINGS**

# Priorities Identified by Participants

Participants were given a list of 20 possible tree benefits to choose from when identifying their priorities for tree planting. The benefits listed were not a comprehensive list of all the possible benefits of trees; rather, they were carefully chosen for their applicability to the City of Paramount.

Criteria for inclusion were that:

- 1) The item listed would address a social or environmental challenge faced by residents.
- 2) The item listed was able to be mapped at a fine resolution so that priorities could be calculated and shown on maps.

The 20 benefits were grouped into 7 categories: Beautify Neighborhoods & Promote Outdoor Activities, Improve Air Quality & Reduce Noise, Increase Equity for Residents, Prevent Flooding &

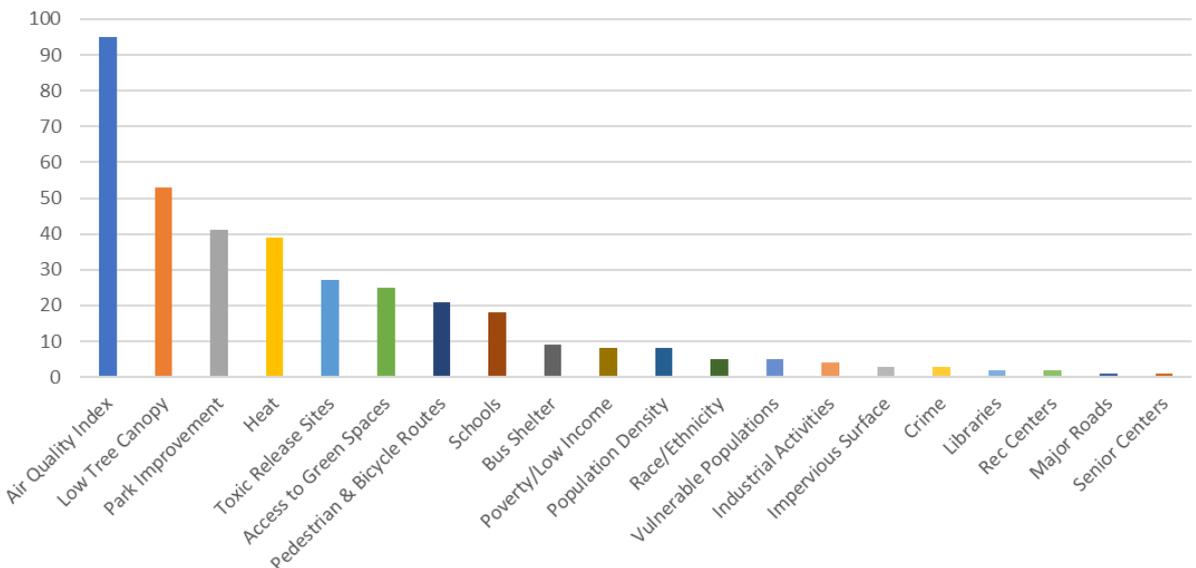
Increase Infiltration, Protect Critical Community Places, Reduce Crime, and Reduce Heat (see Figure 7 and Appendix).

Each participant was given 10 votes, and these could be distributed however the survey taker deemed appropriate. Thus, all 10 votes could be used for one benefit, the votes could be evenly distributed among 10 separate benefits, or some combination therein.

When the survey results were analyzed by *specific benefit*, results from the 37 surveys showed that participants most frequently identified Air Quality Index as the highest priority. This is followed by Low Tree Canopy, Park Improvement, Heat, and Toxic Release Sites. Figure 10 shows how the specific benefits were prioritized.

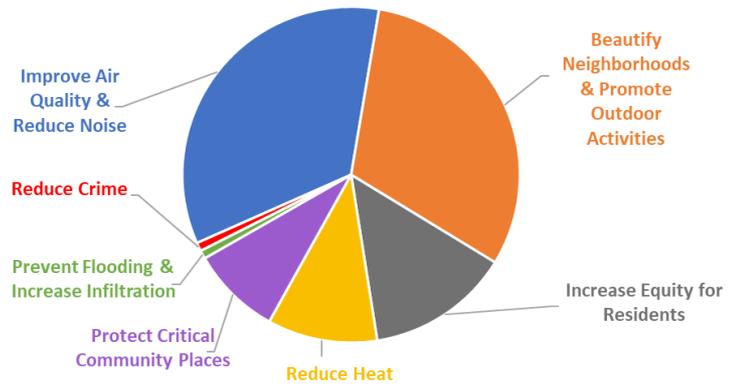
**Figure 10.**

Tree canopy priorities by specific benefit, as chosen by Paramount Tree Canopy Survey respondents.



## STUDY FINDINGS

When summarizing by *category*, the priorities follow a similar pattern. The highest priority for tree planting was Improve Air Quality and Reduce Noise with 34% percent of the votes in this category (Figure 11). This was followed by Beautify Neighborhoods and Promote Outdoor Activities with 31% of the votes, Increase Equity for Residents (14%), Reduce Heat (11%), Protect Critical Community Places (9%), Prevent Flooding & Increase Infiltration (1%) and Reduce Crime (1%).



**Figure 11.**

Tree canopy priorities by category, as chosen by Paramount Tree Canopy Survey respondents.

## Map of Priorities

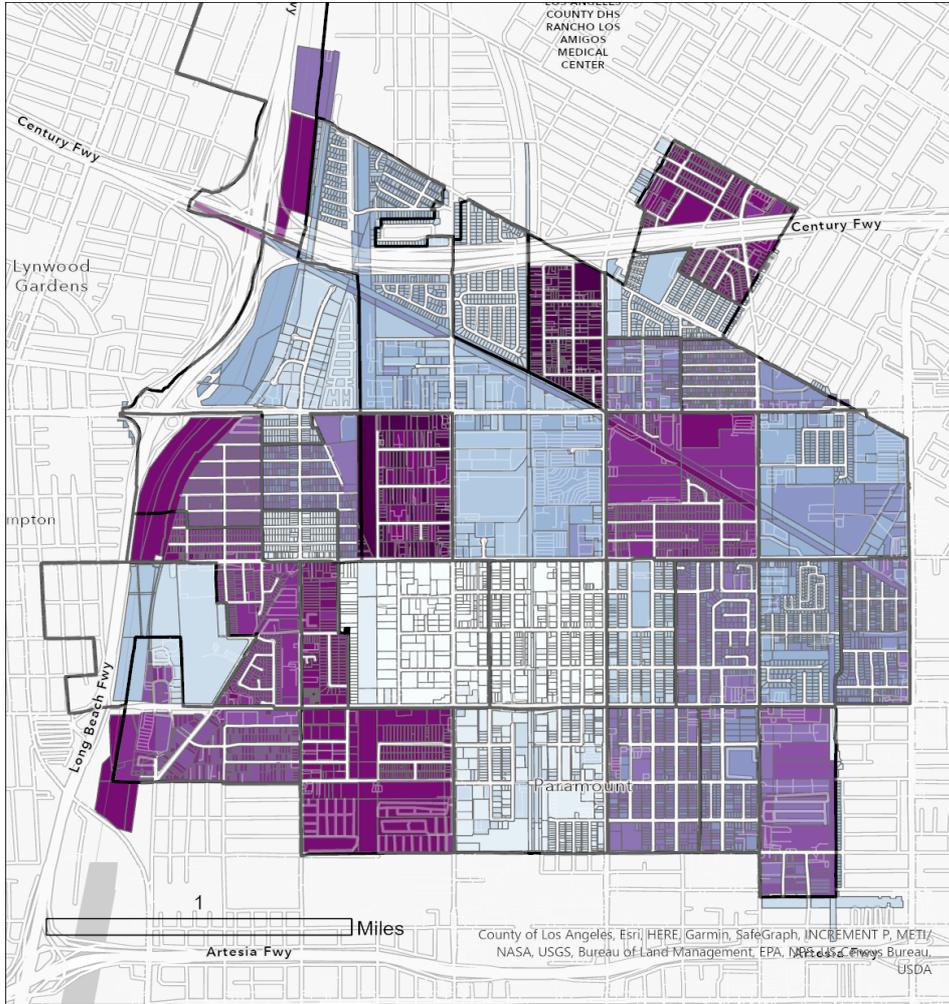
The priority data collected from the survey were then combined with the tree canopy data to develop maps and tables of priority locations for planting. As mentioned earlier, each priority had an associated spatial variable that could be mapped at a fine resolution. Data were acquired for each of these variables. For example, for Heat, surface temperature data was acquired from NASA's ECOSTRESS program. For Pedestrian and Bicycle Routes, a spatial map was created from the Bellflower-Paramount Active Transportation Plan.

Each variable was given a different weighting to account for the information gathered from the survey. Air Quality was weighted the highest and Senior Centers and Major Roads were weighted the lowest. The weighted priority variables were processed in an ArcGIS model to produce a map of areas where tree summit participants collectively prioritized planting trees. Figure 12 on the next page shows the overall priority map for increasing Paramount's tree canopy. As shown, many of the

high priority areas for planting trees are in the central eastern, southeastern, and northwestern parts of the city. Many of these areas border the I-710 or I-105 freeways, reflecting priorities to improve air quality and reduce noise. The lowest priority areas are found in the southern central part of Paramount.

This priority map can be used alongside the Possible Tree Canopy maps (Figure 6) to determine best places for tree planting. In addition to the maps, a table was created to provide a comprehensive listing of the priority scores for planting locations for all parcels in the City of Paramount. These are provided in an Excel file along with this report (see Appendix) and can help to guide future plantings by the City.

**STUDY FINDINGS**



- Block Groups
- Priority
- 1.1 - 1.5
- 1.6 - 2.0
- 2.1 - 2.3
- 2.4 - 2.5
- 2.6 - 2.8
- 2.9 - 3.0
- 3.1 - 3.3
- 3.4 - 3.6
- 3.7 - 4.0
- 4.1 - 4.6
- 4.7 - 5.5

**Tree Canopy Improvement Priorities  
City of Paramount**

The priority indicator is calculated based on possibility of tree planting, population, vulnerability (expose to high heat and traffic, age), distance to or density of the key community facilities (libraries, senior centers, parks, and other community facilities).

**Figure 12.**

Final prioritization map of the results from the Paramount Tree Canopy Survey. The collective responses from participants showed their highest priority areas for planting trees are in the central eastern, southeastern, and northwestern parts of the city. The lowest priority areas are found in the southern central part of Paramount.

**STUDY FINDINGS**

# Perceptions of Urban Forestry in Paramount

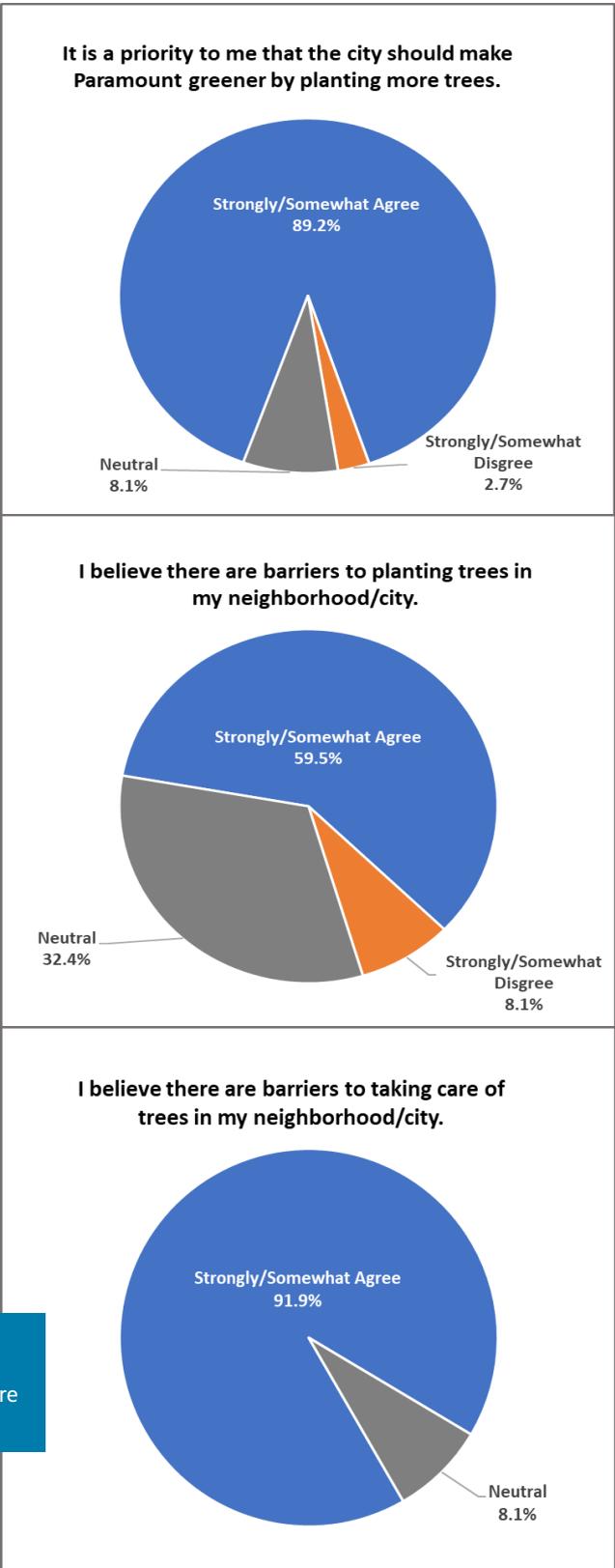
In addition to identifying priorities, participants were asked about their perceptions of tree planting and care in the City of Paramount. Respondents were given a set of statements regarding the importance of tree planting in Paramount, and barriers that are faced by urban forestry in the city.

Respondents ranked this series of statements on a scale from 1 to 5, where 1 was strongly agree and 5 was strongly disagree. As shown in Figure 13, nearly 90% of participants chose Strongly or Somewhat Agree that the city should make Paramount greener by planting more trees. However, nearly 60% believe that there are barriers to planting trees, and an overwhelming 92% believe there are barriers to taking care of trees in their neighborhood/city.

Those who agreed that there were barriers were asked to provide specific examples in a write-in response. As shown in Table 1 on the next page, the majority of the barriers listed could be grouped together as related to Land Ownership, Land Availability, or Water. Additional notable responses were related to the importance of maintenance (e.g. upkeep, tree trimming, no budget for maintenance).

Twelve participants also provided final remarks, which are provided in the Appendix for review.

**Figure 13.** Responses to the Paramount Tree Canopy Survey questions about perceptions of tree planting and care in the city.



## STUDY FINDINGS

**Table 1.**

Barriers to Tree Planting & Care Identified by Paramount Tree Canopy Survey respondents.

Category	Examples of Barriers
 <p><b>Land Ownership</b></p>	<p>Refusal from private property owners</p> <p>Landlords</p> <p>Permission from city government</p>
 <p><b>Land Availability</b></p>	<p>Highly industrial/concrete areas</p> <p>Not enough open ground space</p> <p>Parking lots</p>
 <p><b>Water</b></p>	<p>Drought friendliness</p> <p>High price of water</p> <p>Water</p>

## Participant Characteristics

There were 37 respondents to the City of Paramount Tree Canopy Survey. Of the 37 survey respondents, 27 (73%) live in the City of Paramount, and 14 (38%) work or study in the City of Paramount. A subset of those who work in the City of Paramount identified their employer (Figure 14).

The survey also asked participants to identify personal demographic information. These questions were intended to better understand how well the survey participants represented the overall demographics of the City of Paramount. Participants were asked to identify their age range, ethnic identity, racial identity, and gender identity. The next page shows these results.



**Figure 14.**

Organizations listed as employers by participants in the Paramount Tree Canopy Survey

## STUDY FINDINGS

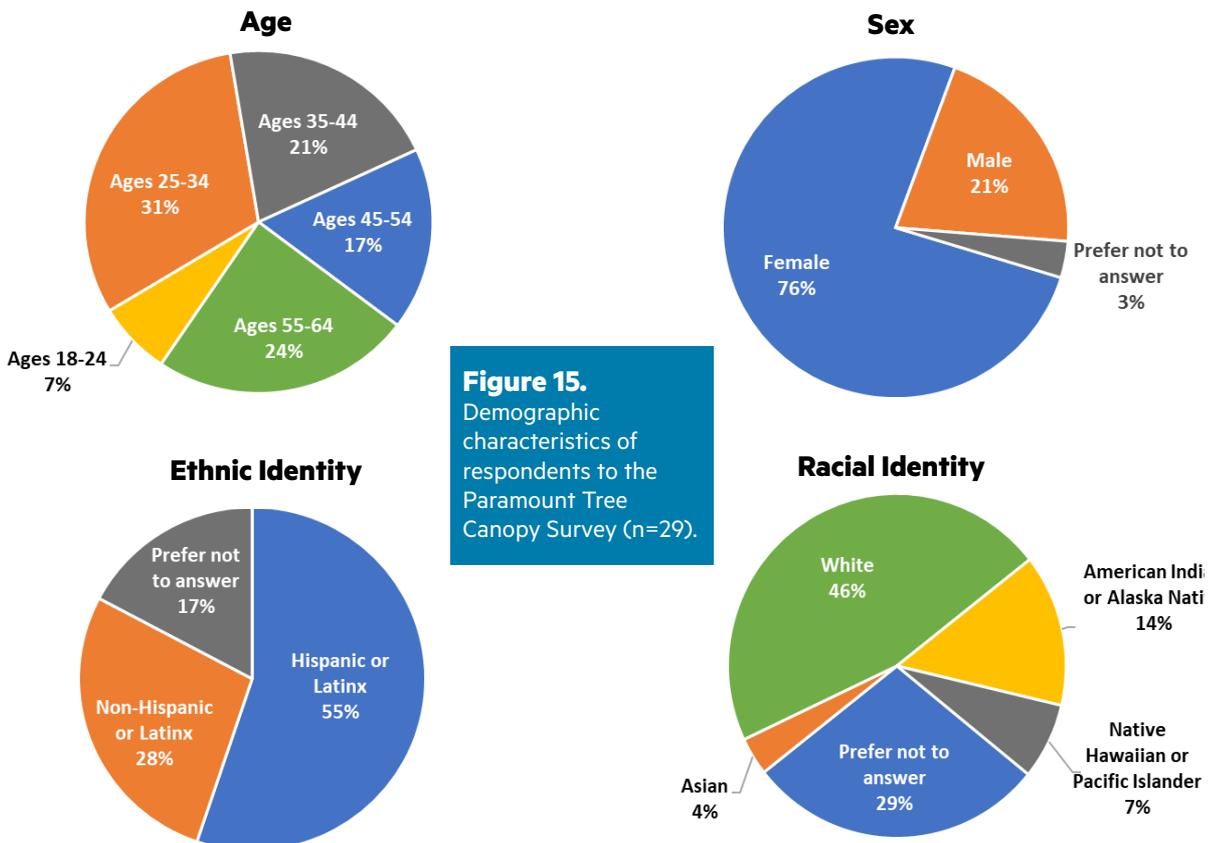
Figure 15 shows the demographic representation of survey participants and Table 2 shows 2019 U.S. Census data for Paramount. A direct comparison between the U.S. Census data for Paramount and the survey data is not easily made, as the survey allowed respondents to choose all that applied for racial and ethnic identity questions, and large percentages chose not to respond.

For the age and sex categories, the age ranges chosen by respondents align well with the median age of Paramount residents, but the survey respondents were 76% female, meaning that males were not well represented. The White and Asian respondents were well aligned with Census data, but all other races and ethnicities were either over-represented (e.g. American Indian or Alaska Native, Native Hawaiian or Pacific Islander) or under-represented (e.g. Black or African American, Hispanic or Latinx). While this could be due to many respondents choosing not to answer the question, follow-up outreach may be necessary to reach residents in communities that were not well represented here.

**Table 2.**

U.S. Census 2019 demographic data for the City of Paramount

U.S. Census Race & Ethnicity Data for Paramount, CA	
White alone	47.2%
Black or African American alone	9.1%
American Indian and Alaska Native alone	0.4%
Asian alone	3.1%
Native Hawaiian and Other Pacific Islander alone	0.7%
Two or More Races	2.7%
Hispanic or Latino	81.0%
White alone, not Hispanic or Latino	5.5%
U.S. Census Age & Sex Data for Paramount, CA	
Male	50.4%
Female	49.6%
Median Age (Years)	30.9



**Figure 15.** Demographic characteristics of respondents to the Paramount Tree Canopy Survey (n=29).

## SUMMARY & NEXT STEPS

# Next Steps

The City of Paramount has demonstrated success in urban forestry initiatives. This is evidenced in their designation as Tree City USA and through other awards and recognitions. Yet this report shows that there is great opportunity for the City of Paramount to increase its urban forest. Analysis of the tree canopy data showed that 45% of the land area of the city may be feasible for planting trees. Through the community-based prioritization process, it was found that the highest priority areas for planting are located in the southeastern, southern central, and northern central areas of the city. This spatially represents the most chosen benefits of trees for survey participants, including Air Quality, Low Tree Canopy, Park Improvement, Heat, and Toxic Release Sites.

In the near to medium term, the results can help the City of Paramount focus their planting efforts. By utilizing the Possible Tree Canopy maps alongside the Priority map, City leaders can pursue planting in high priority parcels that also score high on the Possible Tree Canopy - Vegetated map. This may involve reaching out to private property owners through educational campaigns and incentive programs. In the longer term, this report and the associated tools can aid in furthering urban forestry planning and initiatives in the city. It is notable that the

majority of Possible Tree Canopy is covered by impervious surfaces, and that Land Availability was recognized by many respondents as a barrier to planting more trees. Paramount may consider pursuing state or other funding sources to replace some of these surfaces with vegetation, including trees.

Paramount's prioritization is part of a regional effort by the project team to conduct prioritizations in the cities of Commerce, Lynwood, Vernon, and Montebello. The work in Paramount will be strengthened by being part of this Gateway Cities initiative.

The prioritization approach allowed for the use of a high resolution, high accuracy assessment of tree canopy in the City of Paramount as a foundation of a data-driven community engagement process. This helped to increase community awareness of the importance of urban trees; involve residents and other stakeholders in decision-making regarding the urban forest; and provide maps and other information that can support the city to grow its urban forest. Together, this approach can contribute to a greater sense of stewardship for the trees in Paramount and have an impact on the long-term success and resilience of urban forestry efforts.



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ESRI Living Atlas

KTUA: Bellflower-Paramount Active Transportation Plan

Los Angeles County GIS Portal

Los Angeles Regional Imagery Acquisition Consortium (LARIAC)

NASA SEDAC

SavATree Consulting Group

SCAG Open GIS Portal

University of Vermont Spatial Analysis Laboratory

U.S. Census American Community Survey

## APPENDIX

Project Team List

Map 1: Existing Tree Canopy in Paramount

Map 2: Possible Tree Canopy in Paramount

Map 3: Tree Canopy Priority Map for Paramount

Paramount Tree Canopy Survey (English & Spanish)

Survey Respondents' Final Remarks

### DATA FILES

Excel: Table of Parcels with Tree Canopy Prioritization Score

KMZ: Paramount Parcel Level Tree Canopy Prioritization



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