



# BUREAU OF STREET SERVICES

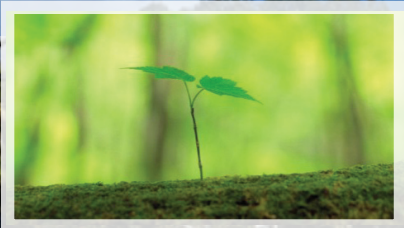
  

# 2015 STATE OF THE STREET TREES

# REPORT

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*Quality • Timeliness • Efficiency*

CITY OF LOS ANGELES / DEPARTMENT OF PUBLIC WORKS  
**BUREAU OF STREET SERVICES**

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## Executive Summary



Street trees are a significant and highly visible portion of the City's urban forest and they are recognized as a vital public works infrastructure system essential to improving the quality of life in the urban environment.



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The Bureau of Street Services (Bureau) is responsible for the maintenance and preservation of numerous elements of the Public Works infrastructure including the approximately 700,000 street trees planted in the City of Los Angeles' (City) public right-of-way (PROW). Comprised of over nine hundred different tree species growing along 6,500 centerline street miles, the City's street tree network is one of the largest and most diverse in the nation.

Street trees are a significant and highly visible portion of the City's urban forest and they are recognized as a vital public works infrastructure system essential to improving the quality of life in the urban environment. This living infrastructure provides numerous economic, social, environmental, ecological, and aesthetic benefits. One of the Bureau's primary goals is to optimize street tree benefits by maintaining a sustainable, healthy, safe, and appealing street tree population.

However, due to funding limitations since 2008, the Bureau no longer plants street trees and has been limited to providing emergency response for the removal of dead, dying, or hazardous trees,

pruning of foliage obstructing traffic control devices and emergency response vehicles, and supervising a small amount of contract tree trimming. Without regular maintenance, the street tree population's condition is declining and poses a threat to the City's sustainability and resiliency.

In addition, recent developments further threaten the health and sustainability of the street tree population. The City is experiencing a historic drought that is causing stress on the trees and making them more susceptible to disease. Already, thousands of street trees have died or are in decline due to these deadly diseases. Our region is also forecasted to have unusually severe weather in the next several months due to the presence of El Niño. This weather could bring extreme conditions under which already vulnerable street trees may fail. Additionally, the City's recent commitment to extensive sidewalk reconstruction over the next thirty years will result in the removal and replacement of a significant number of street trees across the City.

The State of the Street Trees Report is the first step in assessing the impact of these factors in order to address the needs of our street tree population. Recent developments such as the Mayor's Executive Directive #5: Emergency Drought Response, the Sustainable City pLAn, and the City's Sidewalk Repair Program offer significant opportunities to improve the state of our City's street trees. Therefore, determining the overall condition of the street tree population is vital for the Bureau to properly manage this extremely important asset and guide future policy, plans, and programs significantly impacting street trees.



The State of the Street Trees Report establishes a measurement methodology and baseline grade for the current condition of the City's street tree population.

Utilizing Urban Forest Sustainability models, the Bureau determined the following five performance metrics to be the best condition indicators for the State of the Street Trees Report assessment:

1. Tree Species Diversification
2. Tree Age Diversification
3. Tree Stocking Rate
4. Tree Health
5. Tree Maintenance Program

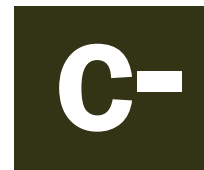
Performance metrics data sources included street tree inspections, maintenance records, and dates of home/tract completion. The Bureau's 1996 street tree inventory also provided useful data on tree species, tree sizes and locations, and the existence of other infrastructure relative to the trees.

The Bureau conducted a thorough analysis and a letter grade was assigned, wherein an

A represents excellent and an F failed/failing. Grades are assigned a "+" or "-" to provide more range within a letter grade. The individual performance metrics grades were then combined to provide a composite final grade.

The Bureau analysis of the five street tree population performance metrics studied provided the following findings:

- Species Diversification..... A**
- Age Diversification..... D**
- Tree Stocking Rate ..... B+**
- Tree Health..... D**
- Tree Maintenance..... F**



Overall Street Tree Assessment

The Bureau's analysis of the five performance metrics used to assess the street tree population reveals an unacceptable condition of our City's street tree population. The current unacceptable condition is primarily due to poor age diversification, health, and maintenance of the City's street trees.

While the City's street tree species are extremely diverse and stocking rates are adequate, if deferred tree maintenance, increasing pest infestations, drought, and lack of programmatic tree removal and replacement continue, the composite street tree grade will decline.

Maintaining a healthy, diverse, and equitably distributed street tree population is essential for the City to reach its sustainability and resiliency goals. Therefore the Bureau recommends the following actions be taken:

- Create a street tree removal and replacement program in order to minimize the impact of dying trees, create a more sustainable age distribution, and increase tree canopy along the public right-of-way
- Increase the amount of tree planting in order to improve the street tree stocking rate
- Conduct a street tree inventory in order to more adequately assess and manage street tree health
- Establish a regular maintenance program in order to sustain a healthy street tree population by funding tree pruning and removal crews
- Rebuild the City's Urban Forestry Division with high level leadership that incorporates street tree management into the City's larger sustainability objectives



## Introduction

The goal of the State of the Street Trees Report is to establish an assessment methodology and provide a baseline grade for street trees in the City.

The Bureau envisions this Report as a management tool, guiding future investments in street tree infrastructure and providing advisement for policy, plans, and programs impacting street trees. The Bureau developed a quantifiable and justifiable grading system that can be tracked over time. Due to the organic and constantly changing nature of the street tree population, the State of the Street Trees Report will be re-evaluated every three to five years and modified as necessary as the knowledge base or data availability grows.

Assessing the condition of our street tree population is more important than ever before due to our ongoing historic drought, widespread tree diseases, looming El Niño, and necessary sidewalk reconstruction. Furthermore, the baseline data provided by this report will be used to develop a street tree succession plan to ensure a healthy, vibrant and equitably distributed street tree population for generations to come.

### Recent Developments

Over the past year, several developments have taken place with significant implications for the City's street trees. Prominent among them are the historic drought, Mayor's Executive Directive #5: Emergency Drought Response, release of the Sustainable City pLAN, and the beginning of a major sidewalk reconstruction program as a result of the Willits Settlement.

Currently, the City, State, and Western United States are experiencing a historic drought that began in 2011-2012. The City's response, codified in the Mayor's Executive Directive #5, requires the City to reduce its landscape water usage significantly over the next few years.

The Bureau has therefore reduced its median island irrigation usage by approximately 30% to date. Reduced watering and ongoing drought, as well as the long term impacts of climate change, will have an impact on the street tree population and need to be taken into account when planning for street tree succession.

The Mayor's Sustainable City pLAN also includes street trees as an important part of reaching sustainability goals. Specific goals related to street trees include protecting and supporting biodiversity in the urban ecosystem, increasing stormwater capture, and reducing urban heat island effect. The pLAN also outlines objectives to increase the amount of street trees and sets a short-term goal of completing a street tree inventory to document the street tree system and guide future tree planting investments.

The Sidewalk Repair Program (SRP) was established in the wake of a class action lawsuit settlement, *Willits versus the City of Los Angeles*, which requires the City to repair sidewalks to comply with the Americans with Disabilities Act (ADA). The SRP will conduct systematic repair of the City's sidewalk system over the next 30 years. Since a majority of sidewalk damage in the City is due to street tree conflict, the impact of sidewalk repair on the street tree population will be significant.

The challenges of a drought, the vision laid out in the Sustainable City pLAN, and the implications of the sidewalk reconstruction program all offer immense opportunities to regenerate, expand, and revitalize the state of the street tree population in the City. Furthermore, the City recently codified an existing practice to replace two trees for every one tree that is removed – known as the City's 2:1 policy. If managed correctly, the codification of this practice ensures the street tree population's ongoing growth and sustainability.



## Current Efforts

The primary outcome of the City's urban forest, set forth by the General Plan Framework (Goal 9Q), is to provide a "sustainable urban forest that contributes to the overall quality of life." However, due to the City's financial difficulties during 2008, reduced departmental funds have since limited the ability to properly maintain a safe and sustainable urban forest.

Given these limited resources, the Bureau allocates staff resources towards the public safety priorities below:

1. Response to tree related emergencies within twenty four hours during non-storm periods.
2. Clear obstructed traffic control devices and locations where low foliage may obstruct emergency vehicle access.
3. Removal of hazardous or dead trees.
4. Maintaining emergency vehicle PROW accessibility.

The City's general fund budget has periodically provided a small amount of contract funding for proactive tree pruning which has increased over the past two fiscal years. Additionally, the Bureau of Street Lighting (BSL), through Street Lighting Assessment Funds (SLAF), provides annual contracted tree pruning funding for street trees contained in SLAF districts to maintain acceptable levels of street light illumination. However, outside of these programs, other non-emergency street tree maintenance, such as regular pruning, has ceased.

While the Bureau strives to maximize efficiencies, reduced resources have resulted in the deterioration of the City's street tree infrastructure. Without regular pruning, street tree foliage can often obstruct pedestrian passage on sidewalks and undermine our transportation network. The deterioration of the living tree infrastructure also impacts the surrounding infrastructure systems such as sidewalks, streets, traffic control devices, and adjacent buildings subsequently increasing the city's exposure to risk and liability.

Although the Bureau is limited in its resources to maintain the street tree population, there are additional efforts outside the Bureau that impact street trees. City Plants, a public-private partnership between the City and non-profits, residents, and businesses, performs the tree planting function. Utilizing six nonprofit partners, City Plants planted approximately 2,000 street trees in 2014 and plans to plant approximately 4,800 street trees a year in 2015 and 2016. While they work in coordination with the Bureau, this program is funded by the Department of Water and Power (LADWP) Energy Efficiency Program, Federal and State grants, private grants, and corporations.

## Asset Description

The City contains one of the largest urban forests in the world. As a whole, the city's urban forest is comprised of trees, understory plants, wildland interface trees and plants, and all landscaping contained on both public and private property. According to the Los Angeles Canopy Cover Assessment (McPherson et al 2006), the City's estimated tree population is in excess of ten million trees.

Public trees are located in the City's public rights-of-way, adjacent to public buildings, on city-owned facility grounds, or in golf courses and parks. Trees along streets in the public rights-of-way and the park trees are the only two urban forest components actively managed by the City. This report is strictly limited to assessing the public trees contained in the public rights-of-way, commonly referred to as Street Trees.

The Bureau manages the approximately 700,000 street trees that are part of the total urban forest tree population. It is the Bureau's responsibility to ensure a sustainable street tree population that is safe, free and passable, and equitably distributed. Although street trees comprise only seven percent of the City's entire urban forest, they are one of the urban forest's most visible components.

Street trees most commonly exist alongside the street system's 6,500 centerline miles in sidewalk areas with tree well cut-outs or in planting strips (parkways) located between the sidewalk and street. Street trees are also located in street median islands and grade separations. Planting area sizes vary significantly from small three by five feet tree well cutouts to large, expansive, and continuous parkways and median islands.

### Street Tree as Infrastructure

In the 1980s, the City took a historic step by becoming the first city in the nation to recognize street trees as public works infrastructure. Street trees are one of many different infrastructure elements in the infrastructure system and historically one of the few pieces of organic and living infrastructure.

Street trees provide a myriad of quantifiable environmental benefits that vary based upon tree age, tree size, foliar density, and placement in a landscape. Large, dense canopy trees provide a much higher degree of benefits than younger, smaller, or less dense canopy trees. These benefits include, but are not limited to:





- Heat Island Effect Reduction
- Carbon Sequestration and Storage
- Storm Water Control and Collection
- Energy Conservation
- Airborne Particulate Matter Reduction

Unlike many other public works infrastructure elements, street trees are an organic and dynamic system. This makes for significant differences compared to traditional hard, non-organic infrastructure, also known as gray infrastructure. The differences between street trees and traditional gray infrastructure are particularly dissimilar when appraising the infrastructure value.

Typically, gray infrastructure value is based upon the service provided, for example the amount of light a street light provides, the safe passage of a street as a result of its pavement condition, or the amount or pressure of water

that a water main pipe may provide. Traditional gray infrastructure value is greatest at the time of installation and depreciates in a predictable manner based upon the type of infrastructure.

However, a tree's value fluctuates over its lifespan, with the quantifiable benefits increasing as the tree grows larger. Once established, trees often provide quantifiable monetary benefits greater than the cost of maintaining them. Therefore, it is imperative the City ensures the street tree population remains in good condition to fully capitalize on the benefits provided.

### Street Trees and Infrastructure Conflict

The City's infrastructure system is dynamic and, therefore, what effects one element effects the entire infrastructure system. Due to their living nature, the impacts of street trees on the infrastructure system constantly changes as trees grow and change over time. As a result, street trees often come into conflict with other infrastructure.

of other infrastructure types. Due to the unique benefits provided by street trees, future planning to resolve street tree and infrastructure conflict must ensure that as many vital and healthy street trees are retained as possible.

The City is committed to economic, cultural, political, and environmental sustainability as it relates to its infrastructure system. Resolving conflicts between street trees and any other infrastructure is an important priority for the City's long-term livability and sustainability.

The most common street tree conflict with other infrastructure elements occurs with the sidewalk system and is largely due to the confined spaces in which trees are planted. However, street trees also interface with other infrastructure including but not limited to driveways, streets, curb and gutter, fire hydrants, overhead utilities, traffic control devices, and other in-ground and above-ground utility vaults and boxes.

In order to maintain a sustainable infrastructure system, resolution of such conflict may require street tree removal or the removal or relocation



## TOP TEN STREET TREE SPECIES BY POPULATION



1. Crape Myrtle



2. Mexican Fan Palm



3. American Sweetgum



4. Southern Magnolia



5. Indian Laurel Fig



6. Jacaranda



7. Camphor



8. London Plane



9. Modesto Ash



10. Italian Cypress

## Methodology and Criteria

The State of the Street Trees Report assessment is based upon Urban Forest Sustainability models. From these models, the Bureau selected the most appropriate metrics to provide a comprehensive analysis and street tree condition assessment. The State of the Street Trees Report methodology consists of the following five performance metrics and subsequent criteria:

1. Tree Species Diversification
2. Tree Age Diversification
3. Tree Stocking Rate
4. Tree Health
5. Tree Maintenance Programs

### Tree Species Diversification Performance Metric

Best Management Practices (BMP) for tree species diversification recommend that no one Botanical tree species comprises more than 10% of the street tree population, no one Botanical tree genus comprises more than 20% of the street tree population, and no one Botanical tree family comprises more than 30% of the street tree population. Therefore, a letter grade for species diversity was assigned as follows:

Grade	Percentage of Street Tree population		
	Species	Genus	Family
A	<10	<20	<30
B	<20	<35	<45
C	<30	<45	<55
D	<40	<55	<70
F	<50	<60	<80

Table 1



### Tree Age Diversification Performance Metric

Tree ages are generally sorted into the following categories: new trees are those that have been in the ground less than five years, young adult between five and fifteen years, mature between fifteen and sixty years, aging between sixty and eighty years, and senescent if the tree is more than eighty years or declining due to factors other than aging (note: there is a small undetermined number of trees older than 80 years that are not senescent). Based on these categories, the letter grade for tree age diversity was assigned as follows:

Grade	Percentage of Street Tree Age Diversification				
	New Trees	Young Adults	Mature	Aging	Senescent
A	10	20	40	20	10
B	10	10	50	20	10
C	5	15	45	25	10
D	5	15	45	25	10
F	0	5	50	30	15

Table 2

### Tree Stocking Rate Performance Metric

The tree stocking rate is understood as the percentage of potential tree sites that are currently planted. This rate is determined by comparing the ratio between the number of planted sites (x) relative to number of total potential tree planting sites (y), expressed as (z):  $x/y=z$ .

Grade	Stocking Rate Percentage
A	> 97
B	85-97
C	75-85
D	60-75
F	<60

Table 3







Good

Poor/Senescent

Dead

### Tree Health Performance Metric

The tree health condition assessment is based upon healthy canopy volume, foliar color, amount of dry wood, presence of pests, structural defects (“included” bark, co-dominant stems, crossing limbs, etc.), and trunk condition (i.e. decay and cavities).

Grade	Good (%)	Fair (%)	Poor/Senescent (%)	Dead (%)
A	>55	>35	<9	<1
B	>45	>35	<18	<2
C	>42	>33	<20	<5
D	>35	>33	<25	<7
F	>30	>35	<25	<10

Table 4

### Tree Maintenance Performance Metric

The primary form of street tree maintenance is regular pruning. Professional BMPs recommend a five to seven year pruning cycle depending on the tree species. The tree pruning cycle can be determined by dividing the total number of street trees by the number of trees pruned within any one fiscal year.

Grade	Pruning Cycle in Years
A	3-5
B	5-8
C	8-12
D	12-15
F	>15

Table 5



## Condition Assessment Process and Results

In order to assess the City’s street tree population, the Bureau has utilized a variety of sources including inspections, maintenance records, and dates of home/tract completion. The Bureau’s 1996 street tree inventory data provided information on tree species, tree sizes and locations, and the existence of other infrastructure relative to the trees.

To arrive at an average grade for the street tree population, the Bureau conducted a thorough analysis using the previously discussed criteria of the five street tree performance metrics. This analysis produced the following grades:

- Tree Species Diversification..... **A**
- Tree Age Diversification..... **D**
- Tree Stocking Rate..... **B+**
- Tree Health Assessment..... **D**
- Tree Maintenance Assessment..... **F**

The overall street tree population grade relative to all five performance metrics is a C-.

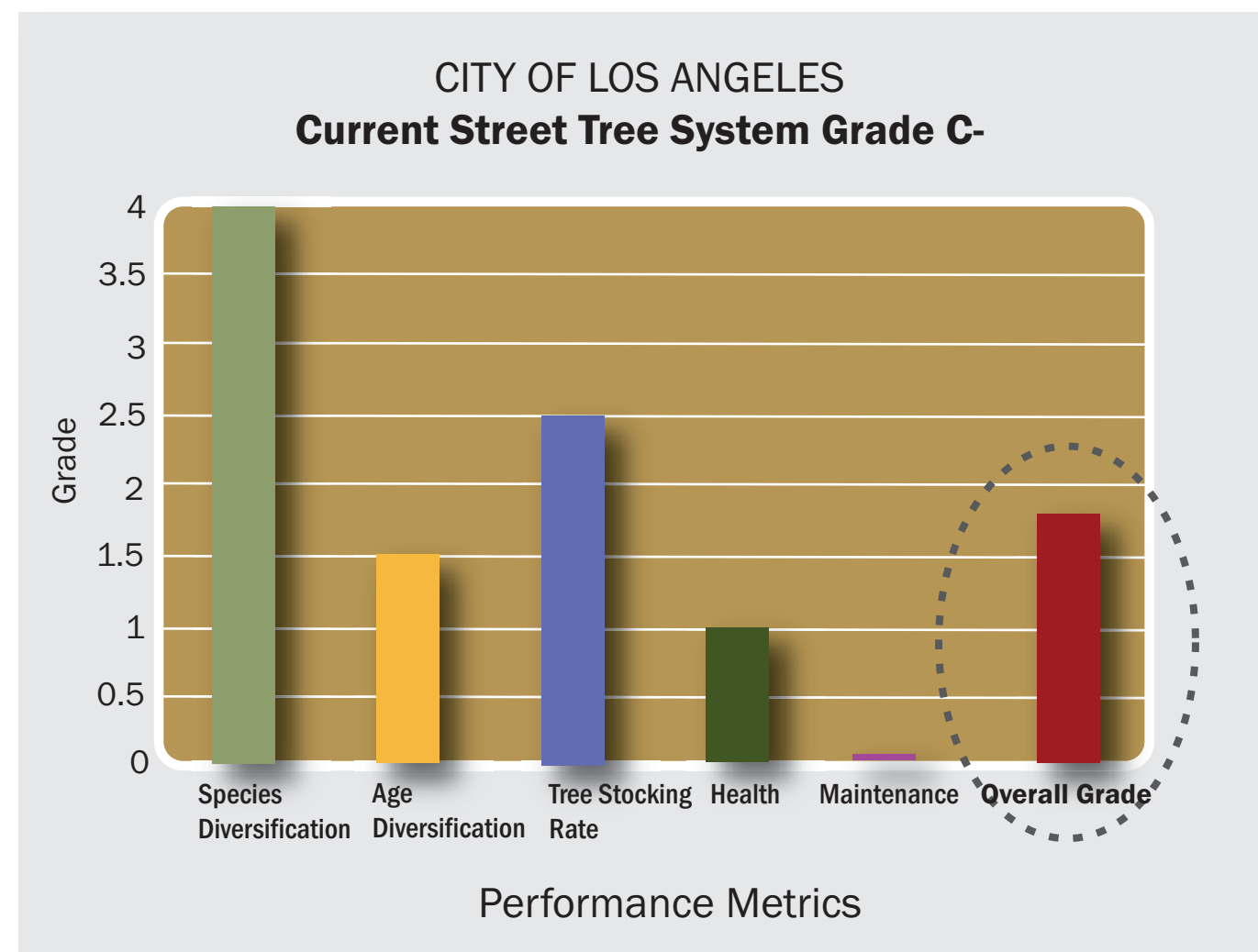


Figure 1



### Species Diversification Performance Metric

#### Species Diversification Grade: A

The City's street tree population is not only one of the largest United States municipal street tree system but also the most diverse with more than 900 identified street tree species. As a result of the City's Mediterranean climate, many of the world's diverse tree species live and thrive in the City.

Using the Bureau's street tree inventory, tree species quantities were analyzed relative to the entire population to determine species diversification. The City species diversification is well within the BMP recommended tolerances:

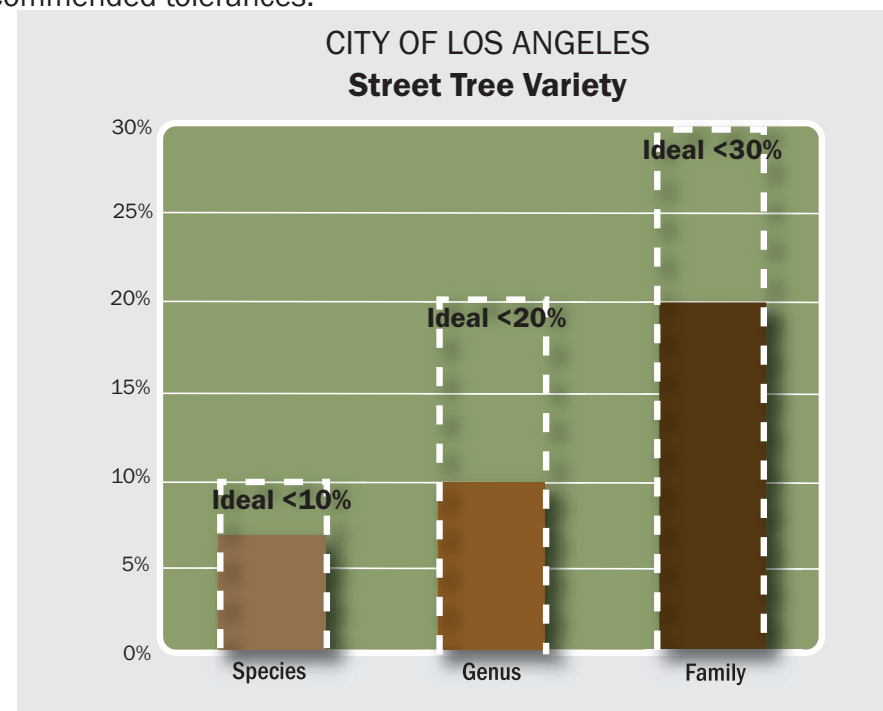


Figure 2

### Tree Age Diversification Performance Metric

#### Age Diversification Grade: D

Tree age diversification was determined by random sampling of home ages in approximately 30 neighborhoods and a thorough analysis of post-World War II tract development dates. At the beginning of the 20th Century, there were relatively few street trees and the first major street tree planting programs began in the 1930s. It is estimated that 60%, or more, of the existing street trees were planted between 1945 and 1970 during the post-World War II housing and building development boom.

	New	Young	Mature	Aging	Senescent
	<5 yrs	5-15 yrs	15-60 yrs	60-80 yrs	>80 yrs
Optimal Age	5%	20%	55%	15%	5%
Current Age	3%	10%	45%	35%	7%

Table 6

The City's aging and senescent street tree population is currently twice the optimal percentage (Table 3). As trees age, they lose their vigor and their ability to provide environmental services is greatly reduced. This condition is, known as senescence. Aging and senescent trees not only provide less benefits but have an increased likelihood of failure. The City's large amount of aging and senescent trees threaten the resiliency and sustainability of the overall street tree population.

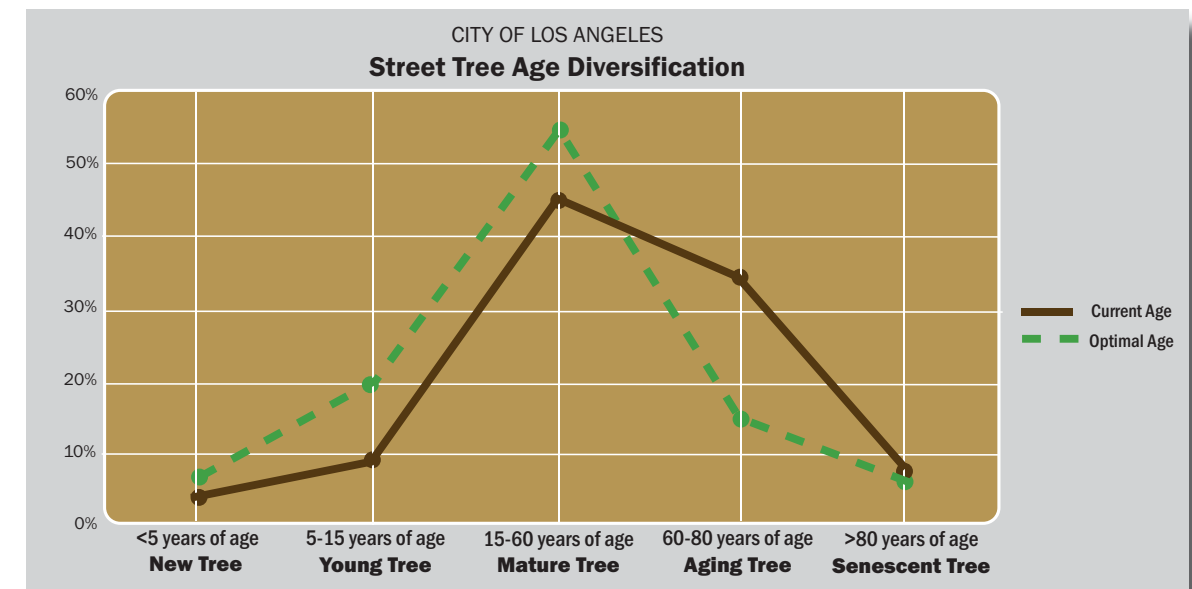


Figure 3



## Tree Stocking Rate Performance Metric

**Stocking Rate Grade: B+**

The Bureau analyzed the street tree inventory to identify the number of planted tree sites relative to the number of potential tree sites to determine the Tree Stocking Rate. According to the 1996 inventory, there are approximately 800,000 potential public right-of-way street tree planting sites. Of these approximately 700,000

are planted, a number that has increased recently due to the City Plants tree planting program that has added approximately 3,000 trees per year over the past few years. Therefore, the planted tree sites versus vacant tree sites ratio is approximately eighty-eight percent.



## Tree Health Performance Metric

**Health Grade: D**

Tree health was determined by random tree inspections by Bureau Arborists, review of the street tree inventory, and discussions with Arboriculture experts. One of the most significant health factors impacting the City and other Southern California cities is a new bacterial pest, Xylella.

Early research indicates Xylella has attacked numerous tree and shrub species. However, there has not yet been significant research performed on this pest. The early research indicates that species affected include, but are not limited to, Oleander (*Nerium oleander*), American Sweetgum (*Liquidambar styraciflua*), White Mulberry (*Morus alba*), Camphor (*Cinnamomum camphor*), and Magnolia (*Magnolia grandiflora*). Drive-by inspections by Bureau arborists have identified Xylella infestations on American Sweetgum and Mulberry trees in significant numbers. Fatality has occurred in these species on many streets

and a significant number of the remaining trees exhibit dieback effects.

The State and City are also experiencing a historic drought that began in 2011-2012. Inspections performed by City arborists have not yet indicated widespread health impacts on street trees directly attributable to the drought. The apparent lack of street tree drought impact is due to the continuing irrigation of many street trees by homeowners, even if this kind of intermittent shallow watering is not optimal.

However, the drought is almost assuredly adding stress to the trees experiencing Xylella and the Bureau is monitoring trees for their potential drought effects. It is expected this pest and the drought will continue to place downward pressure on the street tree population's overall health rating. These factors, combined with the aging street tree population previously mentioned, contribute to an observed street tree health that averages a poor rating.



Examples of street trees showing effects of a Xylella infestation

## Tree Maintenance Performance Metric

**Maintenance Grade: F**

The tree maintenance performance metric was determined by comparing the City's current tree pruning cycle relative to professional BMPs. To provide additional context, this assessment also included an analysis of historic tree pruning cycles.

Street tree pruning cycles have fluctuated from a historically high frequency pruning cycle of less than six years in 2003 to a more than fifty year cycle in 2011. The current fiscal year, 15-16, cycle is twenty-five years. The recent pruning cycle is four to five times higher than

the five to seven year professional BMP pruning cycle, resulting in a sub-poor tree maintenance rating.

Deferred maintenance and pruning results in depletion and damage to the street tree population. Neglecting to remove and replace older and senescent trees increases tree failure potential and lowers the overall condition of the street tree population. Without proper pruning, low hanging limbs create difficulty in traversing streets and sidewalks, increase traffic conflicts due to obstructed traffic control devices, and obstruct street lights creating opportunities for crime.



Figure 4

## Recommendations

The performance metric assessment results reveal that street tree age diversification, health, and maintenance are placing significant downward pressure on the street tree population's average condition and vitality. An overconcentration of diseased, aging, and senescent street trees may potentially result in half of the street tree population reaching senescence and/or failure over a relatively short time frame. This would not only result in a significantly reduced street tree population but also a dramatic decrease in street tree canopy coverage that would take decades to rebuild.

In addition, the high numbers of diseased street trees both increases the risk for tree failure

and reduces the benefits typically gained from street trees such as reduction of urban heat island and carbon sequestration. Furthermore, the deterioration of street trees due to a lack of proactive street tree maintenance also impacts the surrounding environment. Without proper maintenance, street trees have the potential to cause significant damage to adjacent streets, sidewalks, utilities, and private property.

Maintaining a healthy, diverse, and equitably distributed street tree population is essential to reaching our goals as a sustainable and resilient City. Therefore, the Bureau recommends the following actions be taken:

“... maintaining a healthy, diverse, and equitably distributed street tree population is essential to reaching our goals as a sustainable and resilient City.”

## Tree Age Diversification - Removal and Replacement

The Sidewalk Repair Program provides an opportunity to achieve diversified tree age goals. The majority of trees causing sidewalk damage are typically those approaching senescence and are therefore candidates for removal in conjunction with the Sidewalk Repair Program. When these trees are removed, the City's 2:1 tree replacement policy should result in an overall net gain for the urban forest and will

enable a more appropriate tree age distribution.

Therefore, the Bureau recommends the integration of a tree removal and replacement plan in coordination with the Sidewalk Repair Program in order to improve the Tree Age Diversification performance metric as well as the overall sustainability of the street tree population.



## Tree Stocking Rate – Planting Programs

Improving the Tree Stocking Rate requires a consistent increase in street tree planting. Tree planting is currently performed by City Plants through a public/private partnership with the LADWP Energy Efficiency Program and by individual residents through the permitting process.

The City Plants program offers the most significant impact on the Tree Stocking Rate, planting approximately 3,000 trees per year, resulting in a net increase of approximately 1,000 trees per year. Therefore, the Bureau recommends the City Plants programs be increased to obtain and maintain a 97% Tree Stocking Rate BMP.



## Tree Health - Inventory and Asset Management System

The Bureau currently utilizes a street tree inventory from 1996. While the majority of the trees in the inventory still exist today, many trees have died or been removed and even more trees have been added. An up-to-date and accurate street tree inventory is critical for street tree management. Pests such as Xylella and other tree stressors, such as the drought, are difficult to measure without a thorough assessment. Technology improvements allow for more efficient data collection and management thereby enabling more effective and efficient resource management.

Additionally, a comprehensive inventory will assist in managing the many newly planted trees distributed throughout the City by the

Bureau and City Plants. An inventory will also capture the amount of available space for tree plantings, such as vacant tree wells, helping set goals for expanding our street tree population. This assessment will also provide targeted areas for planting to reach the BMP goal of a 97% Tree Stocking Rate.

The Bureau recommends performing and maintaining an inventory of street trees and their condition as well as tree wells and areas available for planting. This inventory will be assessed to strategize how best to improve the Tree Health performance metric and identify target areas to improve the Tree Stocking Rate performance metric.



## Tree Maintenance – BSS Maintenance Program

Achieving the professional BMP of pruning trees on a five year cycle significantly increases the health of the urban forest. Maintaining the urban forest through regular BMP pruning cycles improves the safety, health, and quality of our street tree population, improves the relationship of green/gray infrastructure by reducing conflicts, and provides a safer and more accessible public right-of-way.

Due to the overwhelming benefits of a five-year pruning cycle, the Bureau recommends the adoption of a BMP pruning cycle and necessary

department resources to sustain appropriate street tree maintenance. To make progress towards achieving this targeted BMP, the Bureau recommends two new tree pruning and removal crews be included in the fiscal year 16-17 City budget. The Bureau anticipates these crews can collectively prune twenty thousand street trees and remove fifteen dead trees annually. These additional crews and increased maintenance will improve the Tree Maintenance performance metric, as well as enhance public right-of-way accessibility and visibility.

## Bureau Street Tree and Sustainability Programs



Proper management of the City's street trees is crucial to the future sustainability and resiliency of the City of Los Angeles. This cannot be done without both rebuilding the City's Urban Forestry division and providing it with high level leadership that incorporates street tree management into the City's larger sustainability objectives.

Achieving the City's sustainability and resiliency goals requires collaboration with other City and outside agencies. Oversight and management of these broad-based programs requires a full-

time staff with a multi-disciplinary knowledge base, authority over Divisional management heads, and extensive institutional knowledge.

Therefore the Bureau recommends that the head of Urban Forestry be paired with the functions of the Bureau's Chief Sustainability officer and that this position be established at the Assistant Director level. Paired with a rebuilding of the Urban Forestry division, the Bureau would be poised to manage the regeneration of the city's vital street tree population.

## Funding Estimates

In order to improve the street tree grade, additional funding needs to be allocated for street tree removal and replacement, planting additional street trees, conducting a street tree inventory, and regularly maintaining street trees. The information below provides baseline estimates for constructing future budgets to address these items.

### Street Tree Removal and Replacement

Tree removal cost = \$1000 per tree  
Tree planting cost = \$425 per tree (24" box size)

Tree watering cost = \$650/tree/year (three year establishment period)

**Total Planting and Watering Cost: \$2375 per tree for three year establishment**

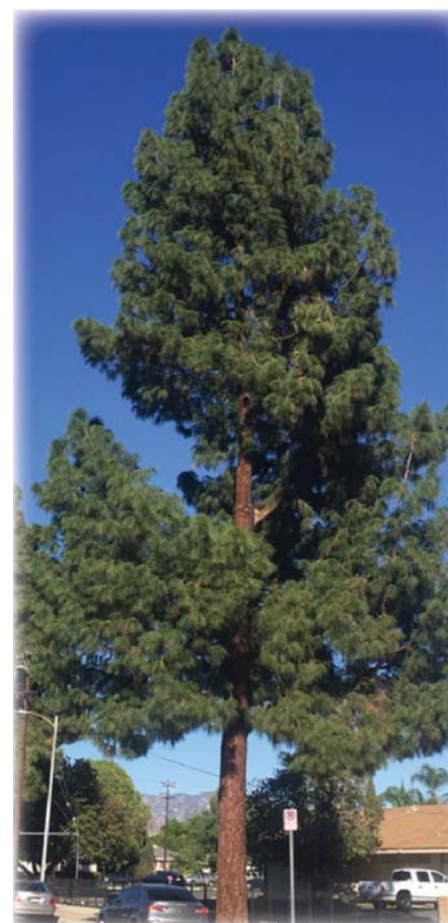
Given the City's 2:1 tree removal replacement policy, total tree replacement/maintenance costs are \$4,750.00 per tree removed.

### Street Tree Inventory

One-time cost to conduct an inventory has been estimated at \$3 million. This one-time cost could be reduced significantly through the leveraging of new technology and public data.

Additional cost per year for asset management service subscriptions is estimated at \$2,000/year.

Note: There is currently inventory and asset management software used by City Plants and Department of Recreation and Parks that may potentially be leveraged to conduct a street tree inventory.



## Street Tree Maintenance

### City Forces Programmatic Tree Pruning and Removal Crews

Estimated annual cost/crew = \$1,320,000

Annual expected production per crew

- Tree Pruning = 6,000 trees
- Tree Removal = 750 trees

### Contract Programmatic Tree Pruning

Current contract per tree pruning cost = \$135/tree

Approximate number of street trees = 700,000

Pruning cycle options (extrapolated expectation using contracts only):

20 year pruning cycle = 35,000 trees/year X \$135 = \$4.725 million/year

15 year pruning cycle = 46,666 trees/year X \$135 = \$6.3 million/year

10 year pruning cycle = 70,000 trees/year X \$135 = \$9.45 million/year

5 year pruning cycle = 140,000 trees/year X \$135 = \$18.9 million/year



Funding Estimates

## Definitions

### Public rights-of-way (PROW):

That portion of property owner's property dedicated to the City allowing for the egress/ingress of vehicles/pedestrians

### Street Trees:

Those trees located in the PROW adjacent to City streets.

### Tree Senescence (senescent):

Tree senescence is a significant reduction in growth often caused by cell division cessation but still alive and metabolically active. Tree senescence can occur at any phase of a tree's life. Compounded stress can weaken the tree causing a significant reduction in growth and initiating tree senescence.

### Tree Stocking Rate:

The ratio of planted potential tree planting sites (x) relative to the total number of tree planting sites (y)  $x/y=z$ .

### Urban Forest:

An urban forest is comprised of street trees, park trees, residential trees, native trees and plants, landscaping, vegetation, and people.

### Urban Forestry:

Urban forestry is generally defined as the art, science, and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic, and aesthetic benefits trees provide society.





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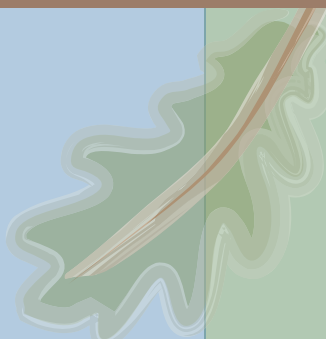
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