



CITY OF SAN DIEGO

# Urban Forest Management Action Plan

DRAFT JANUARY 6, 2016

photo courtesy of Melissa Badelen





City of San Diego

# Urban Forest Management Action Plan

DRAFT JANUARY 6, 2016

INLAND URBAN FOREST GROUP



Emma Barham



## Table of Contents

Executive Summary	1
Introduction	3
The Process	4
Overview	5
Environmental and Historical Context	5
Why a Plan Is Needed	7
Benefits Provided by Trees	8
Estimating the Economic Value of San Diego's Urban Forest	12
Status of San Diego's Urban Forest	13
Tree Resource Assessment	13
Park and Open Space Trees	18
Tree Planting Goals	19
Tree Resource Management	22
Applicable Regulations	24
Issues and Trends	28
Community Values	30
Goals, Objectives, and Actions	32
Monitoring Plan	53
Financing the Urban Forestry Program	56
Budget History	56
Costs of Tree Planting, Pruning and Trimming	58
Options for Funding the Urban Forest	59

# Vision Statement

---

*To grow an equitable and resilient world class urban forest infrastructure for future generations.*

The City's Tactical plan envisions a world class city for all and a world class city depends on the urban forest. Trees make vital contributions to the sense of community, pedestrian friendly neighborhoods, and air quality. The Climate Action Plan outlines a climate resiliency strategy that depends on trees to sequester carbon and reduce green house gasses .

# Executive Summary

---



**T**his Urban forest management action plan (Plan) outlines the objectives and actions needed to sustain, protect, and enhance community trees in the City of San Diego (City). The trees along streets, in parks, and in open space areas provide many benefits to the city, its residents and visitors. They provide shade, save energy, improve air quality and public health, mitigate climate change, reduce stormwater runoff, increase property values, create wildlife habitat, and enhance quality of life.

The goals for the urban forest are outlined in the 2008 General Plan. This plan outlines the objectives and actions for achieving those goals, principally to:

- Establish and maintain optimal levels of tree cover and age and species diversity to maximize ecosystem benefits provided by urban trees;
- That maximizes the efficiencies in urban forest management and minimizes risk associated with trees in urban environments;
- Maintain trees in a healthy condition through good tree care;
- Incorporate street tree plans and urban forest management in community plan updates; and
- Foster public education and community support for urban forestry.



This Plan discusses issues and trends that affect the City's public trees. The most recent tree inventory was completed in 2002, and there is a need for an updated inventory and a tree canopy assessment. Significant investments are needed to implement a management program to achieve a healthy urban forest, particularly for street tree planting and replacement, watering, and pruning.

The City of San Diego's policies, regulations, and planning documents establish a strong framework for planting, maintaining, preserving and enhancing the urban forest. The economic downturn and recent fiscal challenges have resulted in cuts to street tree planting, tree pruning and palm trimming, code compliance, and public education.

Recommendations for this Plan were based on input from City staff, local urban forestry professionals, landscape architects, and planners. Community members identified benefits of trees, desires for more trees in their neighborhoods, issues relating to tree care, and their willingness to invest in trees. Local tree care professionals, landscape architects, and planners reviewed and revised the Street Tree Selection Guide to identify additional species and remove those less suitable for street tree planting.

This Plan is meant to be a working document that will be continually implemented and monitored during the next 20 years. Budget decisions will either limit or enhance the quality and quantity of trees planted and managed and their resultant contributions to air quality and public health, energy reduction, stormwater retention, climate change adaptation, and desirability of urban neighborhoods.

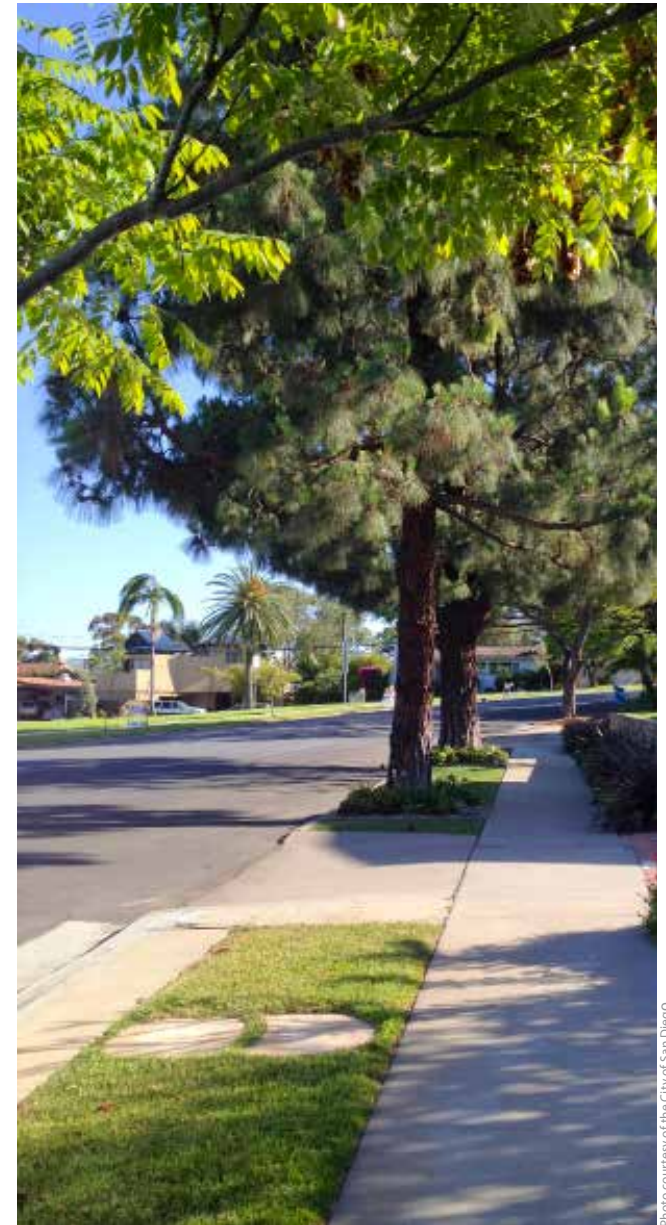


Photo courtesy of the City of San Diego



# Introduction

The City of San Diego is the eighth-largest city in the United States and the second largest in California, with a population of 1.3 million.<sup>1</sup> San Diego is known for its mild Mediterranean climate, tourist destination, border with Mexico, deep harbor, educational institutions, and technology-based industries in the southwest corner of California.

The City's tree canopy provides significant contributions to the quality of life for residents and visitors, because trees make a vital and affordable contribution to the sense of community and create pedestrian-friendly neighborhoods. During the past decade, San Diego's tree cover has declined; budgets for tree planting and maintenance have been reduced; and landscape code violations were given lower priority for enforcement.

A diminished urban forestry program reduces public assets, costs taxpayers money, and eliminates grant-funding eligibility. A long-range plan, guided by urban forestry expertise, is needed to bring together existing policies and guidelines, best urban forestry management practices, and community planning. An effective

urban forestry program is critical to meeting the City's commitment to sustainability, carbon sequestration, stormwater reduction, wildlife habitat preservation and enhancement, water conservation, and climate change as set out in the 2008 General Plan.

This Plan provides an overall strategy that will help the San Diego maximize its urban forest benefits for years to come. It covers the city's street trees, park trees, and trees required by development permits on private property.

<sup>1</sup> 2010 census.



# The Process

---

The City completed the General Plan in 2008, with policies outlining a healthy urban forest and the development of an urban forestry master plan. In 2013, the City of San Diego received a grant from the California Department of Forestry and Fire Protection (CAL FIRE) to develop an urban forest management action plan. The community outreach process began in 2014, to determine and assess community attitudes and concerns regarding neighborhood trees and the benefits of an urban forest.

Concurrently, monthly working group meetings were conducted with city staff and community members from April 2014 to February 2015. Interviews were conducted with individual city staff members during this time. Two public forums or stakeholder meetings were held in September 2014, to review the draft goals and objectives. Stakeholder meetings were also held in January and February 2015, to review the draft Plan.

The goals from the City's 2008 General Plan were used as the basis for this plan. Objectives were developed to support those goals, and then actions were written to implement each objective. Public comment on the draft Plan was obtained.



Photo courtesy of the City of San Diego

# Overview

## Environmental and Historical Context

Located along the coast of the Pacific Ocean, San Diego's climate is characterized by warm, dry summers and mild winters with most of the annual precipitation falling between December and March. The city has a mild climate year-round with an average of 201 days above 70°F and low rainfall (9 to 13 inches annually). San Diego falls into Sunset's<sup>2</sup> zones 21 and 23 (inland foothills and valleys) and 24 (coastal with marine influence).

Like most of Southern California, the majority of San Diego's vegetation was originally occupied by chaparral and sage scrub—plant communities with mostly drought-resistant shrubs. The steep and varied topography and proximity to the ocean create a rich diversity of native habitats within the city limits with growing conditions that are complex and enable many non-native trees to thrive. Sycamore, cottonwood, and willow trees grow in the riparian area along creeks and rivers, with native oaks growing on the northern and eastern slopes.

Trees native to many other places can thrive in San Diego's urban environment. The soil is alkaline, low in organic matter, and dry. Urban soil is often a mixture of disturbed soils and sometimes construction debris. Frequently, trees have restricted rooting



space, often constrained by concrete or asphalt and overhead utility lines. Imported water and recent drought conditions favor selecting trees with low water requirements.

<sup>2</sup> Brenzel, Kathleen Norris. *The New Sunset Western Garden Book*. New York, NY: Time Home Entertainment Inc., 2012. Also described at <http://www.sunset.com/garden/climate-zones/sunset-climate-zone-san-diego-area>.

Trees have played a substantial role in San Diego's history. Native Americans used willow for baskets, acorns for food, and other products from trees for food, shelter, and implements. Olive trees were first cultivated in California at Mission San Diego de Alcalá in the late 1790s.<sup>3</sup> Eucalyptus trees were planted in the late 1800s with an unrealized promise to produce lumber for railroad ties.<sup>4</sup> The citrus trees planted in the early 1900s were gradually replaced by housing developments in the 1950s.

City Park was established in 1868 and is now known as Balboa Park. The park's first imported non-native trees were planted by Kate Sessions, a renowned horticulturalist, who leased 36 acres for a nursery in 1902. In exchange, she planted 100 trees per year in the park and furnished 300 more trees annually for planting throughout the city. Today, Balboa Park is a significant horticultural and cultural resource with more than 15,000 native and non-native trees.

From the early 1900s, planners, architects, and landscape architects have been incorporating trees into their plans for residential developments, business areas, and boulevards. In the late 1990s, the mayor, city council and community leaders began working together to establish urban forestry initiatives. As a result, the Community Forest Advisory Board (CFAB) was established in 1999 (formerly known as the Tree Advisory Board); the city was certified as a Tree City USA in 1999; a Tree Protection Policy was adopted in 2005; and urban forestry guidelines were incorporated into the General Plan in 2008.

<sup>3</sup> Carter, Nancy C. 2008. San Diego olives: Origins of a California industry. J. San Diego History 54(3):137-161. Available at <http://www.sandiegohistory.org/journal/v54-3/pdf/v54-3carter.pdf>.

<sup>4</sup> Stanford, Leland. 1970. San Diego's eucalyptus bubble. J. San Diego History 16(4):. Available at <http://www.sandiegohistory.org/journal/70fall/eucalyptus.htm>.





## Why a Plan Is Needed

Urban forestry researchers and practitioners draw upon longstanding arboriculture practices and many scientific and social science disciplines in managing urban trees to provide environmental, economic, and social benefits.<sup>5</sup> To realize these benefits, a comprehensive vision is needed along with an implementation plan to manage the city's trees and secure its resources.

The urban forest management action plan is a planning process with a number of steps to gather, analyze, and act on information. The first step is to conduct a tree inventory that consists of gathering information about specific trees, or it can be estimated from aerial images. This information is then analyzed and evaluated to describe the current state of the urban forest. The city's tree inventory is incomplete and outdated, and accomplishing one is a high priority.

Based on the tree inventory, management goals are set for the urban forest resources and program, including goals for services provided to city residents, percent of urban tree canopy, mix of species by age and location, regulations governing tree cover and care, and technical oversight. The resources and actions to achieve these goals are outlined generally in this Plan, and need to be further detailed as tree inventory information is obtained and a full implementation developed.

<sup>5</sup> Glossaries of terms used in urban forestry, tree management, and this Plan are available at <http://www.treepeople.org/glossary> and <http://selectree.com/information.lasso>.



## Benefits Provided by Trees

San Diegans' quality of life depends on the urban forest, as trees make a vital and affordable contribution to the sense of community, pedestrian-friendly neighborhoods, energy savings, and air quality. The urban forestry program is critical to meeting the city's commitment to climate change, carbon sequestration, stormwater reduction, wildlife habitat enhancement, and water conservation. Trees are one of the few infrastructure investments that grow in value over time.

References in this section were taken from the review of benefits of trees and urban forests by Alliance for Community Trees, which cited 122 references<sup>6</sup>. Other references for the benefits of trees are the Urban Ecosystems and Social Dynamics research program at the U.S. Department of Agriculture (USDA) Forest Service Pacific Southwest Station;<sup>7</sup> Urban Forests, Environmental Quality and Human Health research program at the USDA Forest Service Northern Research Station;<sup>8</sup> and the Human Dimensions of Urban Forest and Urban Greening at the University of Washington.<sup>9</sup>

### Positively Influence Climate . . . and Ensure San Diego's Sustainability

Trees absorb carbon dioxide and store carbon in wood, which helps to reduce greenhouse gases. Carbon emissions from vehicles, industries, and power plants are a primary contributor to increased air temperatures in metropolitan areas, because they slow the passage of heat through the Earth's atmosphere. Urban trees in the United States store 700 million tons of carbon valued at \$14 billion with an annual carbon sequestration rate of 22.8 million tons per year valued at \$460 million annually.<sup>10</sup>

### Clean Air . . . and Breathe Easy

Shade trees reduce pollution and return oxygen to the atmosphere. In addition to carbon dioxide, trees' leaves or needles absorb pollutants, such as ozone, nitrogen dioxide, sulfur dioxide, and some particulate matter. As of 2002, San Diego's community forest removed 4.3 million pounds of pollutants from the air annually, a benefit worth \$10.8 million.<sup>11</sup>

### Save Energy . . . and Lower the Cost of Cooling and Heating Buildings

As natural screens, trees can insulate homes and businesses from extreme temperatures, keep properties cool, and reduce air conditioning utility bills. A 20 percent canopy of deciduous trees over a house results in annual cooling savings of 8 to 18 percent and annual heating savings of 2 to 8 percent.<sup>12</sup> By planting shade trees on sunny exposures, residents and businesses can save up to 50 percent on hot-day energy bills.<sup>13</sup>

6 Alliance for Community Trees. 2011. Benefits of trees and urban forests: A research list. Unpublished white paper, 19 pp. Available at [http://www.actrees.org/files/Research/benefits\\_of\\_trees.pdf](http://www.actrees.org/files/Research/benefits_of_trees.pdf). Refer to this report for full citations of the source documents.

7 Greg McPherson, USDA Forest Service, <http://www.fs.fed.us/psw/programs/uesd/>.

8 David Nowak, USDA Forest Service, <http://www.nrs.fs.fed.us/units/urban/>

9 Kathleen Wolf, University of Washington, <http://naturewithin.info/>.

10 Alliance for Community Trees, 2011, reference 52.

11 Urban Ecosystem Analysis, San Diego, California. <http://www.ufe.org/files/pubs/SanDiegoUEA.pdf>

12 Alliance for Community Trees, 2011, reference 13.

13 Alliance for Community Trees, 2011, reference 91.

### Reduce Street Maintenance . . . and Save Money

Shaded streets last longer and require far less pavement maintenance, reducing long-term costs. Canopy diminishes pavement fatigue, cracking, rutting, and other damage, reducing repair costs up to 60 percent.<sup>14</sup> A study from University of California at Davis found that 20 percent shade cover on a street improves pavement condition by 11 percent, which is a 60 percent savings for resurfacing over 30 years.<sup>15</sup>

### Raise Property Values . . . and Compound Assets

Trees are sound investments, for businesses and residents alike, and their value increases as they grow. Sustainable landscapes can increase property values up to 37 percent.<sup>16</sup> The value of trees appreciates over time, because the benefits grow as they do. For businesses, trees have added value, including higher revenues. Shoppers seek out leafy promenades that frame storefronts. Research shows that shoppers spend more—between 9 and 12 percent more—on products in tree-lined business districts.<sup>17, 18</sup>

### Clean Water . . . and Conserve Water and Soil

A tree's fibrous roots, extending into the soil, are premier pollution filtration and soil erosion prevention systems. In 2002, more than 39 percent of San Diego was covered with impermeable surfaces.<sup>19</sup> In contrast to an impervious hardscape, a healthy urban forest can reduce annual storm water runoff up to 7 percent.<sup>20</sup> Highly efficient trees also utilize or absorb toxic substances such as lead, zinc, copper, and biological contaminants.<sup>21</sup> One study estimated that eliminating the need for additional local stormwater filtration systems would result in savings exceeding \$2 billion.<sup>22</sup>

<sup>14</sup> Alliance for Community Trees, 2011, reference 42.

<sup>15</sup> Alliance for Community Trees, 2011, reference 96.

<sup>16</sup> Alliance for Community Trees, 2011, reference 13.

<sup>17</sup> Alliance for Community Trees, 2011, reference 45.

<sup>18</sup> Alliance for Community Trees, 2011, reference 46.

<sup>19</sup> American Forests 2003.

<sup>20</sup> Alliance for Community Trees, 2011, reference 10.

<sup>21</sup> Alliance for Community Trees, 2011, reference 19.

<sup>22</sup> San Diego Canyon Policy Portfolio, 2006, Preamble, Ecosystem Services Analysis.



Photo courtesy of Melissa Babin





### Cool Pavement . . . and Diminish Urban Heat Islands

Broad canopy trees lower temperatures by shading buildings, asphalt, and concrete. They deflect radiation from the sun and release moisture into the air. The “urban heat island effect” is the resulting higher temperature of areas dominated by buildings, roads, and sidewalks. Cities are often 5 to 10°F hotter than undeveloped areas, because hot pavement and buildings have replaced cool vegetated land.<sup>23</sup> In addition, high temperatures increase the volatility of automobile oil and oil within the asphalt itself, releasing the fumes into the atmosphere. Shade trees can reduce asphalt temperatures by as much as 36°F, which diminishes the fumes and improves air quality.<sup>24</sup>

### Protect Wildlife . . . and Restore Ecosystems

Planting and protecting trees can provide habitat for hundreds of birds and small animals. San Diego is often cited as a region with more plant and animal species than any other in the United States, yet urbanization and the destruction of valuable ecosystems have led to the decline of many of these species. Only 10 percent of San Diego’s native coastal sage scrub and 5 percent of wetland habitats remain. Adding trees, particularly native trees, provides valuable habitat for wildlife.

### Build Safe Communities . . . and Decrease Crime

Police and crime prevention experts agree that trees and landscaping cut the incidence of theft, vandalism, and violence by enhancing neighborhoods. Thriving trees on well-maintained streets indicate pride of ownership. Public housing residents with nearby trees and natural landscapes reported 25 percent fewer acts of domestic aggression and violence.<sup>25</sup> Apartment buildings with high levels of greenery had 52 percent fewer crimes than those without any trees. Buildings with medium amounts of greenery had 42 percent fewer crimes.<sup>26</sup>

<sup>23</sup> Alliance for Community Trees, 2011, reference 15

<sup>24</sup> Alliance for Community Trees, 2011, reference 42

<sup>25</sup> Alliance for Community Trees, 2011, reference 69

<sup>26</sup> Alliance for Community Trees, 2011, reference 82

### Calm Traffic . . . and Make Neighborhoods Safer and Quieter

People drive more slowly and carefully through tree-lined streets, because trees create an illusion of narrower streets. One study found a 46 percent decrease in crash rates across urban arterial and highway sites after landscape improvements were installed.<sup>27</sup> The presence of trees in a suburban landscape reduced the cruising speed of drivers by an average of 3 miles per hour. Faster drivers and slower drivers both drove at decreased speeds in the presence of trees.<sup>28</sup>

Trees reduce noise pollution, buffering against as much as half of our urban noise. By absorbing sounds, a belt of trees 100 feet wide and 50 feet tall can reduce highway noise by 6 to 10 decibels.<sup>29</sup> Buffers composed of trees and shrubs can reduce 50 percent of noise.<sup>30</sup>

### Live Well . . . and Reduce Stress

Neighborhoods with generous canopies of trees are uplifting and good for public health. Greater contact with natural environments correlates with lower levels of stress, improving performance.<sup>31</sup> Studies show that children with attention deficit disorder function better after activities in green settings.



A green environment impacts worker productivity; workers without views of nature from their desks claimed 23 percent more sick days than workers with views of nature.<sup>32</sup> Residents of areas with the highest levels of greenery were 3 times as likely to be physically active and 40 percent less likely to be overweight than residents living in the least green settings.<sup>33</sup>

<sup>27</sup> Alliance for Community Trees, 2011, reference 38.

<sup>28</sup> Alliance for Community Trees, 2011, reference 40.

<sup>29</sup> Alliance for Community Trees, 2011, reference 90.

<sup>30</sup> Alliance for Community Trees, 2011, reference 39.

<sup>31</sup> Alliance for Community Trees, 2011, reference 31.

<sup>32</sup> Alliance for Community Trees, 2011, reference 29

<sup>33</sup> Alliance for Community Trees, 2011, reference 25.



## Estimating the Economic Value of San Diego's Urban Forest

The San Diego County Tree Map<sup>34</sup> has functions to calculate the environmental benefits trees provide: gallons of stormwater retained, pounds of air pollutants captured, kilowatt-hours of energy conserved, and tons of carbon dioxide removed from the atmosphere. The benefits of the 200,000 trees in the city's recent tree inventory are:

- Estimated annual greenhouse gas benefits are 10,800,000 pounds CO<sub>2</sub> reduced (4,889 metric tons [MT], rounded to 5,000 MT), for a value of \$215,000.<sup>35</sup>
- These trees conserve an estimated 47,000,000 gallons of water per year (savings of \$86,145).<sup>36</sup> Rather than being a net user of water (and indirectly, energy), trees conserve water by intercepting rainfall, increasing stormwater retention, and requiring only supplemental water after initial establishment.
- The estimated annual energy savings are 4,970,000 kWh conserved, for a value of \$800,000.
- The trees also capture 32,000 pounds of air pollutants annually, an estimated annual value of \$1,700,000.



Photo courtesy of the City of San Diego

<sup>34</sup> San Diego County Tree Map, <http://www.sandiegotreemap.org>, Type location as "San Diego" and search. This database underestimates the trees in San Diego, as it only includes street trees that were inventoried in the past 15 years and does not include trees in parks, residential, or commercial properties.

<sup>35</sup> Benefits and economic values computed with iTree software from the USDA Forest Service, <http://www.itreetools.org>.

<sup>36</sup> San Diego County Tree Map, <http://www.sandiegotreemap.org>.

# Status of San Diego's Urban Forest

## Tree Resource Assessment

### Canopy cover

Tree canopy is an important measure of the urban forest resource. The urban tree canopy is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. Estimates of San Diego's tree cover vary based on image type, resolution, and type of study/author.

American Forests<sup>37</sup> conducted a study of aerial imagery for San Diego comparing 30-meter (m) resolution data from 1986 and 2002. Tree cover was estimated at 7 percent with this data. The land uses were calculated as:

- 110,044 acres of urban land (51 percent)
- 48,674 acres of grassland (22 percent)
- 32,956 acres of shrub land (15 percent)
- 14,738 acres of tree canopy (7 percent).

According to this analysis, the city lost 32 percent of its grassland, 27 percent of its tree cover, and 7 percent of its scrubland from 1985 to 2002, while the city's developed urban areas increased by 39 percent in those years.

<sup>37</sup> American Forests, 2003. Urban ecosystems analysis, San Diego, CA. 20 p. Available at <http://www.ufe.org/files/pubs/sandiegoea.pdf>.



In a national study by the USDA Forest Service, tree canopy and impervious surface cover were estimated from maps at 30m resolution from 2001 Landsat satellite imagery and published in 2007<sup>38</sup> in conjunction with 1990 and 2000 census and geographic data (1:5,000,000 scale cartographic boundary files) to assess current urban and community forest attributes. This analysis of Landsat imagery showed that San Diego's tree cover is approximately 4.2 percent.<sup>39</sup>

The city has secured funding to obtain a current urban tree canopy assessment that will enable the city to have a baseline of the status of the current urban tree canopy and to set future tree planting goals. Using high-resolution remotely-sensed light detection and ranging (LiDAR) data recently obtained by the city, urban parcels will be ranked on their suitability for establishing new tree canopy, including available planting spaces, ownership, topography, soils, and other inputs.

<sup>38</sup> Homer, C.; Dewitz, J.; Fry, J.; Coan, M.; Hossain, N.; Larson, C.; Herold, N.; McKerrow, A.; VanDriel, J.N.; Wickham, J. 2007. Completion of the 2001 national land cover database for the coterminous United States. Photogrammetric Engineering and Remote Sensing. 73(4): 337-341. Cited in Nowak and Greenfield, 2010. [https://www.itreetools.org/Canopy/resources/Tree\\_and\\_Impervious\\_Cover\\_change\\_in\\_US\\_Cities\\_Nowak\\_Greenfield.pdf](https://www.itreetools.org/Canopy/resources/Tree_and_Impervious_Cover_change_in_US_Cities_Nowak_Greenfield.pdf)

<sup>39</sup> Nowak and Greenfield, 2010 [https://www.itreetools.org/Canopy/resources/Tree\\_and\\_Impervious\\_Cover\\_change\\_in\\_US\\_Cities\\_Nowak\\_Greenfield.pdf](https://www.itreetools.org/Canopy/resources/Tree_and_Impervious_Cover_change_in_US_Cities_Nowak_Greenfield.pdf)

## Street Tree Inventory

The Streets Division completed the most recent tree inventory in 2002. It includes all trees in public rights-of-way, but not those in assessment districts. City employees and interns walked the streets with GPS units, identified and recorded data for existing trees, and identified vacant sites.<sup>40</sup> This data is part of the “Street Tree Inventory” database at the City and in the Trees\_SD database at the San Diego Association of Governments.<sup>41</sup> The number of trees and palms varies greatly by community. Table 1 displays trees by community, sorted in descending order of number of trees per street mile. Values of 0 (zero) indicate that data has not been recorded for that area.

This database likely underestimates the number of trees in the city since it has only been updated where tree care management companies (contractors to the city) have pruned, planted, or otherwise treated a tree, entered information into their database, and provided that data to the city. The database generally does not include trees in parks, residential, or commercial properties.

The data is summarized in Table 2 by community planning area for the number of street trees and palms, with calculations made for the percent of street trees planted. (The total number of trees and palms is lower than the value in Table 1, likely due to different queries of the data.)

While San Diego’s streets are lined with an estimated 200,000 trees and palms, it is estimated that they could accommodate more than double that amount. Assuming that full capacity would be one tree every 50 feet (on both sides of the street), or 200 trees per street mile, the tree and palm species were tabulated for each community planning area. Many planting opportunities exist in the city, such as



along under-planted arterials; in older, established neighborhoods where trees may have been lost; in new, treeless neighborhoods; around schools; and in areas around freeway interchanges. There will also be opportunities in reducing hardscape and increasing canopy cover by redeveloping and retrofitting existing roads, streets, and alleys using Green Streets criteria.<sup>42</sup>

<sup>40</sup> Drew Potocki, Urban Forester, City of San Diego, Transportation and Streets Department, personal communication March 2014.

<sup>41</sup> Mike Klein, GIS Specialist, Planning Department, personal communication, October 8, 2014.

<sup>42</sup> Green Streets, Municipal Handbook, [http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi\\_munichandbook\\_green\\_streets.pdf](http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf)

As summarized in Table 3, the tree inventory is dominated by eight genres: *Afrocarpus*, *Cupaniopsis*, *Pinus*, *Platanus*, *Liquidambar*, *Lophostemon*, *Jacaranda*, and *Eucalyptus*. This table does not list the palm species.

Table 1: Street Tree Count, Miles of Streets, and Acreage in Community Planning Areas<sup>43</sup>  
City of San Diego, 2002 inventory

Community	Tree Count	Miles of Street in CPA	Mean Trees/ Mile Street	CPA (acres)	Mean Trees/ acre
Mid-City: Kensington-Talmadge	4,487	51	88.0	1,157	3.88
Torrey Hills	2,003	23	87.1	833	2.41
Miramar Ranch North	3,657	44	83.1	1,894	1.93
Carmel Valley	8,406	103	81.6	4,525	1.86
Torrey Highlands	2,474	31	79.8	1,506	1.64
Sabre Springs	2,688	34	79.1	1,595	1.68
Uptown	9,626	125	77.0	2,647	3.64
Downtown	4,852	66	73.5	1,516	3.20
Carmel Mountain Ranch	2,566	37	69.4	1,523	1.69
Reserve	332	5	66.4	281	1.18
Pacific Beach	8,145	123	66.2	2,609	3.12
Greater Golden Hill	2,976	45	66.1	746	3.99
La Jolla	10,736	167	64.3	5,719	1.88
Mid-City: Normal Heights	2,638	42	62.8	846	3.12
Greater North Park	7,465	121	61.7	2,254	3.31
Mira Mesa	11,903	204	58.3	10,729	1.11
Ocean Beach	2,357	41	57.5	641	3.67
San Ysidro	3,238	57	56.8	1,862	1.74
Scripps Miramar Ranch	5,033	91	55.3	4,197	1.20
Otay Mesa	5,334	103	51.8	9,316	0.57
Navajo	9,297	180	51.7	9,087	1.02
Skyline-Paradise Hills	6,986	139	50.3	4,585	1.52

<sup>43</sup> Tree data from <http://www.sandiegotreemap.com>, street and acreage data from SanGIS. Analysis done by Amanda Schochet, student at University of California San Diego, October 1, 2012.



Table 1: Street Tree Count, Miles of Streets, and Acreage in Community Planning Areas continued

Community	Tree Count	Miles of Street in CPA	Mean Trees/ Mile Street	CPA (acres)	Mean Trees/ acre
Encanto Neighborhoods, Southeastern	5,544	117	47.4	3,811	1.45
Rancho Penasquitos	6,384	135	47.3	6,456	0.99
Peninsula	9,142	194	47.1	5,282	1.73
Serra Mesa	3,195	68	47.0	2,211	1.45
Clairemont Mesa	11,407	249	45.8	8,539	1.34
Otay Mesa-Nestor	6,117	135	45.3	5,368	1.14
College Area	2,705	60	45.1	1,969	1.37
Rancho Bernardo	7,115	159	44.7	6,583	1.08
Southeast San Diego, Southeastern	6,031	146	41.3	2,929	2.06
Old Town San Diego	486	12	40.5	275	1.77
Mid-City: Eastern Area	4,124	103	40.0	3,115	1.32
University	6,114	161	38.0	8,676	0.00
Tierrasanta	3,624	96	37.8	7,247	0.50
Mid-City: City Heights	5,321	145	36.7	2,936	1.81
Via de la Valle	107	3	35.7	133	0.81
Linda Vista	2,851	82	34.8	2,732	1.04
Midway-Pacific Highway	1,088	37	29.4	918	1.18
Barrio Logan	814	29	28.1	552	1.48
Fairbanks Ranch Country Club	195	7	27.9	788	0.25
Torrey Pines	1553	57	27.2	2,722	0.57
Mission Beach	621	23	27.0	220	2.82
Kearny Mesa	2,240	95	23.6	4,423	0.51
Mission Valley	2,076	99	21.0	3,216	0.65
North City Future Urbanizing Area Subarea II	117	6	19.5	849	0.14

Table 1: Street Tree Count, Miles of Streets, and Acreage in Community Planning Areas continued

Community	Tree Count	Miles of Street in CPA	Mean Trees/ Mile Street	CPA (acres)	Mean Trees/ acre
Tijuana River Valley	157	13	12.1	3,589	0.04
Mission Bay Park	503	50	10.1	4,293	0.12
Balboa Park	219	27	8.1	1,299	0.17
Black Mountain Ranch	207	55	3.8	5,091	0.04
Rancho Encantada	47	20	2.4	2,699	0.02
Los Penasquitos Canyon	8	5	1.6	1,213	0.01
San Pasqual	42	38	1.1	10,599	0.00
Military Facilities	64	165	0.4	23,474	0.00
East Elliot	0	8	0.0	2,920	0.00
Del Mar Mesa	0	16	0.0	2,093	0.00
Pacific Highlands Ranch	1	34	0.0	2,644	0.00
Total	207,418	4481		211,932	

Table 2: Total street trees and palms inventoried and calculation of planting percentages, City of San Diego, 2002 inventory

	No. of Street miles	Total trees	Total palms	Total = Trees + palms	Capacity # trees (200/ street mi)	% Trees planted (total/ capacity)
District 1*	507	33,494	5,642	39,136	101,376	33
District 2	422	20,692	17,429	38,121	84,316	25
District 3	296	12,629	11,376	24,005	59,198	21
District 4	312	15,883	2,743	18,626	62,360	25
District 5	418	28,798	2,330	31,128	83,500	34
District 6	407	18,939	3,066	11,505	81,320	23
District 7	273	13,904	2,267	16,171	54,600	25
District 8	282	15,266	3,752	19,018	56,410	27
Sum of all Districts	2,915	159,605	48,605	197,710	583,080	27

\*Council districts reconfigured in 2011, now nine districts.

## Park and Open Space Trees

The City of San Diego oversees nearly 40,000 acres of developed and undeveloped open space; more than 340 parks including Balboa Park, Mission Trails Regional Park, and Mission Bay Park; and 25 miles of shoreline from Sunset Cliffs to La Jolla. The trees in San Diego's parks are not part of the recent street tree inventory. There is little current data regarding park trees, and an inventory is needed to effectively manage those trees. The current Parks System Master Plan was written in 1956.<sup>44</sup>

For many communities, only the canyons located throughout San Diego remain as undeveloped natural landscapes. Canyons provide the citizens of San Diego with such benefits as scenic vistas, preservation of natural resources, outdoor recreation, and other benefits to health and well-being. Maintenance is only done in these natural areas to control invasive species or to provide for safety. The recommendations in this Plan, related to planting and maintenance of trees, do not apply to the undeveloped open space areas.

The Park and Recreation Open Space Division oversees 55 of the city's 63 maintenance assessment districts (MADs). The Economic Development Department oversees eight MADs. Personnel who conduct management activities for MADs are referred to as MAD staff in this Plan to differentiate them from staff in the Open Space program who manage the canyons and other undeveloped areas. The districts are, for the most part, adequately funded to maintain trees.



<sup>44</sup> City of San Diego. 1956. A Master Plan of Parks and Recreation. 33 p.

## Tree Planting Goals

Community plans set goals for tree planting and acknowledge the benefits trees provide for livability and sense of place. These goals need to be translated into tree planting projects and funded using a variety of sources.

The estimate of tree canopy in the city ranges from 4.2 percent<sup>45</sup> to 7 percent.<sup>46</sup> The Climate Action Plan<sup>47</sup> sets out a goal of increasing tree canopy to 15 percent by 2020, at least a doubling of percent tree cover according to estimates of the city's tree canopy cover. Absent an actual tree canopy cover percentage developed in the Urban Tree Canopy Assessment, only a rough estimate can be made to understand the impact of the Climate Action Plan tree canopy goal.

The following is an estimate of the number of trees that need to be planted to double tree cover:

- The most recent tree inventory shows that there are approximately 200,000 street trees in San Diego.<sup>48</sup>
- As there is no recent inventory of trees on private land, the assumption (for this report) is that street trees are 20 percent of the total trees, and therefore the rough estimate is that there are 1,000,000 trees in the city.
- To double the tree canopy, 1,000,000 more trees would need to be planted on public and private land.

Larger trees should be favored, as they provide larger canopies and

sequester more carbon. Trees need to be watered, trimmed, and protected to maximize their health and lifespan. Alternate estimates of tree planting targets can be made by projecting mature canopy sizes of planted trees to cover public and private properties that are currently unoccupied by buildings, streets, and other designated uses.

The following tree planting opportunities could be pursued to reach the goal of doubling the tree canopy in the city:

Streets and parkways;

- Parks, community centers, schools, colleges, and other public properties;
- State and federal properties, including California Department of Transportation rights-of-way and military installations;
- Residential properties (front and back yards);
- Commercial and industrial properties, especially parking lots; and
- In canyons, where only a few trees would be planted as much of their acreage is committed to Multi-Habitat Planning Areas for native vegetation.

<sup>45</sup> Nowak and Greenfield, 2010.

<sup>46</sup> American Forests. 2003. Urban ecosystems analysis, San Diego, CA. 20 p. Available at <http://www.ufei.org/files/pubs/sandiegouea.pdf>, accessed 2/10/12.

<sup>47</sup> City of San Diego Draft Climate Action Plan 2014, [http://www.sandiego.gov/planning/genplan/cap/pdf/sd\\_cap\\_032515\\_draft.pdf](http://www.sandiego.gov/planning/genplan/cap/pdf/sd_cap_032515_draft.pdf)

<sup>48</sup> San Diego County Tree Map, <http://www.sandiegotreemap.org>, Type location as "San Diego" and search. This database under estimates the trees in San Diego, as it only includes street trees that were inventoried in 2003 and does not include trees in parks, residential, or commercial properties.

Table 3: Total street trees inventoried and tabulation of most common trees in each district, City of San Diego, 2003

	1	2	3	4	5	6	7	8	All Districts
Acacia	570								570
African fern pine	880	826	463		1,035	95		31	3,330
Ash	66	40				807	378		1,291
Bradford pear	64			313	239			170	473
Brazilian pepper			560	369					873
Brisbane Box	874	409	406	491	1,810	1,525	506	149	6,048
Calif. pepper	52	67							610
Calif. sycamore	2,363							656	3,019
Camphor	414								414
Coral tree		26							26
Carob		459		1,479					459
Carrotwood	1,157	1,793	1,446		1,852	2,263	1,089	1,410	12,489
Chinese flame	340	39	237		316	310			1,242
Crape myrtle			134	473				13	147
Eucalyptus	2,097	502	194		3,561	1,793	1,168		9,788
Ficus		19					99	221	339
Fig	96	52		1,639		177			325
Italian cypress	340			868				35	2,014
Jacaranda	323	2,529	1,223		289		134	672	6,038
Juniper		183				1,028		781	1,992
London plane	294	31			270				595
Magnolia		240			128				368
Melaleuca	450	803			220	209			1,682
Myoporum	641							33	674
New Zealand Christmas tree	209	51						266	526
Oleander	346	161							507



Table 3: Total street trees inventoried and tabulation of most common trees in each community, City of San Diego, 2003 continued

	1	2	3	4	5	6	7	8	All Districts
Olive		17							17
Poplar	388			867					388
Pine	3,622	1,025			3,708		492	13	9,727
Siberian elm		203				450		761	1,414
Sweetgum	2,677	1,524	798		166		1,012		6,177
Torrey pine	168					1,048		89	1,305
Victorian box								39	39
White alder								328	328
Tipu				438				223	223
Yucca		10						359	807
Total number of trees	18,431	11,009	5,461	6,937	13,594	9,705	4,878	6,249	76,264



Photo courtesy of the City of San Diego



## Tree Resource Management

At the city staff level, the urban forestry programs are currently managed in five departments:

- Planning (community plan updates);
- Development Services (code compliance);
- Park and Recreation (parks, open space, and maintenance assessment districts);
- Economic Development Department (business districts); and
- Transportation and Storm Water (street trees).

The success of an urban forestry program depends not only on the expertise of professionals trained in this field, but also on the commitment of allied professionals such as landscape architects, planners, engineers, appointed and elected public officials, and the citizens and local businesses in the community. In many cities, the urban forestry program is placed within the public works department because the street trees must be managed together with the streets, sidewalks, water and sewer lines, and other underground utilities. Other cities place the program in the planning department, to ensure that trees and proper tree management are incorporated into planning decisions and development applications.

In the City of San Diego, the Streets Division of the Transportation and Storm Water Department conducts the majority of street tree maintenance. Within the Streets Division, the Tree Maintenance Supervisor helps to update the street tree inventory. To conduct tree maintenance, there are five tree trimmers, one arborist, and one supervisor in Streets Division. Currently, there are several five-year contracts in place for citywide tree care services.



The Streets Division had a contract with the Urban Corps, a local non-profit conservation corps and charter school, to plant trees for the city. Youth enrolled in the work-learn program plant the trees as part of their job training curriculum. Each year, depending on funding, more than 1,000 trees are planted in the public right-of-way. The city requires the adjacent property owner to maintain the trees, and the Urban Corps obtains signed agreements from property owners who commit to regular watering.

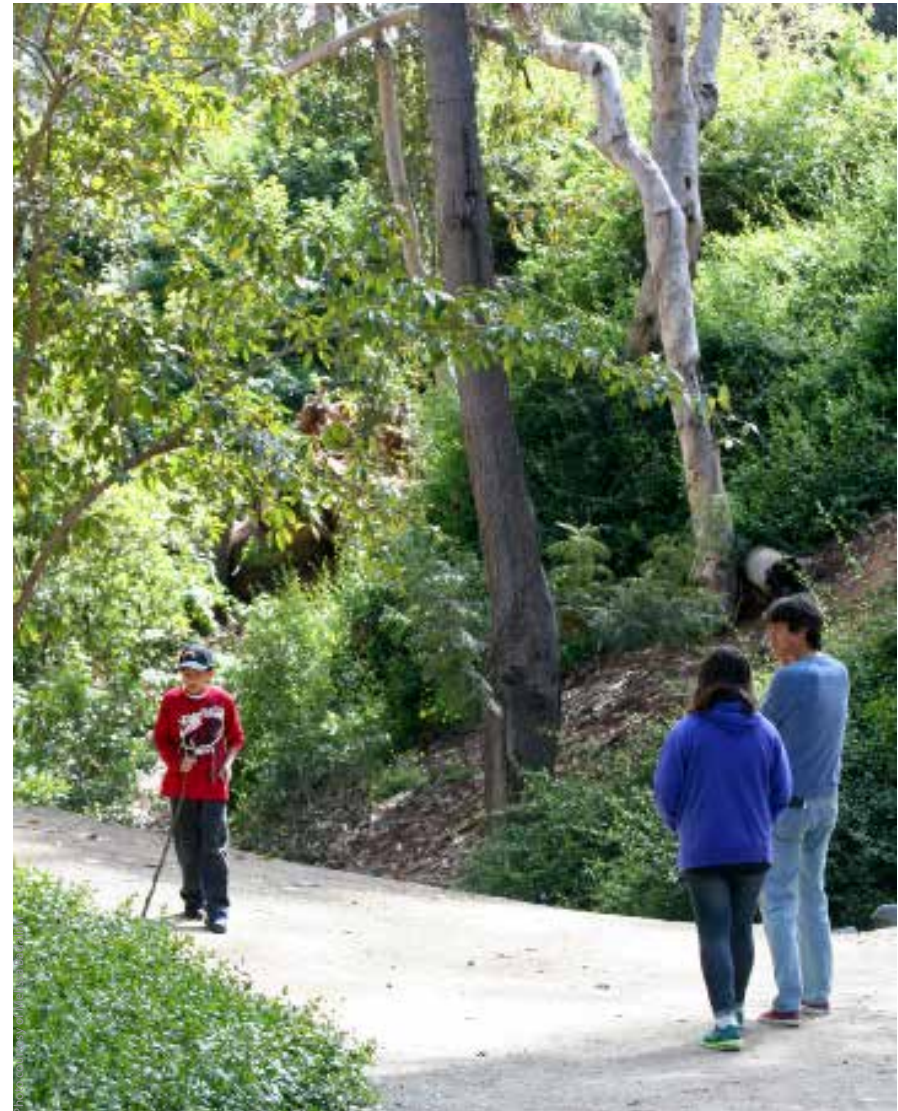
The Streets Division conducted a sidewalk assessment. There are approximately 5,000 miles of sidewalk throughout the city. Property owners are responsible for sidewalk damage when city trees are not involved. If a city tree is involved, an arborist assesses for root pruning and, in some cases, the tree is removed and replaced (ideally within six months). Funding for tree replacement is from the city's general fund.<sup>49</sup>

<sup>49</sup> According to July 23, 2014, telephone interview with John Helminski, Deputy Director of Transportation, Storm Water, Streets Division.

The Park and Recreation Department, Open Space Division manages more than 26,000 acres of open space, including open space canyons and parklands. MADs maintain approximately 3,886 acres of the city's 26,000 acres of open space. Some 3,200 acres are citywide neighborhood canyons and parklands that are overseen by the Open Space Canyon Program staff. Those trees within the city's rights-of-way and managed by the MAD program are regularly pruned and maintained.<sup>50</sup>

The general fund is used to maintain trees in undeveloped open spaces and work is only done to remediate safety issues. The MAD program also manages hundreds of acres of open space, primarily in Tierrasanta and Scripps Ranch, wherein trees are maintained at a higher level than the Open Space's general fund program. The Open Space Division Canyon Program supports various Friends of Canyons groups by assisting with environmental education, canyon enhancement planning, weed management, trail maintenance, and kiosk installation.<sup>51,52</sup>

Within the city's parks, maintenance is primarily performed in-house reactively. There is a reliance on park personnel to inform the division about tree issues. There are three tree trimmers, a park arborist, and two groundskeepers.



50 <http://www.sandiego.gov/park-and-recreation/general-info/mads/>

51 <http://www.sandiego.gov/park-and-recreation/parks/oscp/index.shtml>

52 <http://www.sandiego.gov/park-and-recreation/pdf/fastfacts.pdf>

## Applicable Regulations

The City of San Diego's policies, council resolutions, ordinances, and planning documents establish a framework for developing and managing the city's urban forest. The recent economic challenges and fiscal budgeting have curtailed their implementation, resulting in a depleted urban forest canopy. The city's documents and publications range from the guiding General Plan to the specific recommendations of individual tree species in the Street Tree Selection Guide.

The Community Forestry Advisory Board provides recommendations related to the city's policies and programs, meeting the second Wednesday of every month.<sup>53</sup> Board responsibilities include providing recommendations for a comprehensive urban forestry master plan and tree inventory; reviewing and recommending necessary revisions to urban forestry-related policies and programs; networking with other boards, agencies, and community residents; sharing information and promoting volunteerism; reviewing the implementation and compliance with urban forestry policies and programs; advocating for funding for the establishment and maintenance of an urban forestry program; and promoting and fostering a strong sense of community through urban forestry.

The following policies and regulations are applicable to urban forestry activities in the City of San Diego.



**City of San Diego's General Plan.** The Plan's Conservation Element, Section J. Urban Forestry, provides the most in-depth description and discussion of urban forestry and identifies the benefits of and policies relating to trees.<sup>54</sup>

**City of San Diego Climate Action Plan.** The Climate Action Plan calls for increasing urban tree coverage by 15 percent by 2020 and by 25 percent by 2035. It also specifies completing an urban tree canopy assessment, implementing the urban forest management action plan, and hiring an Urban Forestry Program Manager, which has already been done.<sup>55</sup>

<sup>53</sup> Community Forest Advisory Board information at <http://www.sandiego.gov/economic-development/about/cfab.shtml>.

<sup>54</sup> City of San Diego General Plan 2008, <http://www.sandiego.gov/planning/genplan/pdf/generalplan/fullversion.pdf>.

<sup>55</sup> City of San Diego Climate Action Plan 2015, <http://www.sandiego.gov/planning/genplan/cap/pdf/CAP%20Adoption%20Draft%202015.pdf>



**Municipal Code Article 2: General Regulations, Division 6: Landscape Regulations.**<sup>56</sup> These regulations establish rules and regulations to control and protect planting on city streets. The following changes should be considered to create a more sustainable urban forest:

§142.0403 General Planting and Irrigation Requirements, pages 6-9 (Table 142-04B, Plant Point Schedule)

Incentives need to be given for planting, protecting, maintaining, and establishing smaller nursery stock, as long-term tree vigor is greater when trees can establish root systems in the street parkway or other location. Monitoring and maintenance requirements could be added for smaller tree planting stock. Soil structure and volume need to be modified in some planting conditions, to provide adequate space for tree roots.

Table 142-04B, Plant Point Schedule should be revised to value the mature size (long-term value) of trees and to reduce the value given to palms. Palms provide far fewer benefits at the pedestrian scale than shade trees. Palms can invade creek bottoms, and stormwater channels, and have high maintenance costs. Palms are usually approved for visual effect or when an existing adopted community plan includes palms as an approved street tree.

Some of the requirements for tree planting and care could be replaced by referral to industry standards: International Society of Arboriculture (ISA),<sup>57</sup> American National Standards Institute (ANSI)<sup>58</sup> and Urban Forest Ecosystems Institute.<sup>59</sup>

§142.0412 Brush Management

Consider revising the requirement that tree canopy (drip line) of planted trees be 10 feet or more from habitable structures in Zone One. The ignition of urban trees from embers in San Diego's high-wind wildfire conditions is highly unlikely if the trees are watered and vegetation under the tree is restricted to one-third of the height of clearance between the ground and tree branches.

For replacing trees that die within three years of installation (section (b)(8)), regulations should require the correction of site conditions that contributed to that mortality, including soil, irrigation, and protection.

**Council Policy 200-05, Planting of Trees on City Streets**, effective November 15, 1993. This policy establishes guidelines for the planting and removal of trees from city street rights-of-way.<sup>60</sup> The Park and Recreation Department has authorized Development Services to issue the No Fee Permit, which is required for all street tree planting, pruning, and removal.<sup>61</sup> It is recommended that the policy be modified to require the property owner to remove stakes and grates that restrict trunk growth.

**Council Policy 900-19, Public Tree Protection**, effective June 13, 2005. This policy protects designated trees.<sup>62</sup> There are categories for protection (Landmark, Heritage, Parkway Resource, and Preservation Grove), and stated penalties for unauthorized removals. Restrictions in Multiple Species Planning Areas might limit the designation of protected trees and their pruning, and the policy may need to be revised to reflect this.

<sup>56</sup> Municipal Code Article 2: General Regulations, Division 4, posted at <http://docs.sandiego.gov/municode/MuniCodeChapter14/Ch14Art02Division04.pdf> and Division 6, posted at <http://docs.sandiego.gov/municode/MuniCodeChapter14/Ch14Art02Division06.pdf>.

<sup>57</sup> ISA resources, <http://www.isa-arbor.com/education/onlineresources/cadplanningspecifications.aspx>.

<sup>58</sup> ANSI 300 Standards, <http://tcia.org/business/ansi-a300-standards>

<sup>59</sup> Tree standards and specifications, [http://ufei.calpoly.edu/tree\\_standards.lasso](http://ufei.calpoly.edu/tree_standards.lasso)

<sup>60</sup> Council Policy 200-05, posted at [http://docs.sandiego.gov/councilpolicies/cpd\\_200-05.pdf](http://docs.sandiego.gov/councilpolicies/cpd_200-05.pdf).

<sup>61</sup> No Fee Street Tree Permit, posted at <http://www.sandiego.gov/nccd/pdf/streettreepemittapplication.pdf>.

<sup>62</sup> Council Policy 900-19, posted at [http://docs.sandiego.gov/councilpolicies/cpd\\_900-19.pdf](http://docs.sandiego.gov/councilpolicies/cpd_900-19.pdf).



**Council Policy 100-21, Funding for Maintenance Assessment Districts,** effective September 7, 2004.<sup>63</sup> This document sets criteria for establishing new maintenance assessment districts and funds landscape maintenance within the districts.

**Street Tree Selection Guide.** This document recommends trees suitable for planting as street trees.<sup>64</sup> In fall 2014, 20 local tree care professionals, landscape architects, and planners reviewed and revised the Street Tree Selection Guide to identify additional species and remove those less suitable for street tree planting. Unsuitable species have serious pest problems, are invasive and spread to natural areas, drop a lot of edible or inedible fruit, and/or have structural weaknesses, such as limbs breaking off. Trees that are considered highly invasive (spreading onto adjacent land and/or displacing native species) are not included, although some suitable listed species could be moderately invasive under certain conditions. The list has been revised and there was considerable discussion about palms suitable for street trees. A total of 13 palms are included in the list.

**Street Design Manual.**<sup>65</sup> Specifications are provided for trees in residential, commercial, collector, and major streets. Design standards are included for urban parkway configurations, and specifications given for visibility and clearance.

**Low Impact Development Design Manual.**<sup>66</sup> This document includes guidance for siting, installing, and maintaining bioswales and other stormwater retention basins and structures. There are inconsistencies in the recommended species, soil requirements, supplemental watering, and other conditions for planting and maintaining trees.

**Multiple Species Conservation Plan (MSCP).**<sup>67</sup> The MSCP involves a regional effort

63 Council Policy 100-21, Funding for Maintenance Assessment Districts, posted at <http://docs.sandiego.gov/municode/MuniCodeChapter14/Ch14Art02Division06.pdf>.

64 Street Tree Selection Guide, posted at <http://www.sandiego.gov/street-div/pdf/treeguide.pdf>.

65 City of San Diego. 2002. Street Design Manual, 162 pp. Available at <http://www.sandiego.gov/planning/programs/transportation/library/stdesign.shtml>

66 City of San Diego. 2011. San Diego Low Impact Development Design Manual. 312 pp. Available at <http://www.sandiego.gov/stormwater/pdf/lidmanual.pdf>.

67 City of San Diego, 1997. Multiple Species Conservation Program: City of San Diego MSCP Subarea Plan. 175 pp. Available

to preserve a network of habitat and open space, protecting biodiversity and enhancing the region's quality of life. San Diego is one of several jurisdictions participating in the MSCP. The city's MSCP includes agreements with state and federal wildlife agencies that established endangered and sensitive species conservation requirements. City regulations conform to or have been amended to be consistent with the MSCP requirements.

**Landscape Standards of the Land Development Manual.**<sup>68</sup> This document establishes the minimum plant material, irrigation, brush management, and landscape-related standards for work done in accordance with requirements of the Land Development Code. Development Services is currently evaluating the street tree criteria in this document with an eye toward expanding the urban forest.

**Clarification of Brush Management Regulations and Landscape Standards.**<sup>69</sup> This document pertains to development within the wildland/urban interface. It describes brush management and fire protection requirements including thinning and pruning of vegetation. It provides specific horizontal and vertical distance requirements for trees and shrubs. Indigenous, native trees are exempt. The Fire Prevention Bureau does not require permits, but does require a brush management plan and program to be processed for any development. The Fire-Rescue Department issues notices of violation for noncomplying properties.

**Pedestrian Master Plan.** This plan promotes the contribution of shade trees in enhancing the pedestrian experience, protecting walkers

from the elements, providing visual interest, increasing safety from passing traffic, and buffering adjacent uses.<sup>70</sup>

**Community Plans.**<sup>71</sup> There are 52 community planning areas that comprise the city, each with a community plan. Some of the plans address tree selection, while others do not. The Planning Department refers to the Street Tree Selection Guide for plans without tree lists, and when community plans are updated, street tree plans are included.

**Public Tree and Community Forest Ordinance.** Consideration should be given to providing a comprehensive Public Tree and Community Forest ordinance for tree planting, protection, removal, and replacement.<sup>72</sup> The regulations are currently in several sections of the Municipal Code and in Council Policies. In 2004, a comprehensive ordinance was drafted, but not given further review or consideration by CFAB members, other local urban forestry professionals, landscape architects, and planners.

---

at <http://www.sandiego.gov/planning/programs/mscp/pdf/subareafullversion.pdf>.

68 Landscape Standards of the Land Development Manual, posted at <http://www.sandiego.gov/development-services/pdf/industry/standards09.pdf>.

69 Clarification of Brush Management Regulations and Landscape Standards, posted at <http://www.sandiego.gov/fire/pdf/brushpolicy.pdf>.

70 City of San Diego. 2006. Pedestrian Master Plan, posted at <http://www.sandiego.gov/planning/programs/transportation/pdf/pmpfv.pdf>.

71 Community planning is outlined at Community Planning, outlined at <http://www.sandiego.gov/planning/community/>.

72 Guidance on tree ordinances is available from the Arbor Day Foundation, at [http://www.isa-arbor.com/education/resources/educ\\_TreeOrdinanceGuidelines.pdf](http://www.isa-arbor.com/education/resources/educ_TreeOrdinanceGuidelines.pdf).



## Issues and Trends

The following were identified as issues or trends to be addressed in the Plan. They were derived from numerous interviews in spring and summer 2014 with city staff from the Streets Division, Open Space Division, Park and Recreation Department, Planning and Development Services, Transportation and Storm Water Department, Environmental Services, and members of the Plan Working Group that included CFAB members, city staff, and citizens at large.

**Tree Planting.** Policies need to be implemented to ensure that appropriate species are planted in the appropriate location for the right reasons. There is a need to have nurseries supply trees to the city that meet minimum standards. There is no replacement policy when trees are removed. Concerns have been raised about increasing water consumption if more trees are planted.

The spacing of trees should be extended to allow for trees of larger size to grow without root crowding, and the soil compaction should be loosened to optimize growing conditions. Soil structure and volume often limit tree growth and create conflicts with sidewalks and other infrastructure. The soil structure required in the city's Low Impact Development (LID) guidelines should be examined for compatibility with tree growth. A soil structure should be pursued that serves a dual purpose to promote tree growth and treat stormwater.



Photo courtesy of the City of San Diego

**Tree Planting Adjacent to Open Space.** There is a concern that non-native tree species are found in the city's natural open space areas. Invasive trees should not be planted near any natural canyons, creeks, hillsides, or other areas currently containing vegetation native to the City of San Diego including but not limited to designated Open Space areas. Planting invasive, non-native trees in proximity to open space increases the chances of those species invading open space and in their seeds reaching storm drains that flow through canyons. When non-native invasive species are found in open space areas, the city uses resources to remove them. A buffer should be established wherein only local native street trees are planted adjacent to open space.

**Tree Care.** Young trees need to be irrigated in the first years after planting. Maintenance is performed reactively. Drought, pests, and diseases should be addressed proactively. Ensuring the irrigation of the young trees after they are planted has been a challenge, even as there are signed agreements from property owners to regularly water the trees. There are no data on the survivability rate of trees planted as part of this program.

**Conflicts with Infrastructure.** The root structures of trees are often in the rights-of-way, in spaces that must also accommodate water and sewer lines and other underground utilities. Trees should be integrated into the planning process as they can successfully coexist with gray infrastructure. Some past planning decisions did not fully take into account the location of trees. Aging sewer lines develop cracks, and tree roots grow into them. The conflicts with trees are part of the sidewalk assessment of the approximately 5,000 miles of sidewalks conducted in 2014-15 by the Streets Division.

**Parks.** Within the city's parks, there is no inventory and no regularly scheduled maintenance program. There are limited areas for increasing the urban tree canopy within parks. The current Parks System Master Plan was written in 1956 and needs to be updated.

**Enforcement.** Currently, property owners face few consequences when they use bad pruning practices. Lack of proactive enforcement of tree-related regulations is an ongoing issue (code compliance). Vandalism is an issue in parks.

**Education.** Public and city staff education is needed about the benefits of trees as well as planting the right tree in the right place for the right reason.



Photo courtesy of Marlene Williams

**Management.** Additional staff is needed to better manage the urban forest. Mechanisms need to be implemented for identifying issues in the field. Risk should be managed proactively. Some policies and department priorities may contradict each other. A stable source of funding is needed to manage and maintain safe trees.

**Other City Programs.** A holistic approach to urban forestry is lacking. Air quality, storm water, climate action, and carbon sequestration policies should employ urban trees to meet city goals. The urban forest is not always viewed as a resource. The Storm Water Division incorporates tree planting only for mitigation of LID projects. Policies need to incorporate the need to manage for wildlife habitat.





## Community Values

Citizen support plays a vital role in supporting urban forestry. Tree-related advocacy groups are now common in many cities. They marshal volunteer support and voice support for urban forestry programs to local officials. Tree-planting volunteers join professional arborists on the front lines. More importantly, citizens can provide the political support to sustain public investment in green infrastructure and the urban forest. Effective urban forestry depends ultimately on the public policy supporting it—financially, administratively, and legally.

The first steps in preparing this Plan were to gather information from city residents. Presentations about urban trees and the Plan were given to 40 community-planning groups, business improvement districts, and other community groups from May to September 2014. Each attendee was invited to provide input on community forest benefits and related issues in their community. Table 4 summarizes the responses to questions from 487 attendees at the presentations and 220 who completed the online survey, for a total of 707 respondents.

The results of the survey showed that the respondents have a general understanding about the benefits of trees, identifying the most important as creating more pleasant neighborhoods and business districts, shading streets and parks, reducing air pollution, and mitigating climate change. Two-thirds would like to have more trees in their neighborhoods. They would like to see more trees in the city, and they would support regulations that protect trees.

More than half were concerned about the impacts of trees on the gray infrastructure, particularly damage to sidewalks, pavement, and underground pipes. Approximately half of all respondents were willing to support new regulations, plant new trees on their property, and increase the city's budget for tree planting and maintenance. Other major concerns were leaf and fruit droppings and tree watering.

Table 4. Summary of Responses from Community Groups

## What are the three (3) most important benefits of trees?

Clean the air by absorbing pollutants	49%
Create more pleasant neighborhoods and business districts	53%
Increase property values	11%
Provide food and shelter for wildlife	26%
Reduce greenhouse gases, summer temperatures and address climate change	45%
Shade buildings and lower energy bills	28%
Shade streets for walking and parks for playing	35%
Stabilize soil and reduce storm water runoff	24%
Other	2%

## In your neighborhood, are there are too many or too few public trees?

Too few trees	68%
Too many trees	2%
Enough trees	24%

## What are your top two (2) concerns relating to tree planting and care?

Sidewalks and pavement cracking	53%
Leaves and fruit dropping/ongoing maintenance	29%
Tree roots and underground pipe problems (similar to A-sidewalks-pavement)	28%
Blocking traffic, sidewalks, signs, and/or street lights	16%
Creating safety problems from trees and limbs falling	9%
Attracting bugs and other pests	3%
Trees cost too much money	5%



Photo courtesy of Rolando

## What are you willing to do to ensure San Diego's trees are maintained and protected for future generations?

Support new legislation or rules about planting and tree protection	52%
Plant new trees on my property when trees die or need to be removed	54%
Increase the city's budget for tree planting and maintenance	49%
Volunteer to plant and maintain trees on public property	34%
Support a 1% fee or tax, dedicated to tree care and maintenance	28%
Other	10%

# Goals, Objectives, and Actions

The Conservation Element of the 2008 General Plan includes CE-J.1 to CE-J.5 Urban Forestry, with the overall goal of “protection and expansion of a sustainable urban forest.” There are five policies in that element, and they drive the following objectives and actions in this Plan. There are also policies relating to urban forestry in other sections of the Conservation Element (climate change and sustainable development, water resource management, and air quality), Historic Preservation, and Urban Design elements. Those policies are incorporated into the objectives of CE-J.1 to CE-J.5.

## GOAL CE-J.1.

Develop, nurture, and protect a sustainable urban/community forest.

## GOAL CE-J.2.

Include community street tree master plans in community plans.

## GOAL CE-J.3.

Develop a citywide urban forest master tree-planting plan comprised of the community plan street tree master plans.

## GOAL CE-J.4.

Continue to require the planting of trees through the development permit process.

## GOAL CE-J.5.

Support outreach efforts to educate city staff, the business community, and the public on the environmental and economic benefits of trees.

Appendix B provides a schedule of actions, by staff area and Fiscal Year. Appendix C contains recommended expenditures for tree trimming and planting to grow and maintain a successful urban forest.



**GOAL CE-J.1.****Develop, nurture, and protect a sustainable urban/community forest.**

- Seek resources and take actions needed to plant, care for, and protect trees in the public rights-of-way and parks and those of significant importance in our communities.
- Plant large canopy shade trees, where appropriate and with consideration of habitat and water conservation goals to maximize environmental benefits.
- Seek to retain significant and mature trees.
- Provide forest linkages to connect and enhance public parks, plazas, and recreation and open space areas.

**CE-J.1. Objectives:****1. Inventory all public trees and update the tree inventory every seven years.**

A tree inventory is necessary to determine the number, type (species), age, and condition of the trees to make informed decisions about what is needed to manage and maintain them. Inventories are merely a snapshot in time and as trees grow, the accuracy of the data naturally decreases. It is essential that the street tree inventory data become the central component of the management tool that results in constant updates as services are requested and work is completed.

- Establish inventory of public trees.
- Record all permits and completed maintenance work in the inventory.
- Identify designated and potential heritage trees in the inventory.

**CE-J.1.1 Actions – Inventory and Inventory Update**

- Urban Forestry Program Manager will prepare a request for proposal (RFP) for a street tree inventory. The RFP shall require the identification of landmark trees and potential planting sites.
- Urban Forestry Program Manager will ensure that the new inventory is completed and accurate.
- Urban Forestry Program Manager will administer the inventory contract. In order to keep the inventory current, the Streets, MAD, and Park staff will require all contractors doing tree work in the city to update work records in the city's tree inventory database. It should be clear in the contract that payment for services rendered will not be issued until work records and inventory updates are completed.
- In order to keep the inventory current, the City will make electronic tablets available to employees to update the inventory.
- In order to keep the inventory current each employee will be required to complete work orders that update the tree inventory each time a tree is planted, trimmed, removed, or serviced in any way, such as hardscape repairs.
- In order to keep the inventory current the Development Services Department will update the inventory database when tree permits are issued.
- Every ten years, Urban Forestry Program Manager will request funding and/or seek grant opportunities to completely re-inventory the city trees.

## CE-J.1. Objectives:

### 2. Increase canopy cover (land area covered by trees) to optimize public benefits.

Canopy cover is measured by calculating the percentage of the city's land area that is covered by trees. As trees are removed and others planted, this figure can change.

- a. Obtain a canopy cover assessment using LiDAR remote sensing.
- b. Develop a citywide tree canopy optimum target consistent with the Climate Action Plan goal of increasing canopy cover.
- c. Establish canopy cover goals for each community.
- d. Develop a long-term, tree-planting program for achieving established canopy goals.
- e. Plant trees that maximize public health benefits, carbon sequestration, air quality, energy reduction, water conservation, storm water retention, ground water recharge, wildlife habitat including those for urban birds, and other benefits.
- f. Encourage the planting of large canopy trees to maximize environmental benefits.
- g. Identify potential planting sites on public lands.
- h. Encourage the planting of trees on private properties.
- i. Reduce the urban heat island through actions such as planting trees and other vegetation to produce shade.
- j. Develop greening plans.
- k. Plant non-invasive species as a buffer near open space/natural areas to keep invasive and potentially invasive species from seeding into these areas.

### CE-J.1.2 Actions – Canopy Cover Assessment and Goals

1. Urban Forestry Program Manager will work with canopy assessment experts to complete a LiDAR remote sensing urban canopy cover assessment of the entire city.
2. As part of the Community Plan update process, the Planning Department and the Urban Forestry Program Manager will work with each community to set canopy cover goals specific to each land cover type within the community.
3. Using the vacant planting sites as identified in the tree inventory and the LiDAR urban canopy cover assessment, Urban Forestry Program Manager will develop a 20-year planting plan and prioritization to achieve the identified canopy cover goals using tree species that maximize the benefits of trees.
4. Urban forestry program manager and Transportation and Park staff will begin to address the tree-planting goal in the Draft Climate Action Plan by annually increasing the tree population in areas identified as lacking in trees while the long-term plan is being developed.
5. Transportation and Park staff will begin planting trees in the fall of 2015 through the spring of 2016 using a combination of volunteers, city staff, and contract services.
6. Urban Forestry Program Manager through the public outreach/educational program identified in CE-J.5 will encourage tree planting on private property.
7. Street tree inventory will be implemented and maintained through the enterprise asset management system identified in CE-J.1.5.

## CE-J.1. Objectives:

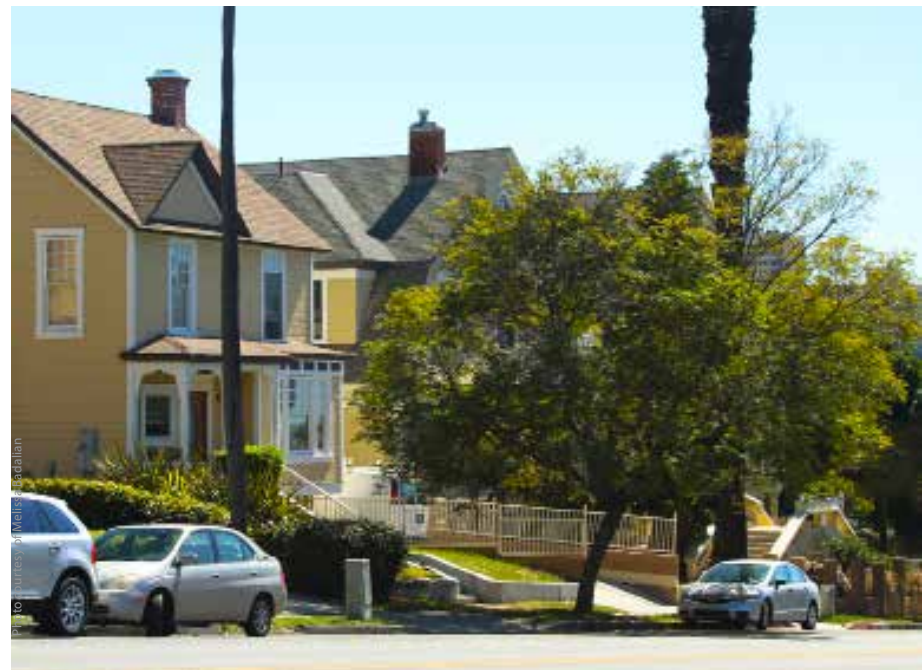
### 3. Develop a Tree Planting Prioritization Plan that identifies areas lacking trees and the appropriate strategy for properly planting trees in those areas.

Age and species diversity help ensure that the city's urban forest is healthy and viable. Species diversity addresses diseases and insects that potentially could destroy large portions of the urban forest if there are too many trees of the same kind. Age diversity helps keep a balance between young and old trees. The goal of effective implementation of age and species diversification is to mimic a natural forest where new trees are sprouting and old trees are dying while nature keeps a balance.

- a. Plant a variety of species to create a more resilient urban forest.
- b. Plan for age diversity, pest susceptibility, and species diversity (recommending no more than 10 percent of any one genus and no more than 2.5 percent of any one species within a genus).
- c. Review and update at least every five years the approved Street Tree Selection Guide based on collaboration with and knowledge of local tree care professionals, landscape architects, and planners. Document reasons for removal/additions of a species from the list.
- d. Encourage where appropriate, the use of native, noninvasive, and water efficient species and collaborate with nursery owners on species selection.
- e. Incorporate trees and other green infrastructure as assets that are measurable in economic benefits.
- f. Include evergreen species to maximize stormwater retention.

### CE-J.1.3 Actions – Diversity and Street Tree List

1. Urban Forestry Program Manager, through an analysis of the city's tree inventory, Urban Canopy Assessment, Urban Heat Island Assessment, and other available data will develop a tree planting prioritization plan that encourages strategic planting initiatives to increase canopy cover in areas that are insufficient.
2. Urban Forestry Program Manager will use this plan in conjunction with the community plan updates that are scheduled and managed through the Planning Department.
3. Urban Forestry Program Manager will review the community plans updated in the last five years to assess whether each urban forest element is consistent with this master tree-planting plan and recommend revisions.



## CE-J.1. Objectives:

### 4. Improve tree-planting success.

Interviews with staff and city contractors determined that there is a need to improve the success rate of establishing new trees. Tree planting areas need sufficient volume for tree roots and soil composition that allows for healthy tree development. Poor nursery quality of trees and planting methods are two of the main challenges in establishing young trees. Some trees are of poor quality and this plan suggests guidelines to purchase better quality trees. Some trees are improperly planted such as planting a tree too deep, which can lead to decline and eventual death.

- a. Review and revise tree planting specifications and guidelines and incorporate physical protections for young trees.
- b. Improve tree stock selection and purchase through qualified inspectors that follow city specifications and guidelines.
- c. Check and monitor planting sites for compliance.

### CE-J.1.4 Actions – Planting Success

1. Develop Street Tree Planting Standards that summarize species and site selection to maximize the benefits of trees.
2. Urban Forestry Program Manager, Horticulturalist, and MAD and Park staff will review and modify, if needed, specifications and guidelines for the purchase and selection of street tree stock for planting in the city public rights-of-way. These will be completed and sent to all department managers purchasing trees and nursery vendors providing city trees.
3. The Horticulturalist and MAD and Park staff will begin spot-checking purchases for compliance beginning in 2016.
4. Urban Forestry Program Manager, Horticulturalist, and MAD and Park staff will review and modify, if needed, specifications and guidelines for the planting of street trees in the city public rights-of-way. This will be completed and sent to all department managers and contractors providing tree-planting services.
5. The Horticulturalist and MAD and Park staff will begin spot-checking newly planted trees for compliance beginning January 2016.





## CE-J.1. Objectives:

### 5. Improve care and maintenance of street trees through a comprehensive management program addressing newly planted trees, mature, and large trees.

There is a need to improve the manner in which trees are managed and maintained in the city. A proactive schedule of tree maintenance includes watering, structural pruning, trimming, and clearance. Trees should be maintained using best management practices (BMPs) and standards established ISA and the ANSI. For example, strong structure is vital for the development of a good tree, and BMPs prescribe how to make proper pruning cuts. This plan focuses on three programs—one for managing young trees, one for adult trees, and another for heritage trees.

- a. Establish a unified City tree database.
- b. Establish a routine planting and maintenance operations report.
- c. Implement BMPs policy for all tree care activities and contract work, following ISA and ANSI standards.
- d. Implement young tree maintenance program that includes tree protection, watering, structural pruning, stake removal, and six-month inspections for two years.
- e. Prune trees on a regular schedule to maintain tree health, reduce risk of failure, provide clearance, and improve aesthetics.
- f. Establish a maintenance program for mature and large trees, including regular inspections and minimal pruning.
- g. Establish a defined standard of care for Street and Park Trees.
- h. Identify current and potential pests and diseases.
- i. Ensure that tree care relating to insect and disease problems follow integrated pest management practices (IPM).

- j. Develop management program for the preservation of heritage trees.
- k. Ensure proper maintenance throughout the life of the tree.

### CE-J.1.5 Actions – Establish a Unified City Tree Database

1. Urban Forester Manager, Horticulturalist, MAD and Park staff will work to develop an enterprise tree asset database that successfully interacts with the databases and operating systems of all departments involved in urban forest management.

### CE-J.1.5 Actions – Establish Routine Planting and Maintenance Operations Report

1. Urban Forester Manager, Horticulturalist, MAD and Park staff will develop routine reporting structure to track the trends in planting, maintenance, and removal of trees.

### CE-J.1.5 Actions – Implement BMPs

1. Urban Forester Manager, Horticulturalist, MAD and Park staff will develop policies for the maintenance of all trees based on ISA and ANSI 300 standards and update current contracts to reflect these policies. Staff and contractors will follow these approved BMPs in their daily activities.

### CE-J.1.5 Actions – Implement Young Tree Care Program

1. The Urban Forestry Program Manager, Horticulturalist, MAD, and Park staff will develop a young tree maintenance program that includes watering, structural pruning, stake removal, and regular inspections.
  - A supplemental watering program using contract services is to commence at the same time as the tree-planting program begins.
  - Residents receiving trees will be given a guide to watering and general care at the time of planting.

- Young trees require structural pruning twice within the first four years. The first pruning should take place when the tree is planted and the second pruning at four years of age.
  - A drive-by visual inspection is needed every six months for the first two years to identify and address any cultural needs.
  - Stakes and ties will be checked during these visual inspections and removed when the tree is strong enough to stand on its own.
2. Watering will be incorporated into the first three years of establishment in Planting contracts.

#### CE-J.1.5 Actions – Implement Mature Tree Care Program

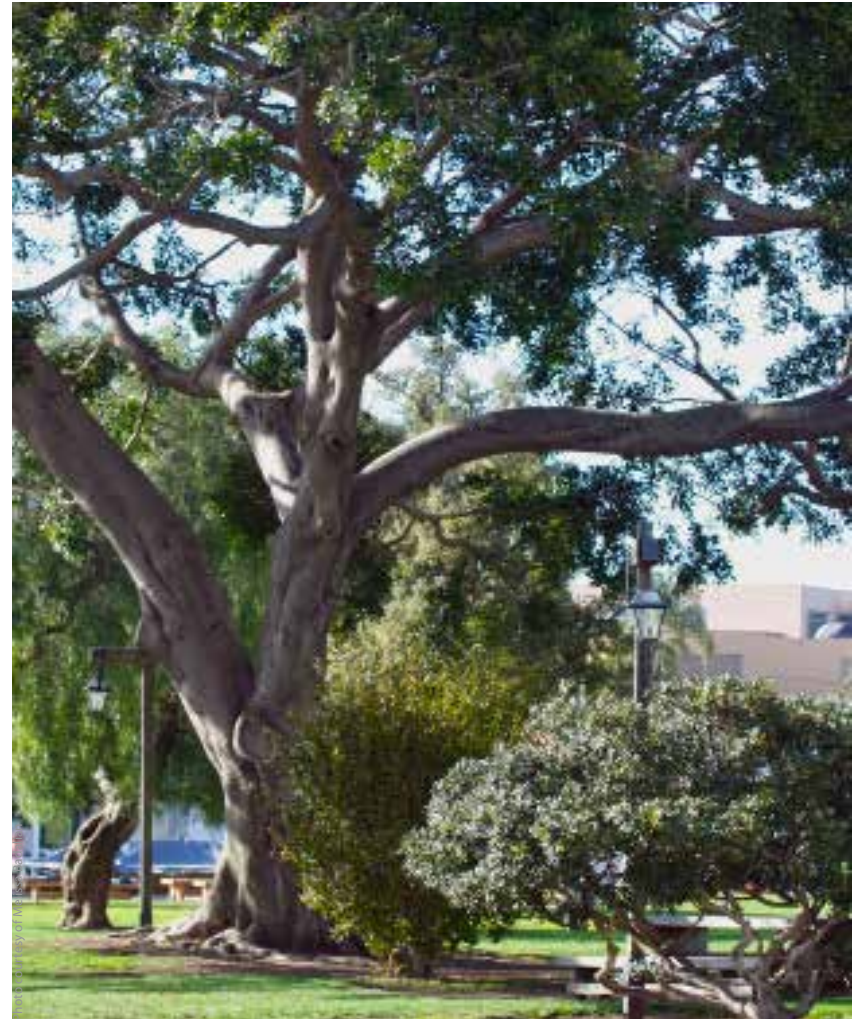
1. Urban Forestry Program Manager, Horticulturalist, and MAD and Park staff will develop adult and mature tree care programs that define a standard of care for street and park trees. The programs for parks, open space areas, and streets will be different because of location and management responsibilities
2. Before this is completed, Streets Division staff will request funding and begin a program of pruning street trees based on a frequency of once every seven years. Staff will set priorities for trees to be pruned.
3. After a detailed tree inventory of the city is completed and a master plan developed, a more balanced tree pruning and palm-trimming program can be developed.

#### CE-J.1.5 Actions – Develop Protected Tree Program

1. Urban Forestry Program Manager will review and make changes to the Protected Tree Program to make it effective and relevant. Urban Forestry Program Manager and Horticulturalist will evaluate all new trees identified in the inventory project (outlined in actions for objective CE-J.1.1) as potential candidates for the Protected Tree Program.
2. Candidates identified for the Protected Tree Program will be

combined with the current identified landmark, heritage, grove, and parkway resource trees.

3. Urban Forestry Program Manager will consult with CFAB and guide the list of trees through the approval process.



## CE-J.1. Objectives:

### 6. Improve care of public trees through a comprehensive water management program addressing newly planted trees, mature, and large trees.

Water and the current drought are concerns in California. Many question why we are planting and watering trees when water is scarce. Yet trees provide important benefits and are needed to shade and cool cities. Many water conservation measures can be implemented to directly benefit trees, including separate irrigation zones for trees, watering deeply and infrequently, drip irrigation at the tree's drip line that is expanded as the tree grows, and tree watering bags for newly-planted trees.

- a. Implement BMPs policy for all tree care activities and Review current programs, practices, and procedures, including the City of San Diego's Water Implementation Task Force report.
- b. Recognize trees need to be watered to maximize environmental and social benefits.
- c. Develop and implement a variety of programs that will ensure adequate water for all of the city's trees.

### CE-J-6 Actions

1. The Horticulturalist and MAD and Park managers will use a diverse watering program for newly planted trees that encourages property owners to water trees, use tree water bags, engage volunteers, and contract for watering services.
2. The Horticulturalist and MAD and Park managers will identify water-stressed public trees and use identified methods to provide supplemental water to these trees.
3. The Urban Forestry Program Manager and the Public Information Officer will develop and implement a public information strategy to encourage property owners to water drought-stressed mature trees.
4. Through partnerships with Non-Government Organizations, establish a citizen stewardship program that engages the public in watering, weeding, and basic pruning of trees.



## CE-J.1. Objectives:

### 7. Develop a tree removal and replacement program to address aging, diseased, poor structured, and problem trees.

Some trees have poor structures or disease and insect problems, which could be due to either lack of or improper maintenance practices. A poorly structured tree is more likely to break and drop a limb with the possibility of causing damage to its surroundings. For trees that cannot be saved, a tree removal program schedules their removal and replacement over a long timeframe so that neighborhoods are not denuded. In cases where large trees were planted in the wrong place (such as under utility lines), trees should be removed and replaced with a tree that can grow in a restricted space without causing damage to the infrastructure.

- a. Use these removals to implement age and species diversity, and street tree master plans (in community plans).
- b. Replace all dead or removed trees on a 2:1 basis.

### CE-J.1.7 Actions

1. Develop a general tree removal policy that outlines the instances where trees are permitted to be removed and the necessary mitigation.
2. Urban Forestry Program Manager, Horticulturalist, and MAD and Park managers will develop a 20-year tree removal and replacement program for each area of responsibility based on current inventory data, severity of problems, and historical knowledge.
3. Staff is to identify trees that have reached their life expectancy, trees that continue to cause infrastructure damage because they are the wrong trees for their locations, trees that are dying from known insects or diseases, trees that are poor street tree candidates because of structure or growth pattern, and invasive tree species.
4. Urban Forestry Program Manager, Horticulturalist and MAD and Park staff will identify and prioritize the problem trees and areas.
5. Urban Forestry Program Manager, Horticulturalist and MAD and Park staff will detail implementation of the program for each area and request budgets for removal and then replant two trees for everyone removed.
6. Urban Forestry Program Manager, Horticulturalist, and MAD and Park staff will implement their individual programs per duties with the Urban Forestry Program Manager providing oversight and coordination if needed.



## CE-J.1. Objectives:

### 8. Identify funding sources for planting, care, maintenance, and protection of trees in the public rights-of-way, parks, and trees of significant importance.

Adequate funding is needed for San Diego to have a strong, viable, and sustainable urban forest. During the past several years funding has been inadequate to expand and maintain the city's urban forest with none to expand it. This objective challenges the city to explore ways of consistently funding the urban forestry program.

- a. Adequately fund the Streets Division as the primary maintenance provider of all trees in public rights-of-way.
- b. Secure dedicated funding for tree planting, establishment, and maintenance of all public trees.
- c. Develop and implement a plan to capture all funding opportunities to meet these goals.
- d. Investigate incentive opportunities for property owners to care for city trees.
- e. Consider establishment of additional maintenance assessment districts.

### CE-J.1.8 Actions

1. With the Urban Forestry Program Manager taking the lead, Streets, MAD, and Park staff will strategize and develop funding sources and opportunities for generating revenue to cover the costs for the planting, care, and protection of the city's urban forest.
2. Urban Forestry Program Manager will project annual revenue needs with the ultimate goal of providing sustainable funding for San Diego's urban forest. Funding sources may include additional maintenance assessment districts, capital improvement funds, and state grants.



Photo courtesy of Melissa Gonzalez

## CE-J.1. Objectives:

### 9. Review, revise and/or write policies that address green and gray infrastructure conflicts.

A tree may be causing damage to gray infrastructure (streets, sidewalks, pipes, and other improvements), but that does not always mean it should be removed. Policies should be developed to preserve and protect trees as much as reasonably possible when there are gray and green infrastructure conflicts. When the benefits that a tree provides are compared with the nominal cost of replacing the sidewalk once every ten years, it might be more feasible to preserve the tree, repair the sidewalk, or provide a larger growing space to allow for greater tree root development and water retention.

- a. Use emerging technologies in soil science and pavement engineering to reduce hardscape repairs and tree removals.
- b. Develop a policy to minimize conflicts between tree roots and water and sewer lines.
- c. Develop a policy to minimize impacts of tree roots on curbs, gutters, and sidewalks.
- d. Develop a policy to minimize tree canopy conflicts with power lines.
- e. Implement a tree root management program to address root conflicts.

### CE-J.1.9 Actions

1. With other city departments, Urban Forestry Program Manager will review and revise with each impacted department, practices and policies that address green infrastructure conflicts, i.e., water and sewer lines, overhead wires, curbs, gutters, and sidewalks.
2. Urban Forestry Program Manager will review the current sidewalk improvement project with the Street Division Manager to ensure that BMPs are followed to preserve and protect existing trees and to install parkways and other improvements to favor planting of additional trees.
3. Urban Forestry Program Manager will work with all departments impacted by these potential conflicts to develop new policies and procedures where needed to ensure a strong and viable urban forest with minimal loss of trees due to these conflicts.
4. Urban Forestry Program Manager will propose revised policies for review and approval by all impacted city departments, appropriate boards and commissions, and the city council.
5. The appropriate departments will submit new budget requests resulting from these new policies.

## CE-J.1. Objectives:

### 10. Ensure that tree care relating to insect and disease problems follow integrated pest management practices (IPM).

IPM is an industry standard used to solve pest problems while minimizing risks to people and the environment. Approaches for managing pests are often grouped in the following categories:

**Biological control** refers to the use of natural enemies—predators, parasites, pathogens, and competitors—to control pests and their damage.

**Cultural controls** are practices that reduce pest establishment, reproduction, dispersal, and survival. They include proper installation, maintenance, watering, pruning, and thinning.

**Mechanical and physical controls** kill a pest directly or make the environment unsuitable for it. Physical controls include mulches for weed management, steam sterilization of the soil for disease management, or barriers such as screens to keep birds or insects out.

**Chemical control** is the use of pesticides, used only when needed and in combination with other approaches for more effective, long-term control and minimal harm to humans and the environment.

- a. Identify current and potential pests and diseases.
- b. Develop a program for addressing these based on IPM.

### CE-J.1.10 Actions

1. Urban Forestry Program Manager, Horticulturalist, and MAD and Park staff will identify current and potential pest and disease problems that have the potential to negatively impact San Diego's urban forest.
2. Urban Forestry Program Manager will develop in conjunction with other departments an IPM program that will address current and future insect and disease problems in an environmentally responsible way.

## CE-J.1. Objectives:

### 11. Develop a biomass reuse program for the city's green trimmings and removals.

Biomass from the pruning, trimming and removal of trees is often ground into mulch and used either as a landfill cover or for weed control. However, large urban trees can have a higher and better use, including furniture, benches, and other wood products.

- a. Identify current and potential biomass reuse programs in the city.
- b. Develop a biomass reuse program based on the above information that focuses on highest and best use of the material.
- c. Establish protocols for sanitary disposal of infected plant material.
- d. Require all city staff and contractors to follow the established program.

### CE-J.1.11 Actions

1. Urban Forestry Program Manager will identify and assess the current biomass reuse program and make recommended changes to focus on the highest and best use of the material.



**GOAL CE-J.2.****Include community street tree master plans in community plans.**

- Prioritize community streets for tree planting.
- Identify the types of trees proposed for those priority streets by species (with acceptable alternatives) or by design form.
- Integrate known protected trees to glossary trees and inventory other trees that may be eligible to be designated as a protected tree.
- Review current urban greening plans that are in use.

**CE-J.2. Objectives:****1. Review street tree plans and urban forest elements to optimize benefits to the community.**

Each updated community plan has a landscape element and Street Tree Master Plan. As placement and species selection can optimize the benefits of trees to the community, each Community Plan will be reviewed and when updated, will recommend optimal location and species for each community.

The Street Tree Selection Guide strives to identify trees that require limited water, tree care, and protection and are not invasive. Preference may be given to native trees and those that provide shade, wildlife habitat, and soil and water retention.

**Actions CE-J.2.1**

1. Urban Forestry Program Manager will review community specific street tree plans and urban forest elements as part of the Community Plan Update process to provide guidance to optimize tree benefits prior to Community Plan adoption.
2. Planning Department will include the need to update the urban forestry element as an important factor to consider when prioritizing Community Plan Updates.
3. Greening plans will be reviewed to ensure they are incorporated into Community Plan Updates.



## CE-J.2. Objectives:

### 2. Prioritize community areas for public tree planting programs.

This objective helps set priorities for tree planting in each neighborhood. The priorities are based on neighborhood needs and the goals outlined in each Community Plan.

- a. Identify primary and secondary streets for developing and implementing the urban forest elements in the approved community master plans.
- b. Prioritize streets for tree planting based on need for improvement, number of vacant planting sites, existing species, and the condition of trees designated in the approved community plan.
- c. Incorporate trees for noise attenuation in street plans.
- d. Identify and plant trees that complement and expand on the surrounding street trees.
- e. Use street trees to unify communities, link residential areas, and enhance wildlife habitat and corridors.
- f. Integrate street trees when planning and retrofitting roadways consistent with complete streets concepts.

### Actions CE-J.2.2

1. Urban Forestry Program Manager will review community specific street tree plans and urban forest elements as part of the Community Plan Update process to provide guidance to optimize tree benefits prior to Community Plan adoption.
2. Planning Department will include the need to update the urban forestry element as an important factor to consider when prioritizing Community Plan Updates.
3. Greening plans will be reviewed to ensure they are incorporated into Community Plan Updates.

### 3. Integrate known protected trees and inventory other trees that might be eligible to be designated as a protected tree in each community.

Protected trees are community assets, and policies should be strengthened to ensure they are identified, protected, and provided with extra care to maintain them. Potential heritage trees can be identified and tracked in the city's tree inventory, and the tree protection policy provides extra care in maintaining them.

### Actions CE-J.2.3

1. Urban Forestry Program Manager and Planning Department staff will integrate known protected trees and inventory other trees that might be eligible to be designated as a protected tree in each community as outlined in CE-J-1.1.
2. Horticulturist and Parks and MAD staff will implement the tree protection policy to provide extra care in maintaining these trees.

**GOAL CE-J.3.****Develop a citywide tree-planting prioritization plan comprised of the community plan street tree master plans.****CE-J.3. Objectives:****1. Develop the Urban Forest Master Plan.**

The difference between an Urban forest management action plan and an Urban Forest Master Plan is that the former looks into the future and sets goals and objectives to move the city toward achieving its vision. The latter is a tree-planting plan that designates where specific species of trees will be planted to maximize benefits.

**Actions CE-J.3.1**

1. Urban Forestry Program Manager, based on the citywide urban tree canopy assessment and street tree inventory, and urban forest element in each Community Plan and the Street Tree Selection Guide, will formulate a tree-planting prioritization plan. This tree-planting prioritization plan will be completed and approved as part of the process identified in CE-J.2.1.
2. Urban Forestry Program Manager will also develop standard urban forest management language for the urban forest element of Community Plans.

**2. Review plan and update as needed.**

New information on tree species and new cultivars is constantly emerging. Reviewing the plan every five years will provide the opportunity to evaluate the current species list and delete trees that are performing poorly or that are now under attack from a new disease or insect. It also enables new cultivars to be planted and their performance assessed in San Diego's environment

**Actions CE-J.3.2**

1. Urban Forestry Program Manager will review the tree planting prioritization plan and update as necessary.
2. Urban Forestry Program Manager and Horticulturist will review the recommended street tree species list and update as necessary.
3. Urban Forestry Program Manager and Horticulturist will review street tree planting standards and update as necessary.

**GOAL CE-J.4.****Continue to require the planting of trees through the development permit process.**

- Consider tree planting as mitigation for air pollution, stormwater runoff, and other environmental impacts as appropriate.

**CE-J.4. Objectives:**

1. **Develop policies that encourage and incentivize developers, homeowners associations, and other organizations to adopt trees as green infrastructure assets.**

Much of the available space for planting trees for San Diego's urban forest is located on private property. To help reach the canopy cover goals set out in the draft Climate Action Plan, this objective focuses on encouraging the planting of trees on private property through incentive programs and regulations.

- a. Develop policies for tree preservation during construction.
- b. Encourage developers to incorporate existing trees and vegetation into building and site designs when redeveloping sites.

**Actions CE-J.4.1**

1. Urban Forestry Program Manager and city planners will review the current development policies and process to ensure that maximum benefit from street tree planting is reached.
2. If the process needs revision or improvement, Urban Forestry Program Manager and city staff will begin a process of revising the policies and procedures for implementing the city's urban forest element into the development process.



#### CE-J.4. Objectives:

### 2. Increase enforcement of the city's policies and regulations related to the urban forest and consider implementing fines.

The city's policies and regulations related to the urban forest should be met and equally enforced. Developers must comply with planting requirements and residents must water and care for trees in the public rights-of-way. Property owners who remove a tree without a permit and approval from the city should be penalized. The public should understand that trees are vital to city health and that the city's policies will be enforced, for a stronger and more sustainable urban forest.

#### Actions CE-J.4.2

1. Urban Forestry Program Manager, Planning staff and Code Enforcement will develop an improved enforcement program that could include fines and other penalties for removing, damaging, or causing the loss of public trees.

### 3. Assess the No Fee Permit process for planting, pruning, trimming, removing and replacing trees in public rights-of-way.

The No Fee Permit process is difficult to manage and needs to be streamlined to be more effective.

#### Actions CE-J.4.3

1. Planning staff and Land Development review Division to review and rewrite the No Fee Permit process as needed.

#### CE-J.4. Objectives:

4. Use trees to shade paved areas, especially parking lots; and use trees and other landscaping to provide shade, screening and filtering of stormwater runoff in parking lots.

Trees are needed to shade paved areas to reduce the heat island effect and help reduce global warming. Heat from the sun reflects off of paved surfaces and this raises ambient temperatures. Shading has an all around cooling effect.

#### Actions CE-J.4.4

1. Planning staff and the Urban Forestry Program Manager will review policies to achieve an increase in tree canopy as set out as a goal in the Draft Climate Action Plan.
2. Planning staff and Urban Forestry Program Manager will request budgets, and implement tree plantings, tree care, and other programs to achieve the Draft Climate Action Plan goals.
3. Consistent with the city's Climate Action Plan, develop guidance for determining when/where tree planting versus other shading opportunities (e.g., raised solar panel arrays) would be most effective.
4. Begin compliance inspections and enforcement for the trees in development permits, and require the replacement of missing trees.

5. Implement programs that use tree planting, bioswales, permeable pavement, and other green infrastructure activities to reduce storm water runoff.

The canopy of trees and tree roots are able to capture significant amounts of rainwater and to reduce storm water runoff. If bioswales, permeable pavement, and other green infrastructure activities are used in conjunction with tree planting, the city can capture a significant amount of rainwater for percolation and refilling of underground water tables.

#### Actions CE-J-4.5

1. The Urban Forestry Program Manager and the Storm Water Division will investigate ways of using trees and other green infrastructure activities to reduce storm water runoff.

**GOAL CE-J.5.**

**Support outreach efforts to educate city staff, the business community, and the public on the environmental and economic benefits of trees.**

**CE-J.5. Objectives:**

**1. Partner with non-profits, academic institutions, and other community organizations.**

The city cannot maintain a healthy urban forest without support and help from the public. Nonprofits and other community groups can help seek grants to plant and maintain young trees. Academic institutions can support the urban forest through research on tree benefits and management. Student groups can volunteer to plant, water, and care for young trees, both on and off campus.

- a. Develop partnerships with non-profit and other community organizations to enhance the city's urban forest.
- b. Support efforts to recruit, train, manage, and recognize volunteers, as part of citizen forester or tree steward programs.
- c. Develop programs that involve student and youth groups in the planting, care, and protection of trees.
- d. Develop a program to provide training to landscape and design committees for homeowners associations and other community groups.

**Actions CE-J.5.1**

1. Urban Forestry Program Manager and Streets, MAD, and Park staff will identify potential non-profit and other community organizations for partnerships that would enhance the city's urban forest.
2. Urban Forestry Program Manager and other city staff will engage potential partners to discuss mutual interests and working relationships.
3. Urban Forestry Program Manager and other city staff will develop a program that provides opportunities for partnerships and volunteer management.
4. Urban Forestry Program Manager and other city staff will organize events for Arbor Days, Make a Difference Day, and other events intended to involve and recognize partnerships.
5. Urban Forestry Program Manager and other city staff will meet the requirements for and submit the city's nomination for Tree City USA.

### CE-J.5. Objectives:

#### 2. Establish a community education outreach program and develop materials to increase public awareness about the value of trees and their benefits to public health and well-being.

It is vital for the public to understand the health benefits of trees to gain support for trees and to promote the actions to maintain and enhance it.

- Educate the public on street tree selection, proper tree care, watering, pruning, and pests and diseases.
- Make property owners aware of their responsibility regarding street trees.
- Identify potential economic benefits from planting trees and share this information with elected officials and business and community leaders.
- Assess current and future educational outreach programs that promote the benefits of the urban forest.

#### Actions CE-J.5.2

- Urban Forestry Program Manager and the Public Information Officer will assess the current educational outreach programs to determine their effectiveness.
- Urban Forestry Program Manager and the Public Information Officer will develop new educational outreach programs that promote the benefits of trees.
- Urban Forestry Program Manager will compile a cost/benefit analysis using cutting-edge metrics of the city's urban forest.
- Urban Forestry Program Manager will identify the public health benefits derived from the city's urban forest.



Photo courtesy of Jennifer Douglas.

#### 3. Incorporate tree watering guidelines and information about water conservation to retain healthy urban trees on public and private properties.

If the public is expected to water and take care of private and public trees, standard watering guidelines need to be in place. Detailed information about San Diego's microclimates, how much water is needed for an individual tree, and how frequently it needs to be watered should be available for public distribution.

#### Actions CE-J.5.3

- Urban Forestry Program Manager and the Public Information Officer will develop tree watering and conservation guidelines as part of their educational outreach program as outlined in CE-J.5.2.



# Monitoring Plan

The goal of the monitoring plan is to provide data to understand what is happening, why it is happening, and how specific management adjustments will change the outcome. The possible situations that may arise over the course of a 20-year plan period cannot all be projected. Actions and plans need to be adjusted over time. By monitoring the urban forest system, information can be gathered to make these adjustments.

The overall scope of the monitoring activities is defined by what will be monitored, when the data will be collected, how the monitoring data will be gathered and analyzed, and who will collect, analyze, and use the information. Table 5 outlines the monitoring actions for this Plan. Generally the term “tree” refers to both shade trees and palms in this table.

Table 5. Monitoring Plan for Selected Objectives and Actions

Objective	Monitoring Plan Actions
CE-J.1.1 Objective: Inventory	<ol style="list-style-type: none"> <li>Track all inventory gathering methods.               <ol style="list-style-type: none"> <li>Actual inventory work.</li> <li>Records of tree related work.</li> </ol> </li> <li>Formal inventory work may be recorded once every ten years as recommended or ideally one-seventh of the street tree data will be updated annually as a result of routine maintenance records.               <ol style="list-style-type: none"> <li>Formal inventory work, contracted by a professional firm, will record the inventory data as specified by the city.</li> </ol> </li> <li>Records of the following tree-related work will be kept as it occurs by staff and contractors, and the tree inventory updated with the following information weekly:               <ol style="list-style-type: none"> <li>Pruning shade trees</li> <li>Trimming palms</li> <li>Removal</li> <li>Root Pruning</li> <li>Infrastructure damage</li> <li>Disease and insect damage/treatment</li> <li>Others</li> </ol> </li> <li>Urban Forestry Program Manager will compare updated inventory data annually to monitor and assess progress towards age and species diversity.</li> <li>Urban Forestry Program Manager will track from inventory data in objective CE-J-1.1, the age and species of each tree removed and planted.</li> </ol>

Table 5. Monitoring Plan for Selected Objectives and Actions continued

Objective	Monitoring Plan Actions
CE-J.1.2 Objective: Canopy Cover	<ol style="list-style-type: none"> <li>1. Urban Forestry Program Manager will conduct an aerial study of the urban tree canopy every five years.</li> <li>2. Urban Forestry Program Manager will oversee coordination of tree planting and recommendations for increasing the urban tree canopy assessment.</li> </ol>
CE-J.1.3 Objective: Age and Species Diversity	<ol style="list-style-type: none"> <li>1. Urban Forestry Program Manager will compare updated inventory data annually to monitor and assess progress towards age and species diversity.</li> <li>2. Urban Forestry Program Manager will track from inventory data (CE-J-1.1) on the age and species of each tree removed and planted.</li> </ol>
CE-J.1.4 Objective: Tree-planting Success	<ol style="list-style-type: none"> <li>1. Horticulturalist and MAD and Park staff or their designee will spot-check tree stock at the nursery prior to delivery of city trees for compliance.</li> <li>2. Horticulturalist and MAD and Park staff or their designee will spot-check all trees planted by in-house staff, contractors, or developers for compliance.</li> <li>3. Horticulturalist and MAD and Park staff will submit semiannual reports to the Urban Forestry Program Manager that contain the number of trees inspected, number and species accepted, and number and specimens rejected.</li> <li>4. Horticulturalist and MAD and Park staff or their designee will spot-check tree planting areas to assess adequacy of soil and physical planting conditions.</li> </ol>
CE-J.1.5b Objective: Young Tree Maintenance	<ol style="list-style-type: none"> <li>1. Inspect young trees every six months, for the first four years after planting.</li> <li>2. Urban Forestry Program Manager, Horticulturalist, and MAD and Park staff annually review the six-month inspections of young trees.</li> </ol>
CE-J.1.5c Objective: Adult Tree Maintenance	<ol style="list-style-type: none"> <li>1. From tree inventory records kept in CE-J.1.1, Horticulturalist and MAD and Park staff compare projected and actual shade tree pruning and palm trimming each year.</li> <li>2. Maintain a database on the number of complete tree failures and limb drops, species, approximate age, when last pruned, and the probable cause of failure.</li> <li>3. Urban Forestry Program Manager will meet annually with the Horticulturalist and MAD and Park staff to determine if the current tree-pruning program is reducing the number of failures.</li> </ol>
CE-J.1.5g Objective: Heritage Tree Maintenance	<ol style="list-style-type: none"> <li>1. Urban Forestry Program Manager will track identified Heritage trees for health and safety by inspecting periodically and recording work done on those trees.</li> </ol>

Table 5. Monitoring Plan for Selected Objectives and Actions continued

Objective	Monitoring Plan Actions
CE-J.1.6 Objective: Tree Removal and Replacement Program	1. Horticulturalist and MAD and Park staff will track progress on the 20-year tree removal and replacement program, and review annually with the Urban Forestry Program Manager.
CE-J.1.8 Objective: Green and Gray Infrastructure Conflicts	1. Urban Forestry Program Manager, Horticulturalist, and MAD and Park staff will establish baseline of the current level of conflicts. 2. Horticulturalist, MAD and Park staff, and Street, Electric, Sewer and Water managers will track daily and report damage and repairs to green and gray infrastructure.
CE-J.2.1 Objective: Optimize Benefits in Neighborhood Communities.	1. Urban Forestry Program Manager and Planning staff will estimate current and future neighborhood tree benefits using i-Tree or similar application based on proposed investments in tree planting and care. 2. Urban Forestry Program Manager and Planning staff will update benefit estimates every five years.
CE-J.2.2 Objective: Neighborhood Tree Planting Programs	1. Urban Forestry Program Manager will track success of tree planting programs based on locations suitable for tree planting (from inventories) and implementation of community plans.
CE-J.3.1 Objective: Urban Forest Master Tree Plan	1. Ensure the development of a Tree Planting Prioritization Plan that is reviewed and updated every ten years. 2. Urban Forestry Program Manager will renew and update Master Tree Plan every ten years.
CE-J.4.1 Objective: Tree Planting Incentives	1. Urban Forestry Program Manager and Planning Department staff will track tree planting after implementing an incentive program. This could include development plantings above the standard requirements; increase in No-Fee tree planting permits; and canopy cover increases on private commercial property.
CE-J.4.2 Objective: Enforcement	1. Urban Forestry Program Manager will assess effectiveness of Code Enforcement of illegal activity regarding public trees.
CE-J.4.4 Objective: Climate Action Plan	1. Urban Forestry Program Manager and Planning Department staff will use data from CE-J.1.2 to determine compliance with the tree planting goals of the approved Climate Action Plan.
CE-J.4.5 Objective: Stormwater Reduction	1. Urban Forestry Program Manager will work with the Storm Water Division on projects that use green infrastructure to estimate the volume of pre-project storm water runoff and track the volume of post-project storm water runoff for ten years after construction.
CE-J.5.2 Objective: Community Outreach	1. Urban Forestry Program Manager and Public Information Officer will use public surveys to assess public awareness, attitudes, and actions resulting from public education programs.

# Financing the Urban Forestry Program

## Budget History

**Street Trees.** Information provided by the Transportation and Storm Water Department, Streets Division about urban forestry expenditures for street trees is displayed in Table 6. The Urban Forestry line item was eliminated from the budget document in FY 2010. City crews continued to respond to urgent tree requests including pruning trees for vehicular and pedestrian clearance, picking up fallen palm fronds, performing selective tree pruning, and evaluation of health and stability of trees as needed. In addition, staff continues to coordinate with the Urban Corps on tree planting and issues permits for tree planting, pruning, trimming or removal in accordance with established city policies.

**Parks.** The Department of Park and Recreation has an annual budget of approximately \$200,000 for tree management for Balboa Park, Mission Hills Park, Golden Hill Park, Morley Field, 28th Street Park, and Grape Street Park. No estimate is available for other city parks.

**Maintenance Assessment Districts.** Tree management has shifted to MADs in many parts of the city. MADs are authorized by the State of California through the Landscaping and Lighting Act of 1972 and subsequent legislation. The city provides for MADs through the San Diego Maintenance Assessment District Ordinance, and the city assesses properties based on the amount of benefit each property will receive.

Funds for the MADs were:

- FY 2011: \$56,000 for tree planting and \$1,030,000 for tree trimming (covering both tree pruning and palm trimming) and maintenance
- FY 2012, \$131,000 for tree planting and \$1,510,000 for tree trimming and maintenance
- FY 2013, \$142,000 planned for tree planting and \$1,510,000 for tree trimming and maintenance

Some of the funding has been allocated from the Gas Tax fund, which totaled \$22 million to the city in 2013. Of this, \$1,268,498 was allocated to MADs, and \$774,382 for street median maintenance program. The city's Gas Tax Median Program is also managed by the Open Space Division, which maintains approximately 86 landscaped medians and parkways.

San Diego's per capita expenditures are far below those of virtually every city in California. Information collected by CAL FIRE staff about urban forestry programs in California cities in 2013 indicates that San Diego spends \$1.73 per capita on trees. For example, Los Angeles spends \$3.08 per capita; San Francisco, \$5.01; Anaheim, \$6.52; and Sacramento, \$9.47.



Table 6: Urban Forestry Activities for Street Trees (\$1000)<sup>73</sup>

Budget Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Palm Trimming	\$284	\$400	\$100	\$600	\$150	\$60	\$200	\$300	\$0	\$0	\$257	\$390	\$400
Broadleaf Pruning	\$252	\$300	\$100	\$150	\$600	\$700	\$300	\$200	\$0	\$0	\$0	\$0	\$0
Tree Planting	\$207	\$335	\$335	\$50	\$50	\$75	\$75	\$25	\$25	\$100	\$50	\$100	\$100
Root Pruning and Barriers	\$132	\$150	\$150	\$327	\$327	\$207	\$290	\$0	\$0	\$0	\$0	\$0	\$0
Tree Removal	\$68	\$50	\$150	\$250	\$250	\$104	\$185	\$0	\$200	\$0	\$300	\$0	\$0
Total for Tree Management	\$943	\$1,235	\$835	\$1,377	\$1,377	\$1,146	\$1,050	\$525	\$225	\$100	\$607	\$550	\$500
Weed Abatement	\$70	\$75	\$75	\$425	\$425	\$350	\$390	\$100	\$300	\$400	\$400	\$400	\$400
Total including Weed Abatement <sup>76</sup>	\$1,013	\$1,310	\$910	\$1,802	\$1,802	\$1,496	\$1,440	\$625	\$525	\$500	\$1,007	\$950	\$1,400
Sidewalk Repair Project Support*	\$268	\$262	\$256	\$250	\$228	\$207	\$185	\$0	\$0	\$450	\$300	\$0	\$0
Total including Weed Abatement and Sidewalk Repair	\$1,281	\$1,572	\$1,166	\$2,052	\$2,030	\$1,703	\$1,625	\$625	\$525	\$950	\$1,307	\$950	\$1,400
Salaries and miscellaneous**	\$4,900	\$4,024	\$3,905	\$3,500	\$3,431	\$3,218	\$4,100	\$0	\$0	\$0	\$0	\$0	\$0
Street Sweeping	\$0	\$0	\$3,700	\$3,700	\$3,700	\$3,700	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Salaries, miscellaneous, and Street Sweeping	\$4,900	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$6,181	\$5,596	\$8,771	\$9,252	\$9,161	\$8,621	\$5,725	\$625	\$525	\$950	\$1,307	\$950	\$1,400
Public Budget Request	\$5,910	\$5,596	\$8,771	\$8,293	\$9,071	\$8,621	\$5,544	\$0	\$0	\$0	\$0	\$0	\$0

\* Sidewalk repair includes root pruning, root barrier installation, unstable tree removal, stump grinding, and other as needed.

\*\*Supporting Street Division emergency services

<sup>73</sup> Urban forestry line item in city budgets from 2003 to 2009, available at <http://www.sandiego.gov/iba/reports/index.shtml>.

<sup>76</sup> Table provided in April 2012, Hassan Yousef, for broadleaf and palm trimming, tree planting, root pruning/barriers, tree removal, and weed removal.

## Costs of Tree Planting, Pruning and Trimming

### Tree Planting

Urban forestry professionals recommend planning for replanting two percent of all trees annually. This generally covers the number of trees lost each year to mortality, vandalism, and storm damage. San Diego's current inventory shows approximately 215,000 shade trees and 35,000 palms. Initially, the city can begin by replanting slightly more than one percent of all trees, or 2,500 trees per year.

The city currently has five-year contracts with local arborist companies for tree planting, pruning, and trimming. Planting costs range from \$90 for a #15 tree (15-gallon pot size) up to \$700 for a 48-inch box tree. Table 7 lists the contract cost for planting 24-inch box trees that the city requires in many planting areas. Watering costs are an estimate based on watering each tree approximately 20 times a year at an average of ten trees per hour. Young tree structural pruning are estimates based on pruning four trees an hour. Costs of preparing the planting site, including soil volume and composition, and installing irrigation are not included.

Table 7. Estimated costs for tree planting and maintenance

Description	Frequency	Per Tree Cost
Tree purchase and planting	First year	\$225
Tree watering (estimated from hourly costs)	First three years	\$300
Structurally prune young trees during first four years.	At time of planting	\$25
Structurally prune young trees again at four years.	Four years after planting	\$20
Prune shade trees	Every seven years	\$60
Trim palms	Every three years	\$65



Photo courtesy of City of San Diego

## Tree Pruning

The average pruning cycle for shade trees in municipalities is once every five to seven years, and three to five years for trimming palms. It is recommended that the city begin a seven-year proactive pruning program to keep its urban forest healthy and minimize potential tree failures.

The City has approximately 215,000 trees and 35,000 palms. On a seven-year cycle, about 30,000 trees would be pruned and 5,000 palms would be trimmed annually. Table 5 lists the costs for pruning shade trees and trimming palms, drawn from the city's current five-year contracts with local arborist companies for tree planting and care. Costs for pruning shade trees are for routine pruning (grid pruning) and costs for trimming palms are averaged from estimates for various species and trimming cycles.

## Options for Funding the Urban Forest

As noted, funding for the urban forest has declined during recent years due to revenue reductions. Public trees are not receiving the care they need. If the urban forest is to grow and meet climate action goals, a dedicated funding source is needed for planting and ongoing tree maintenance.

Regular programmed maintenance is more cost effective than daily work orders, as pruning trees and trimming palms based on work requests requires additional travel time and set up and take down of equipment several times a day. A regular tree-pruning program reduces pruning costs per tree, except for emergencies, and calls from the public for services. Visual inspection of trees to determine whether pruning is needed in that cycle results in optimal use of pruning and trimming

budgets. While the average pruning cycles of many California municipalities are once every five years, pruning once every seven years is recommended to start the cycle.

Identifying and securing consistent funding is the challenge before the city. It will take an in-depth study of how work is currently processed to find areas where funds can be leveraged. Enterprise funds that are impacted by trees might be a source of revenue. To meet the goals of this plan and the Draft Climate Action Plan, it is imperative that consistent funding be secured to have a better standard of care for trees.

Some options that could be consider are:

- Business improvement districts
- Capital improvement funds
- Charitable foundations
- Citywide assessment district
- Enterprise funds
- Grants
- Increasing the use of gas tax funds
- Local bonds
- Parcel tax
- Permit fees and fines
- Public/private partnerships

Generally, tree-planting grants are fairly easy to obtain. Using volunteers to plant and maintain young trees is also possible through various non-profit organizations such as Tree San Diego and California ReLeaf. It is far more difficult to find resources for long-term maintenance. Non-traditional funding methods must be explored.

An analysis of financing options was recently completed for the City of San Francisco,<sup>74</sup> and some of their recommendations could be considered for the San Diego. They include:

- Pursue a program of moderate expansion, planting new street trees each year and replacement trees to keep pace with four percent annual mortality.
- Fund capital costs with outside sources, such as General Obligation bonds, state grants, capital improvement program funds, and in-kind contributions.
- Levy a special assessment or parcel tax to fund operations and maintenance for the average parcel.
- Complete the city's street tree inventory to provide for accurate data for all trees in the public rights-of-way yielding considerable efficiencies, facilitating block pruning, and tracking of maintenance history, which ultimately will help to manage costs.
- Develop a street tree management plan that clearly outlines planting and maintenance plans over the long term. This would leverage economies of scale and reduce costs by implementing block pruning, while also clearly demonstrating the need for capital and operations and maintenance funding to the community and municipal leaders.

Park and street trees are the most visible component of the San Diego's urban forest. However, they face challenges. New and replacement trees are not keeping up with losses. Maintenance and funding are inadequate. Fiscal constraints resulting from local, state, and national economic conditions have required the city to cut funding for non-essential services. As long as San Diego's urban forestry program is a discretionary expenditure, its funding will

remain unstable and continue to fluctuate. New funding revenue streams are necessary.

<sup>74</sup> AECOM. 2012. Financing San Francisco's Urban Forest. Report to the City of San Francisco. 60 pp. Available at [http://www.sf-planning.org/ftp/files/plans-and-programs/planning-for-the-city/urban-forest-plan/121029FINAL\\_REPORT\\_SF\\_Urban\\_Forest\\_Financing\\_Report.pdf](http://www.sf-planning.org/ftp/files/plans-and-programs/planning-for-the-city/urban-forest-plan/121029FINAL_REPORT_SF_Urban_Forest_Financing_Report.pdf).





**City of San Diego**

**Urban Forest Management Action Plan**

