



URBAN FORESTRY PROGRAM

FIVE YEAR PLAN

DRAFT 2016

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TABLE OF CONTENTS

Executive Summary.....7

Definition and Scope of Urban Forestry.....9

Current Structure of San Diego Urban Forest Management.....11

Background.....12

Climate Action Plan Implementation.....15

Program Challenges and Opportunities.....18

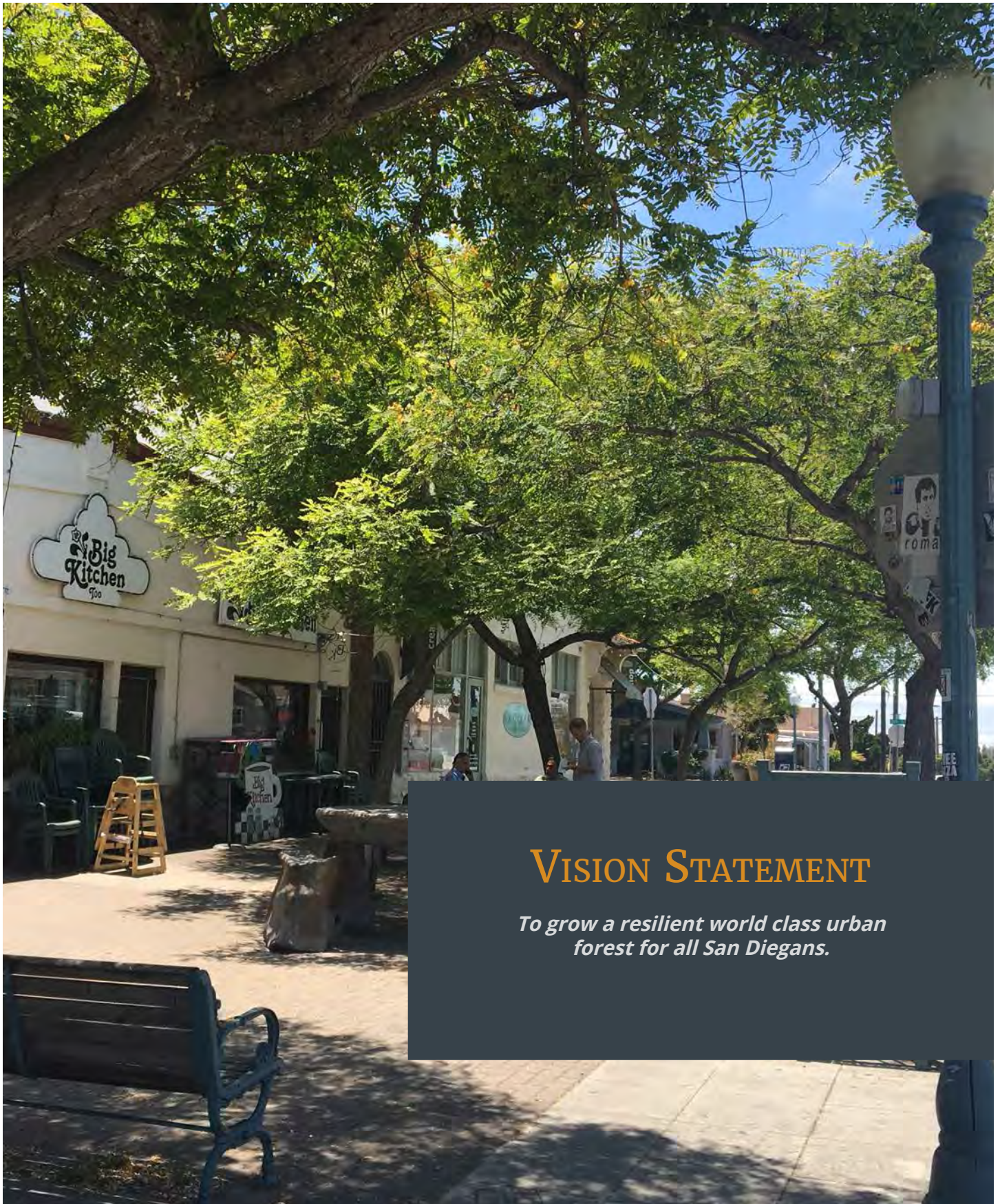
Urban Forestry Tactical Plan.....24

Goal 1 Initiatives.....26

Goal 2 Initiatives.....29

Goal 3 Initiatives.....31

Works Cited.....33



VISION STATEMENT

To grow a resilient world class urban forest for all San Diegans.

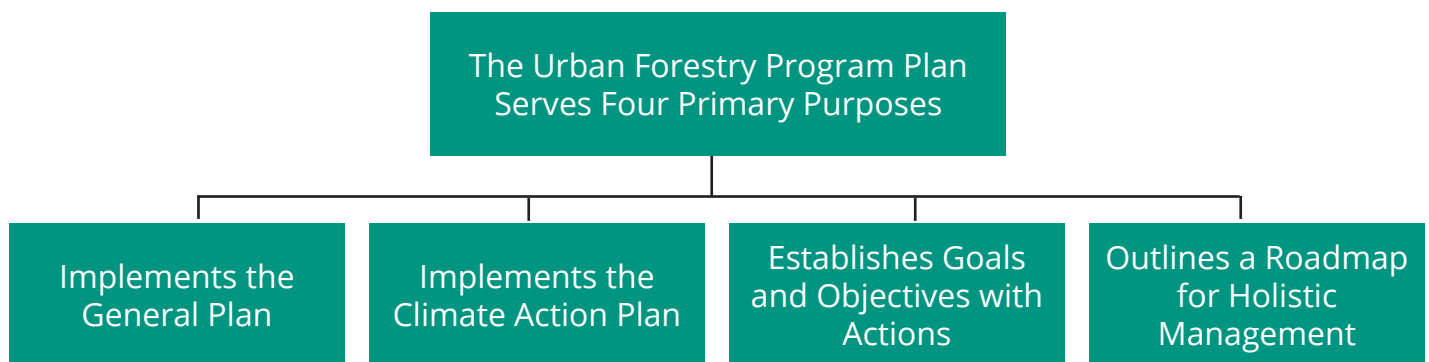
EXECUTIVE SUMMARY

The City's urban forest provides significant contributions to the quality of life for residents and visitors, as trees make a vital and affordable contribution to the sense of community and provide canopy cover that helps to create pedestrian-friendly neighborhoods. In the past decade, San Diego's tree cover has declined due to deferred maintenance, a constrained municipal budget, drought, disease, pests, and extreme weather events. However, a growing environmental awareness, adoption of the Climate Action Plan, and a recognition of the value of green infrastructure and the specific benefits of trees, has led to a renewed emphasis on urban forestry.

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, storm water runoff reduction, wildlife habitat preservation and enhancement, water conservation, healthy communities, and climate change mitigation and resiliency as set out in the General Plan and Climate Action Plan.

The three primary goals and objectives of the urban forestry program are to:

1. Increase our urban tree canopy cover and maximize the benefits of trees.
 - a. Obtain a comprehensive understanding of our urban forest.
 - b. Preserve and grow urban tree canopy cover.
2. Maximize the efficiencies in maintaining the benefits of trees.
 - a. Unify and coordinate urban forest management practices.
 - b. Promote inclusiveness, equity, and effective communication.
3. Minimize the risk of trees in an urban environment.
 - a. Improve the health of the urban forest with superior tree care and maintenance.
 - b. Unify and coordinate urban forest management policies.



URBAN FORESTRY PROGRAM

There are three overarching challenges to growing the City's Urban Forestry Program:

1. Obtaining a definitive understanding of the current canopy cover and tree inventory.
2. Leveraging technology to unify the urban forestry program.
3. Establishing partnerships and citizen support.

The City of San Diego's policies, regulations, and planning documents establish a strong framework for enhancing the urban forest. However, these implementation tools will need to be reviewed and revised to ensure Citywide consistency and address fiscal challenges. Significant investments will be needed to implement a management program to achieve a healthy urban forest and meet Climate Action Plan goals.

This Plan discusses the issues and trends that affect the City's public trees and outlines actions necessary to develop a unified and holistic urban forestry program. The recommendations and actions set forth in this Plan are based on the Draft Urban Forest Management Plan that was funded through a state Department of Forestry and Fire Protection (CAL FIRE) grant. The consulting firm Inland Urban Forestry Group drafted the plan with assistance from the Community Forestry Advisory Board (CFAB) and input from City staff, local urban forestry professionals, landscape architects, and planners. Stakeholders identified benefits of trees, desires for more trees in their neighborhoods, issues relating to tree care, and their willingness to invest in trees.

The Plan is intended to be a flexible, working document that will be monitored and adjusted over time as needed. Implementation of this Plan will be accomplished through a broad range of public and private sector actions. While progress will be made continually, the rate of implementation may vary from year-to-year based upon budget decisions, City priorities and private/public- sector participation and partnerships.

Various components of the Urban Forestry Program are managed by various City departments based on their respective core functions and areas of expertise. This Plan defines the department roles and identifies the necessary actions to unify the program to meet the goals.

The Plan's success also relies heavily on the involvement of an engaged citizenry along with private sector investments to plant and maintain trees, act as volunteer stewards, participate in education and outreach efforts, support the formation of assessment districts, and establish partnerships to achieve mutual benefits.



DEFINITION AND SCOPE OF URBAN FORESTRY

Urban Forestry: The cultivation and management of native or introduced trees and related vegetation in urban areas for their present and potential contribution to the economic, physiological, sociological, and ecological well-being of urban society.

– California Urban Forestry Act of 1978

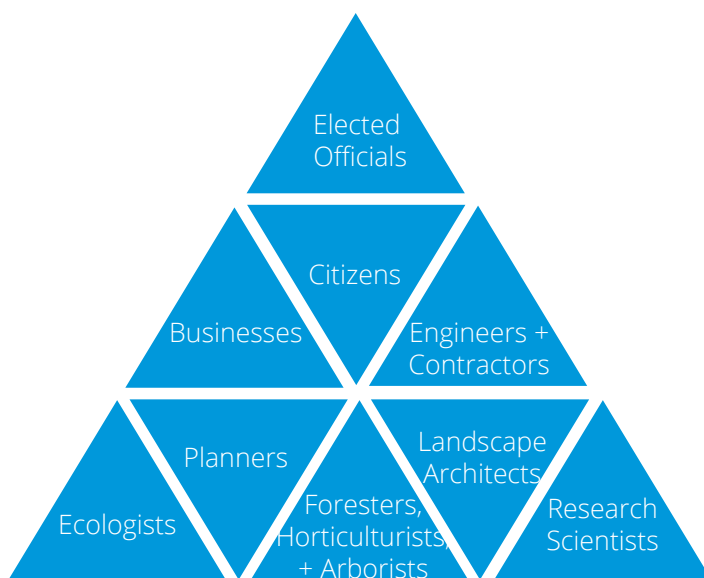
An urban forest is simply trees and vegetation in and around a city environment. Like a natural forest, an urban forest is an entire ecosystem which includes trees on both public and private property.

Trees provide a myriad of benefits in an urban environment and make affordable vital contributions to a sense of community. Along with providing shade, saving energy, improving air quality and public health, trees mitigate climate change, reduce storm water runoff, increase property values, and create wildlife habitat.

However, unlike a natural forest, an urban forest usually needs help from people to survive. The success of an urban forestry program depends on a number of parties and stakeholders; appointed and elected public officials, citizens, local businesses, engineers, contractors, ecologists, planners, foresters, horticulturists, arborists, landscape architects, and research scientists.

It is imperative that these stakeholders work together toward the common goals of increasing canopy cover to maximize the benefits of trees, maximize the efficiencies in managing trees, and minimize the risks of trees in an urban environment.

Urban Forestry is multifaceted and primarily comprised of six components: urban forest management; planning and policy, preservation, maintenance, planting, risk management, and emergency management.



URBAN FORESTRY PROGRAM

Planning and policy are central to urban forest management. Planning sets the course of action and coordination; policy sets the priorities and enacts the planned actions for a desired outcome. It is from here that the City's Urban Forestry Program stems.

Tree preservation is the protection of existing trees from disease, insects, drought, and construction. As trees mature, the environmental benefits they provide increase and generally the largest mature trees provide the greatest benefits (see figure below).

Maintenance is the watering, pruning, and treatment of established trees to promote their continued survival and growth. Efficient maintenance is necessary when managing a large population of trees and starts with communication, coordination, and documentation.

Planting is critical to maintaining a sustainable urban forest, as the addition of new trees is necessary to replace the natural and precipitated senescence. By focusing on planting the right tree at the right site for the right reason, there is a greater likelihood that trees will grow to their full potential and provide the greatest benefits.

Risk Management is the applied policy, procedures, and maintenance practices to monitor and mitigate tree risk. Tree risk is the combination of the likelihood of a conflict or failure occurring and impacting a target with the severity of the resulting consequences like injury, death, property damage, or disruption of services. It is impossible to maintain trees free of risk; however trees can be managed to balance the risk they pose with the environmental benefits they provide.

Emergency Management is the coordinated effort of various departments in response to tree emergencies like downed limbs and trees; oftentimes in the context of a greater disaster, like flooding, wind, or wild fires. In a time of crisis it is imperative to have a plan for response and recovery to address emergencies systematically. Sound protocols expedite an efficient response, accelerate recovery, and avoid unnecessary tree removal.



CURRENT STRUCTURE OF URBAN FOREST MANAGEMENT

In San Diego, the only part of the forest managed by public agencies is that which grows on public land such as along streets and highways, in parks, and around public buildings. The various components of the San Diego urban forestry program are currently managed in the following six City departments based on their respective core functions and areas of expertise:

1. **Planning:** The administrative aspects of urban forest management, community plans that include street tree master plans, policy, and central coordination of the citywide Urban Forestry Program.
2. **Public Works:** The preservation, protection and planting of trees within Capital Improvement Program projects.
3. **Park and Recreation:** The planting, maintenance, and preservation of all trees within Parks and Open Spaces. As well as, the street trees within the rights-of-way of 55 of the 63 Maintenance Assessment Districts (MADs).
4. **Economic Development:** The administration and oversight of the trees within eight MADs and Business Improvement Districts (BIDs)
5. **Transportation and Storm Water (T&SW) :** The planting, maintenance, and preservation of all trees within the rights-of-way throughout the city that are not classified as a MAD.
6. **Development Services (DSD):** The permitting of the planting, maintenance, and removal of trees under the City's jurisdiction. Includes the No-Fee Tree Permit and code compliance enforcement.

CITY OF SAN DIEGO URBAN FOREST MANAGEMENT AND DEPARTMENT ROLES	Planning and Policy	Preservation	Maintenance	Planting	Risk Management	Emergency Management
Planning	X					
Public Works	X	X		X		
Park and Recreation	X	X	X	X	X	X
Economic Development	X	X	X	X		
Transportation and Storm Water	X	X	X	X	X	X
Development Services	X	X	X	X		



URBAN FORESTRY PROGRAM

BACKGROUND

The goals from the City's 2008 General Plan were used as the basis for Draft Urban Forest Management Action Plan. The City adopted the General Plan in 2008, which included 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 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.

The first step in preparing the Draft Urban Forest Management Action Plan was to gather information from city residents. Presentations about urban trees and the Draft Urban Forest Management Action 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 1 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.

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 Urban Forest Management Action Plan. That document and the City Council-adopted Climate Action Plan have served as a reference and guiding documents for this Urban Forestry Program Plan.



General Plan Goals

- Develop, nurture, and protect a sustainable urban/community forest.
- Include community street tree master plans in community plans.
- Develop a citywide urban forest master tree-planting plan comprised of the community plans' street tree master plans.
- Continue to require the planting of trees through the development permit process.
- Support outreach efforts to educate city staff, the business community, and the public on the environmental and economic benefits of trees.

Climate Action Plan Goals

- Greenhouse gas reductions
- Reduce residential building energy consumption
- Divert solid waste and capture landfill methane gas emissions
- Increase urban tree canopy coverage.

Urban Forestry Plan Goals

- Increase our urban tree canopy cover and maximize the benefits of trees.
- Maximize the efficiencies in maintaining the benefits of trees.
- Minimize the risk of trees in an urban environment.



URBAN FORESTRY PROGRAM

TABLE 1: 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 too many or too few public trees?

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

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

Sidewalk and pavement cracking	53%
Leaves and fruit dropping/ongoing maintenance	29%
Tree roots and underground pipe problems (similar to sidewalk and pavement cracking)	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%

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%

CLIMATE ACTION PLAN IMPLEMENTATION

The Climate Resiliency Strategy 5 of the Climate Action Plan establishes the goal to increase urban tree canopy cover with targets of 15% by 2020 and 35% by 2035. Progress and achievement of this goal will take a concerted collaborative effort to be successful. It is impossible for city staff to simply plant enough trees to meet these targets. The first step must be the preservation of the existing canopy, followed by the proper maintenance of the existing trees, and then the proper planting and the addition of new trees.

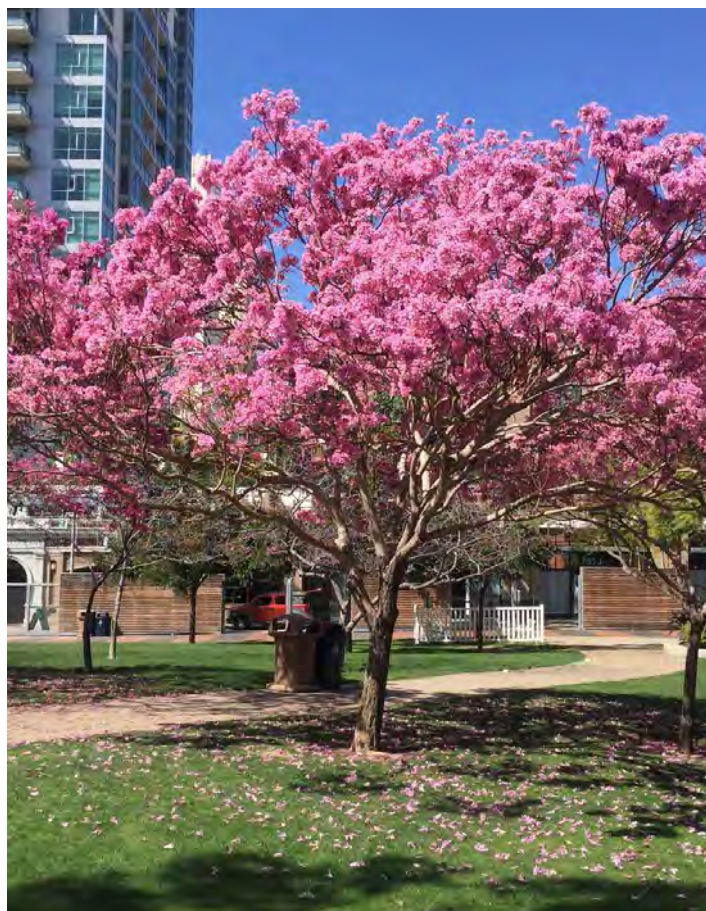
In order to successfully achieve the urban tree canopy cover goal of the Climate Action Plan, there is a need to:

1. Obtain a definitive understanding of the current canopy cover and tree inventory.
2. Leverage technology to unify the program.
3. Establish partnerships and citizen support.

DEFINITIVE UNDERSTANDING OF THE CURRENT CANOPY COVER AND TREE INVENTORY

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

The 2010 and 2003 estimates of tree canopy cover in the city ranges from 4.2 percent to 7 percent respectively. To meet the Climate Action Plan targets this coverage will need to be more than doubled according to these estimates. Absent an actual tree canopy cover percentage from an urban tree canopy



assessment, only a rough estimate can be made to understand the progress toward the Climate Action Plan tree canopy goal.

The City has however secured funding for an urban tree canopy assessment that will establish a current understanding of the status of the 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, each land class will be ranked on their suitability for establishing new tree canopy, including available planting spaces, ownership, topography, soils, and other inputs.

The most recent tree inventory was completed by the Streets Division in 2002. It includes all trees in public right-of-way, but not those in maintenance assessment districts. As part of this inventory, City employees and interns walked the streets with GPS units, identified and recorded data for existing trees,

URBAN FORESTRY PROGRAM

and identified vacant sites. 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. The number of trees and palms varies greatly by community and the database likely underestimates the number of trees in the city since it has only been updated where city-contracted tree care management companies have documented the tree within the city inventory. The database generally does not include trees in parks, or private residential and commercial properties.

The City has secured funding to conduct an updated street tree inventory and will first reconcile the existing data to identify areas that lack sufficient data. New data will be collected in the areas identified in the data reconciliation and a master street tree inventory will be compiled to serve as the new baseline information for program implementation and management.

UNIFYING THE URBAN FORESTRY PROGRAM THROUGH TECHNOLOGY

As noted previously, the various components of the San Diego urban forestry program are currently managed by six city departments based on their respective core functions and areas of expertise. Currently, each department is using their independent management systems to manage the urban forest within their purview. There is an opportunity to unify these systems through an updated street tree inventory and an urban forestry enterprise asset management system. Upon the implementation of an enterprise system, routine tracking and reporting is possible. This would allow for the number of trees planted, maintained, and removed to be monitored for trends and management insight.

The City intends to implement an integrated Enterprise Asset Management (EAM) solution in order to more effectively and sustainably manage infrastructure assets, including trees, at a desired level of service for the lowest lifecycle cost. This new EAM solution will enable the City to use information on assets, including condition, status, and maintenance history, to assess and measure lifecycle costs, evaluate the broader costs and benefits of infrastructure projects and to develop optimal routine maintenance and capital investment strategies.



ESTABLISHING PARTNERSHIPS AND CITIZEN SUPPORT

The Climate Action Plan provides a catalyst and focus in rallying community partners. The momentum generated from this effort can be leveraged to build support for an Urban Forestry Program. Effective urban forestry depends ultimately on the public policy supporting it—financially, administratively, and legally. Tree-related advocacy groups are now common in many cities. They marshal volunteer support and voices for urban forestry programs to local officials. Tree-planting volunteers join professional arborists on the front lines. Citizens can provide the political support to sustain public investment in green infrastructure and the urban forest.

The Community Forestry Advisory Board provides recommendations related to the city's urban forestry policies and programs. 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.

There is a strong interest and support from the public. Also, there are several burgeoning non-profit partners that already align with the general process of growing the urban forest through informing, engaging, educating, and empowering the public to plant, care, and grow trees within the City.



PROGRAM CHALLENGES AND OPPORTUNITIES

The following points were identified as specific challenges and opportunities within the components of urban forest management to address the goals of the General Plan. These points were derived from the Draft Urban Forest Management Action Plan and were the input from numerous interviews in the Spring and Summer 2014, with city staff from the Streets and Open Space Divisions; Park and Recreation, Planning, Development Services, and Transportation and Storm Water Departments; Environmental Services; and members of the Plan Working Group that included Forest members, city staff, and citizens at large. Through the experience and knowledge of the Urban Forestry Program Manager, the challenges were framed for better understanding and presented with correlating solutions for the Program.

PLANNING AND POLICY

There are numerous chapters and articles in the Municipal Code that form the policies of the urban forestry program, as well as community plans and various manuals. These codes, council policies, and manuals comprise the current overarching planning and policy of the urban forestry program. However, in order to strengthen the program a thorough review and revisions of the current codes, policies and manuals is necessary.

The Draft Urban Forest Management Action Plan includes detailed recommendations for the municipal code, council policies, community plans, and relevant manuals.

For example, Municipal Code Chapter 2: Article 2: Administrative Code, Government, Division 15: Park and Recreation Department establishes the Park and Recreation Department shall be responsible for the control and management of street trees and landscaping of city-owned property. Currently, the responsibility of trees within the public right-



of-way is shared with two departments, Park and Recreation, and Transportation and Storm Water. The Urban Forestry Program Manager, who is tasked with coordinating and overseeing the Urban Forestry Program, is within the Planning Department. The code should be reviewed and revised to accurately reflect the current responsibilities.

Municipal Code Chapter 14: General Regulations; Article 2: General Development Regulations; Division 4: Landscape Regulations establishes the rules and regulations to control and protect planting on city streets. Revisions are necessary to establish Incentives 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. The Plant Point Schedule of the municipal code 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 storm water 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.

Council Policy 200-05, Planting of Trees on City Streets establishes guidelines for the planting and removal of trees from city street rights-of-way. 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. It is recommended that the policy be reviewed to identify opportunities for increased efficiencies and modified to require the property owner to remove stakes and grates that restrict trunk growth.

Council Policy 900-19, Public Tree Protection, provides for the protection of designated trees. There are categories for protection (Landmark, Heritage, Parkway Resource, and Preservation Grove), and stated penalties for unauthorized removals. Currently the Policy appears to address three things; designation of significant trees, procedures for protecting trees, and protocol for removing trees. As a result, restrictions in Multiple Species Planning Areas might limit the designation of protected trees and their pruning, and the policy should be reviewed and revised to appropriately strengthen the protection of public trees.



URBAN FORESTRY PROGRAM

PRESERVATION

With an estimated 1 million trees throughout the entire city that total an estimated 4% to 7% canopy cover, preservation of the existing canopy cover is necessary to meet the Climate Action Plan goal of increasing canopy cover.

Council Policy 200-05, outlines the operating policy that street trees shall only be removed if they are; dead, hazardous, causing damage to public improvements that cannot be permanently corrected, the owner of the fronting property requests the removal, the tree is not part of a uniform tree planting, or a significant neighborhood asset. This policy should be amended to create more clarity and incorporate irreversibly diseased or infested trees.

A cultural shift is needed that tree preservation must become the default, and existing trees accounted for early in the various project processes. There are potentially competing mandates that require more thorough attention and analysis like infrastructure repair and solar energy. Conflict and unnecessary tree removal can be minimized, and even avoided, if trees are considered during the scoping phases of these projects.

As for the public and enforcement of the protections of trees, currently, property owners face few consequences when they use poor pruning practices or illegally remove a tree. Vandalism is also an issue in parks. Proactive enforcement of tree-related regulations is currently a lower priority than other code violations. There is a need to look at how proactive or a more responsive enforcement can be incorporated into our current operations.

MAINTENANCE

Proper tree maintenance increases the longevity of trees, reduces premature failures, and maximizes the benefits trees provide. Currently, City maintenance is primarily performed reactively. Drought, pests, and diseases should be addressed proactively and funding has increased in recent years for proactive pruning and trimming.

The maintenance of street trees and park trees is slightly different and each should have a defined standard of care that is the basis of the urban forestry program.

Currently, street trees are primarily maintained by the Transportation and Storm Water Department with in-house crews addressing urgent conditions and contract crews providing proactive systematic pruning and trimming. An established pruning cycle is needed to create a routine inspection cycle, as inspecting trees on a routine cycle is more important than pruning for the sake of pruning.

Within the City's parks, there is no tree inventory and no regularly scheduled maintenance program. A park tree inventory that is compatible with the street tree inventory is needed to develop routine inspections cycles and develop appropriate work plans.

A revised street tree inventory and enterprise asset management system for trees creates the infrastructure to implement routine operations reporting to track trends and monitor the urban forestry program.

PLANTING

While San Diego's streets are lined with approximately 200,000 trees and 48,000 palms, previous studies estimated that they could accommodate more than four times that amount. The assumption for full capacity would be one tree every 50 feet (on both sides of the street), or 200 trees per street mile. Many planting opportunities exist in the City, such as along under-planted arterial roads; in older, established neighborhoods where trees may have been lost; in new neighborhoods with too few trees; 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.

With respect to planting, of particular note is that 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 and growth space, often constrained by concrete or asphalt and overhead utility lines. San Diego's dependence on imported water and recent drought conditions favor selecting native trees with low water requirements or trees that are native to similar climates and known to not invade natural areas.

Policies and protocols 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. The long-term health of a tree starts in the nursery and good quality nursery stock should only be selected for street and park trees.

The spacing of street trees should allow for trees to grow without root crowding, and the soil compaction should be loosened to optimize growing conditions. 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.

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 San Diego Region 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.

URBAN FORESTRY PROGRAM

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

1. Streets and parkways.
2. Parks, community centers, schools, colleges, and other public properties.
3. State and federal properties, including California Department of Transportation rights-of-way and military installations.
4. Residential properties (front and back yards).
5. Commercial and industrial properties, especially parking lots.
6. 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.

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.

Concerns have been raised about increasing water consumption if more trees are planted and it is important to establish trees well after planting and young trees need to be irrigated in the first years. Planting and establishing new trees is a water “investment” as the water conservation benefits outweigh the upfront water use. Ensuring the irrigation of the young trees after they are planted has been a challenge, even with signed agreements from property owners to regularly water the trees. Survivability rate of trees planted should be tracked as part of this program.



The 2015 CAL FIRE grant to plant 500 street trees in Southeastern San Diego provides an opportunity to implement new approaches to planting, including contracted watering as part of the cost of planting and public outreach and education in the surrounding community.

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. The urban tree canopy assessment and Parks System upcoming Park Master Plan provide an opportunity to identify strategic areas to plant trees that will increase overall canopy cover.

Trees provide a myriad of benefits that align not only with the Climate Action Plan, but storm water efforts, pedestrian safety initiatives and many other city goals. Urban trees are valuable assets that should be employed to help meet these goals.



RISK MANAGEMENT

The benefits of trees increase as the age and size of trees increase. However, as trees age and increase in size the more likely they are to shed branches and limbs or develop conditions that can increase the likelihood of failure. While it is impossible to entirely avoid the risk of trees in an urban environment; it is possible to minimize the risk through sound planting, routine inspection and maintenance, and a proper risk management protocol.

The risk management protocol should focus on the prevention and correction of high risk defects, and provide a written systematic procedure for inspecting and evaluating potentially high risk trees, and implementing corrective actions as outlined in the current industry standards. This should also include training and certification for key staff in the International Society of Arboriculture Tree Risk Assessment Qualification.

EMERGENCY MANAGEMENT

Severe weather can result in a significant number of tree emergencies in a rather short period of time that can easily overload the capacity of the various Departments. During the El Niño event of January 31st and February 1st, 2016 more than 500 trees fell and required urgent response.

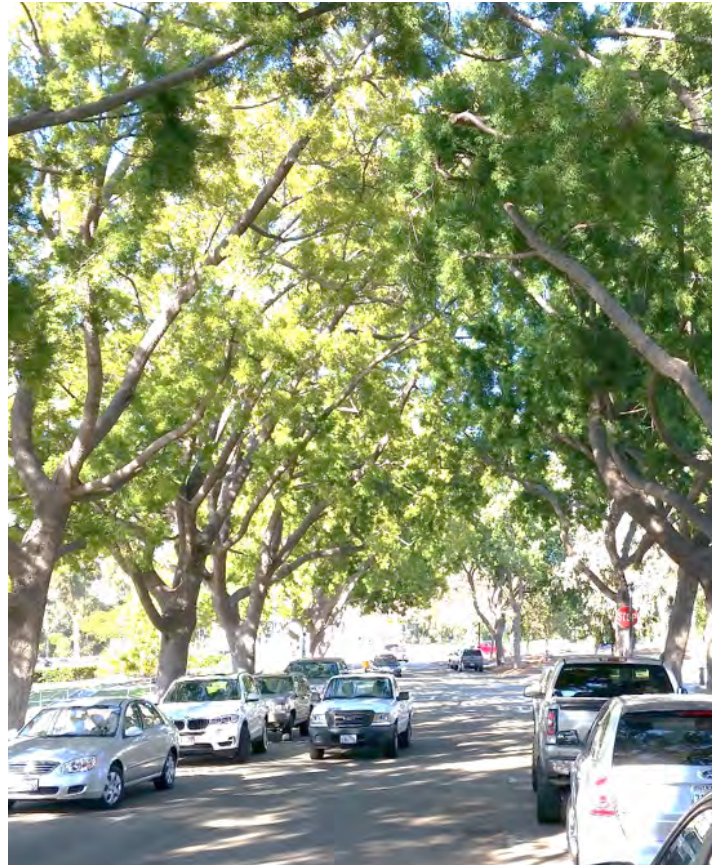
The Transportation and Storm Water Department addresses the tree emergencies in the right-of-way and the Park and Recreation Department address tree emergencies in Parks and the right-of-way of MADs. Both departments typically handle emergencies with in-house crews during business hours and activate contract crews when the demand exceeds their capacity and is outside of business hours. In extreme events, they will mutually aide each other as resources permit.

URBAN FORESTRY PROGRAM

Tree emergencies are prioritized as the following in order of most urgent:

1. Life & Safety (e.g., trees on occupied homes and cars, trees blocking roads)
2. Property Preservation (e.g., Trees on homes and Trees on cars)
3. Quality of life (e.g., Trees down on streets & sidewalks and in Parks)

A storm emergency protocol should be developed that outlines the roles of each department and their jurisdiction. It should include how urban forestry will fit within the Situational Incident Management System, clearly define the priorities and process for forestry response, identify a method for routine reporting to monitor the event, and address the Federal Emergency Management Agency (FEMA) documentation criteria for reimbursement.

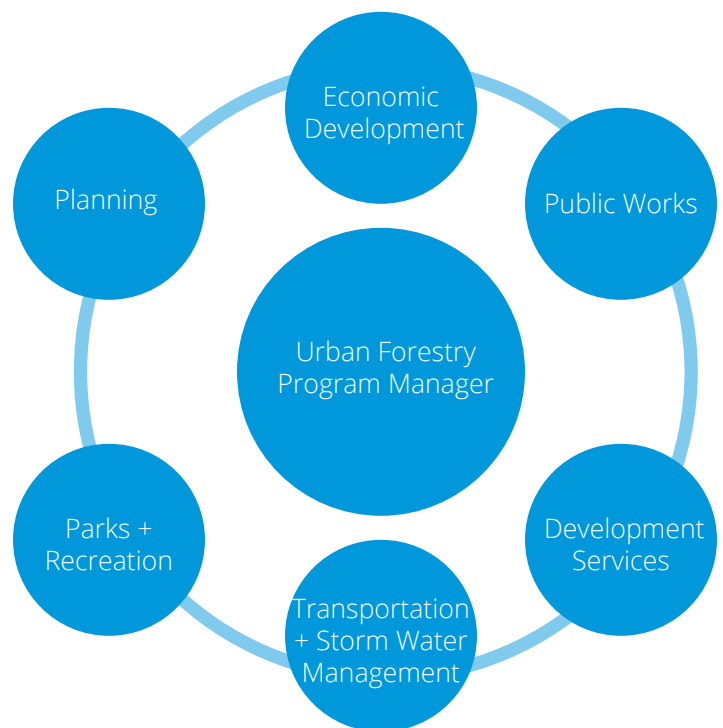


URBAN FORESTRY PROGRAM TACTICAL PLAN

The Department's Urban Forestry Program was established in 2015 to manage the citywide Urban Forestry Program through policy, planning, and coordinating city departments.

The program's initial responsibilities are to outline the citywide Urban Forestry Program and manage the two existing CAL FIRE grant programs underway, the 2014 Urban Forest Management Action Plan presently in final draft, and the 2015 urban tree canopy assessment, street tree inventory and the current street tree planting of approximately 500 trees in Southeastern San Diego.

The following tactical plan outlines the Urban Forestry Program's mission, vision, goals, objectives, and actions for the next five years.



MISSION STATEMENT

To increase the urban tree canopy cover and enhance the urban environment through sound holistic urban forest management.

GOALS AND OBJECTIVES

1. Increase our urban tree canopy cover and maximize the benefits of trees.
 - a. Obtain a comprehensive understanding of our urban forest.
 - b. Preserve and grow urban tree canopy cover.
2. Maximize the efficiencies in maintaining the benefits of trees.
 - a. Unify and coordinate urban forest management practices.
 - b. Promote inclusiveness, equity, and effective communication.
3. Minimize the risk of trees in an urban environment.
 - a. Improve the health of the urban forest with superior tree care and maintenance.
 - b. Unify and coordinate urban forest management policies.

The table on the following page summarizes the actions, identifies roles of the departments, establishes the implementation time frame in relation to the Climate Action Plan and identifies the respective General Plan Goal that implementation strives to achieve.



URBAN FORESTRY PROGRAM

GOAL 1: MAXIMIZE THE BENEFITS OF TREES	DEPARTMENT COLLABORATORS C-coordinator L-lead S-support						IMPLEMENTATION	
<i>Objective A: Obtain a comprehensive understanding of our urban forest.</i>	Planning	Park and Recreation	Transportation and Storm Water	Development Services	Public Works	Economic Development	Climate Action Plan Phase 1: (<18 mos.) Phase 2: (<36 mos.) Phase 3: (<5 yrs.)	General Plan Goal
1. Conduct an urban tree canopy assessment using the LiDAR data to calculate the current tree canopy cover and identify the spatial characteristics.	L						Phase 1	CE-J.1
2. Reconcile existing street tree inventory data and collect new data where necessary to develop an updated street tree inventory.	L	S	S				Phase 1	CE-J.1
3. Inventory and Assess the existing trees designated as heritage trees through Council Policy 900 and the Conserve-A-Tree Program.	C	L	L				Phase 1	CE-J.1
4. Calculate the environmental service benefits of our current street tree population with an iTree Streets Analysis.	L						Phase 1	CE-J.5
5. Conduct an Urban Forest Inventory and Analysis with the US Forest Service to establish baseline assessment of all trees within the City of San Diego.	L						Phase 2	CE-J.1
6. Calculate the environmental service benefits of all trees within the City of San Diego with an iTree Eco Analysis.	L						Phase 2	CE-J.5
7. Define the standard of care for trees within the right-of-way and parks.	C	L	L				Phase 2	CE-J.1
8. Review and assess current biomass reuse protocols and procedures and explore alternative methods of expanding the upcycling and repurposing of biomass.	C	L	L				Phase 3	CE-J.1

GOAL 1: MAXIMIZE THE BENEFITS OF TREES	DEPARTMENT COLLABORATORS						IMPLEMENTATION	
	C-coordinator	L-lead	S-support					
<i>Objective B: Preserve and grow urban tree canopy cover.</i>	Planning	Park and Recreation	Transportation and Storm Water	Development Services	Public Works	Economic Development	Climate Action Plan Phase 1: (<18 mos.) Phase 2: (<36 mos.) Phase 3: (<5 yrs.)	General Plan Goal
1. Re-establish Tree Warden position to provide tree protection enforcement.	C		S	L			Phase 1	CE – J.1
2. Review and Revise as appropriate Council Policy 200-05 Planting of trees on city streets to clarify tree removal and planting standards.	C	S	S	L			Phase 1	CE – J.1
3. Review and Revise as appropriate Brush Management Policy.	C	S		S			Phase 1	CE – J.1
4. Develop a general tree removal policy that outlines the instances where trees are permitted to be removed and the necessary mitigation.	C	L	L				Phase 1	CE – J.1
5. Review and revise the Street Tree Selection Guide to incorporate Street Tree Planting Standards that summarize species and site selection.	L		S				Phase 1	CE – J.3
6. Integrate known Conserve-A-Tree Program trees and incorporate inventory that identifies trees that may be eligible into the into Community Plan updates.	L						Phase 1	CE – J.2
7. Increase species diversity – encouraging the use of native, non-invasive, and water efficient species for a more resilient urban forest.	L	S	S	S	S	S	Phase 1	CE – J.1
8. Develop protocols for the inclusion of trees in the storm water program.	C		L	S	S		Phase 1	CE – J.1
9. Develop Greening Plans for Communities.	L						Phase 1	CE – J.2
10. Using the urban tree canopy assessment, develop canopy cover goals for each community that support the Climate Action Plan canopy cover goal.	L						Phase 2	CE – J.2
11. Develop a 20-year planting prioritization plan.	L		S				Phase 2	CE – J.3
12. Replace all trees removed at planting 2 trees for every 1 tree removed.	L	S	S	S	S		Phase 2	CE – J.1
13. Develop a tree planting program that identifies potential planting sites on public land and encourages tree planting on private property	L						Phase 2	CE – J.3
14. Develop a definitive community tree ordinance that solidifies council policies and protocols in the planting, maintenance and preservation of trees.	L	S	S	S	S	S	Phase 3	CE – J.1
15. Develop an Urban Forest Master Plan.	L	S	S	S			Phase 3	CE – J.3

URBAN FORESTRY PROGRAM

GOAL 2: MAXIMIZE THE EFFICIENCIES IN MAINTAINING THE BENEFITS OF TREES	DEPARTMENT COLLABORATORS						IMPLEMENTATION	
	C-coordinator	L-lead	S-support					
<i>Objective A: Unify and coordinate urban forest management practices.</i>	Planning	Park and Recreation	Transportation and Storm Water	Development Services	Public Works	Economic Development	Climate Action Plan Phase 1: (<18 mos.) Phase 2: (<36 mos.) Phase 3: (<5 yrs.)	General Plan Goal
1. Establish routine Round Table meetings with all internal stakeholders.	L	S	S	S	S		Phase 1	CE – J.5
2. Implement a tree root management program to address root conflicts.	C	S	L	S	S		Phase 1	CE – J.1
3. Begin compliance inspections and enforcement for permit planted trees.	C			L			Phase 1	CE – J.4
4. Develop and improve code enforcement program that could include fines and other penalties for removing, damaging, or causing the loss of a public tree.	C			L			Phase 1	CE – J.1
5. Review and revise the No Fee Permit Process	C	S	S	L	S		Phase 1	CE – J.4
6. Review and revise as appropriate the Low Impact Development Manual.	C		S	L	S		Phase 1	CE – J.1
7. Develop a comprehensive urban forestry storm emergency protocol.	L	S	S	S	S		Phase 1	CE – J.1
8. Review and revise Code as appropriate to clarify public tree jurisdiction.	L	S	S	S	S		Phase 2	CE – J.1
9. Develop and establish a routine planting and maintenance operations report that summarizes all management activities on a regular basis	L	S	S	S	S		Phase 2	CE – J.1
10. Employ mobile electronic technology for urban forest management to keep tree enterprise asset management system current	C	L	L				Phase 2	CE – J.1
11. Any time a tree is permitted to be planted, maintained, removed or serviced in any way, record all permits and work in enterprise asset management system	L	S	S	S	S		Phase 2	CE – J.1
12. Any time a tree is planted, maintained, removed or serviced in any way, record all completed work in the tree enterprise asset management system.	L	S	S	S	S		Phase 2	CE – J.1
13. Develop and implement a tree enterprise asset management system	L	S	S	S	S		Phase 2	CE – J.1
14. Develop an urban forest management plan that includes a 20-year removal and replacement plan	L	S	S	S	S	S	Phase 3	CE – J.3
15. Encourage property owners to water trees	L	S	S				Phase 3	CE – J.5

GOAL 2: MAXIMIZE THE EFFICIENCIES IN MAINTAINING THE BENEFITS OF TREES	DEPARTMENT COLLABORATORS						IMPLEMENTATION	
	C-coordinator	L-lead	S-support					
<i>Objective B: Promote inclusiveness, equity, and effective communication.</i>	Planning	Park and Recreation	Transportation and Storm Water	Development Services	Public Works	Economic Development	Climate Action Plan Phase 1: (<18 mos.) Phase 2: (<36 mos.) Phase 3: (<5 yrs.)	General Plan Goal
1. Restore status as Tree City USA with the Arbor Day Foundation	L	S	S				Done	CE – J.1
2. Identify potential non-profit and non-government organizations for partnership	L	S	S				In Process	CE – J.5
3. Develop partnerships with non-profit and other community organizations to enhance the city's urban forest.	L	S	S				In Process	CE – J.5
4. Review and revise the Conserve-A-Tree Program and Council Policy 900 to make it more effective and relevant.	L	S	S	S			In Process	CE – J.1
5. Organize events for Arbor Day, Make a Difference Day, and other significant days of recognition that involve and recognize partnerships.	L	S	S				In Process	CE – J.5
6. Review & Revise the Street Tree Selection Guide annually in collaboration with local tree care professionals and document reasons for additions/subtractions from the list.	L		S				Phase 1	CE – J.1
7. Engage potential partners to discuss mutual interests and working relationships	L	S	S				Phase 1	CE – J.5
8. Support efforts to recruit, train, manage, and recognize volunteers, as part citizen forester or tree steward program.	L	S	S				Phase 1	CE – J.5
9. Develop programs that involve students and youth groups in the planting, care, and protection of trees.	L	S	S				Phase 1	CE – J.5
10. Develop a program to provide training to landscape and design committees for homeowners associations and other community groups.	L						Phase 2	CE – J.5
11. Through public outreach/education, work with non-profits and volunteers to plant and maintain new trees.	L						Phase 2	CE – J.5

URBAN FORESTRY PROGRAM

GOAL 3: MINIMIZE THE RISK OF TREES IN AN URBAN ENVIRONMENT	DEPARTMENT COLLABORATORS						IMPLEMENTATION	
	C-coordinator	L-lead	S-support					
<i>Objective A: Improve the health of the urban forest with superior tree care and maintenance.</i>	Planning	Park and Recreation	Transportation and Storm Water	Development Services	Public Works	Economic Development	Climate Action Plan Phase 1: (<18 mos.) Phase 2: (<36 mos.) Phase 3: (<5 yrs.)	General Plan Goal
1. Develop a comprehensive management program for trees designated as heritage trees that augments the standard of care afforded to public trees.	L	S	S	S	S		Phase 1	CE – J.1
2. Review and revise tree planting specifications and guidelines.	L	S	S	S	S		Phase 1	CE – J.1
3. Improve tree stock selection and procurement through the review and revision of specifications and guidelines for the purchase and selection of trees to be planted in the public right of way or parks.	L	S	S	S	S		Phase 1	CE – J.1
4. Check and monitor tree plantings for compliance with specifications and standards.	L	S	S	S	S		Phase 1	CE – J.1
5. Implement Best Management Practices and industry standards from the International Society of Arboriculture (ISA) and American National Standards Institute (ANSI) for all tree contracts.	L	S	S	S	S		Phase 2	CE – J.1
6. Develop a variety of programs that ensure adequate water for all public trees.	L	S	S				Phase 2	CE – J.1
7. Establish regular pruning schedule for all trees within the right-of-way and in parks.	L	S	S				Phase 2	CE – J.1
8. Through non-government organizations establish a citizen stewardship program that engages the public in watering, weeding, and basic tree pruning.	L	S	S				Phase 2	CE – J.5
9. Compile a comprehensive list of pests and diseases that threaten the majority of public trees and identify integrated pest management solutions that address them.	L	S	S				Phase 3	CE – J.1
10. Incorporate tree establishment in planting contracts that provides watering and structural pruning for newly planted trees.	L	S	S	S	S		Phase 3	CE – J.1

GOAL 3: MINIMIZE THE RISK OF TREES IN AN URBAN ENVIRONMENT	DEPARTMENT COLLABORATORS						IMPLEMENTATION	
	C-coordinator	L-lead	S-support					
<i>Objective B: Unify and coordinate urban forest management policies.</i>	Planning	Park and Recreation	Transportation and Storm Water	Development Services	Public Works	Economic Development	Climate Action Plan Phase 1: (<18 mos.) Phase 2: (<36 mos.) Phase 3: (<5 yrs.)	General Plan Goal
1. Develop standard urban forest element for Community Plans.	L						In Process	CE – J.1
2. Incorporate greening plans and planting prioritization plans into the Community Plans.	L						Phase 1	CE – J.2
3. Develop urban forest budget report that captures all of the current sources and levels of funding related to urban forest management.	L	S	S		S		Phase 1	CE – J.1
4. Identify funding sources for planting, care, maintenance, and protection of trees in the public right-of-way, parks, and trees of significant importance.	L	S	S		S		Phase 1	CE – J.1
5. Develop a policy that incorporates BMP's to minimize conflicts between tree roots and water and sewer lines.	L		S	S	S		Phase 1	CE – J.1
6. Develop a policy that incorporates BMP's to minimize impacts of tree roots on curbs, gutters, and sidewalks.	L		S	S	S		Phase 1	CE – J.1
7. Develop a policy that incorporates BMP's to minimize tree canopy conflicts with power lines.	L		S	S	S		Phase 1	CE – J.1
8. Incorporate tree planting as an asset in the Capital Improvement Program and the Storm Water Program.	L	S	S		S		Phase 2	CE – J.1
9. Develop a tree risk management protocol.	L	S	S	S	S		Phase 2	CE – J.1
10. Develop policies that encourage and incentivize developers, homeowners associations, and other organizations to preserve, maintain, and plant trees.	L	S	S	S			Phase 2	CE – J.4

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WORKS CITED

BIBLIOGRAPHY

1. 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>.
2. Stanford, Leland. 1970. San Diego's eucalyptus bubble. J. San Diego History 16(4):. Available at <http://www.sandiegohistory.org/journal/70fall/eucalyptus.htm>.
3. Nowak and Greenfield, 2010.
4. American Forests. 2003. Urban ecosystems analysis, San Diego, CA. 20 p. Available at <http://www.ufe.org/files/pubs/sandiegouea.pdf>, accessed 2/10/12.
5. Drew Potocki, Urban Forester, City of San Diego, Transportation and Streets Department, personal communication March 2014.
6. Mike Klein, GIS Specialist, Planning Department, personal communication, October 8, 2014.
7. Council Policy 200-05, posted at http://docs.sandiego.gov/councilpolicies/cpd_200-05.pdf.
8. No Fee Street Tree Permit, posted at <http://www.sandiego.gov/nccd/pdf/streettreepermitapplication.pdf>.
9. Council Policy 900-19, posted at http://docs.sandiego.gov/councilpolicies/cpd_900-19.pdf.
10. Green Streets, Municipal Handbook, http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_green_streets.pdf

LIST OF FIGURES

Cover Page: Estacio, A. (2014). {Balboa Park} San Diego, CA. Retrieved June 10, 2016, from <http://flytpath.com/portfolio/balboa-park-san-diego-ca/>

Vision Statement: Altitude CAM. (2015). Gallery. Retrieved June 03, 2016, from http://www.altitudecam.com/?page_id=32

