

City of San Luis Obispo Community Forest Plan



CITY OF SAN LUIS OBISPO

April 2023

City of San Luis Obispo Community Forest Plan

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Cover photo: 60-year-old Indian laurel figs (*Ficus microcarpa*) along Higuera Street, San Luis Obispo.

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List of Acronyms

CAP	Climate Action Plan
CASE	Climate Adaptation and Safety Element
CFP	Community Forest Plan
DCP	Downtown Concept Plan
DEI	Diversity, Equity, and Inclusion
DRG	Davey Resource Group
ECOSLO	The Environmental Center of San Luis Obispo County
GHG	Greenhouse Gas
ISA	International Society of Arboriculture
ISHB	Invasive Shothole Borer
LIDAR	Light Detection and Ranging
MPCP	Mission Plaza Concept Plan
NAIP	National Agriculture Imagery Program
OA	Organizational Assessment
SFR	Single-Family Residential
SLO	San Luis Obispo
SOD	Sudden Oak Death
UFEI	Cal Poly SLO Urban Forest Ecosystems Institute
UFS	Urban Forest Services
USDA	United States Department of Agriculture
WCA	West Coast Arborists
WUI	Wildland-Urban Interface

Note: A list of acronyms specific to the Implementation Matrix is provided in Section X.



Figure 3. Rotary de Tolosa volunteer tree planting event, South Hills Natural Reserve, 2023.

I. Vision and Mission Statements

A. Vision

The City of San Luis Obispo is a community identified and shaded by a diverse, resilient, thriving urban forest. Relying on the Community Forest Plan, the City actively encourages participation in tree planting and stewardship, preserves and protects trees, and promotes public safety and tree health.

The Plan helps the City implement cost-effective enhancement and maintenance of the urban forest, increases public awareness of the value of our community forest, and maximizes its social, economic, and environmental benefits for current residents and future generations.

B. Mission

The mission of the City of San Luis Obispo Community Forest Plan (CFP) is to achieve the stated Vision by working with and empowering city residents and partners to establish innovative, science-grounded goals and strategies to protect, expand, and nurture the City's public tree cover and the associated benefits over the coming decades.



Figure 4. Carrot wood (*Cupaniopsis anacardioides*) trees along Chorro Street, downtown San Luis Obispo.

II. Goals

The goals of the CFP are as follows:

1. Maintain and expand San Luis Obispo’s urban forest to maximize social, economic, and environmental benefits for all, while minimizing undesirable conditions *(Maintain/expand forest)*
2. Adopt a “right tree, right place,” lifecycle-based perspective towards urban trees which includes the planting, care, and end-of-life use of climate-ready trees in locations where they will have the greatest opportunity to thrive *(Sustainability/climate resilience)*
3. Foster a spirit of collaboration between and within City departments that are involved in urban forest management, as well as between the City and other local stakeholders (e.g., community groups, nonprofit organizations, businesses, utilities, other cities, Cal Poly, other State agencies) *(Collaboration)*
4. Educate and seek the involvement of City residents and visitors, including underserved/underrepresented groups, in order to obtain their interest and participation in creation of a thriving urban forest. *(Outreach/equity)*



Figure 5. A West Coast Arborists crew prunes Brisbane box trees (*Lophostemon confertus*) along Palm Street in downtown San Luis Obispo, July 2022.

III. Summary of Key Findings

This Community Forest Plan (CFP) and the additional background information provided in Appendix A are based on the results of research conducted in 2021 and 2022 regarding the state of San Luis Obispo’s publicly owned urban forest – primarily street and park trees, as well as those located at City facilities. City open space and creek corridor trees are also covered by the plan. The projected lifespan of the CFP is 2023-2035.

The contents of the CFP are based on extensive review of City of San Luis Obispo documents, published urban forestry literature, other cities’ forest management plans, and consultant reports and outreach (including a community survey) commissioned by the San Luis Obispo Public Works Department.

Additional sources of information included over a dozen interviews with knowledgeable urban forestry stakeholders, and ongoing interdepartmental collaboration primarily between the Public Works Department and the Office of Sustainability & Natural Resources.

Key plan recommendations for improving the health and strength of the urban forest, and thus the well-being of City residents and visitors, include the following:

- Update and maintain the City’s inventory of street, park, and City facilities trees
- Continue to use contract services for tree pruning and move toward a proactive, 5-to-6-year maintenance cycle (refer to Figure 6)
- Update the City Street Tree List to focus on species that are both appropriate for urban uses and climate-resilient
- Create a City tree planting and care plan and a City urban wood lifecycle plan which, although citywide, devote considerable attention to downtown’s high-profile urban forest trees

SLO’s Urban Forest – Fast Facts (2023)

Number of City-owned street, park, and facilities trees: 12,455¹

Percent of public street, park, and City facilities trees in “good” condition: 90.4¹

Total value of street, park, and City facilities trees: over \$39 million¹

Total number of trees citywide (public & private) within the urban boundary (excludes City open space): 48,710²

Number of tree species citywide: At least 221²

Estimated percent canopy cover, citywide (2012): 13.2³

“Reasonable baseline” percent canopy cover for a dry western city: 15⁴

Sources:

¹ West Coast Arborists, 2022

² UFEI, no date

³ Nessen, 2012

⁴ American Forests, 2017

- Strengthen social and environmental equity by assessing and working to enhance tree cover in disadvantaged neighborhoods
- Reexamine compensatory planting requirements related to development-related tree removals; any changes made may ultimately impact the role, responsibilities, and authority of the Tree Committee (please refer to Appendix A, Section D)
- After tree removals on private property, require follow-up monitoring by City staff to ensure that replanting took place as required
- Require City arborist review of all development plans
- Implement a comprehensive urban forest database management system that allows for multiple administrative functions and facilitates internal/external partner access to the inventory for updating purposes
- Restart the Commemorative Grove program as resources become available
- Expand engagement with key stakeholders and the community.

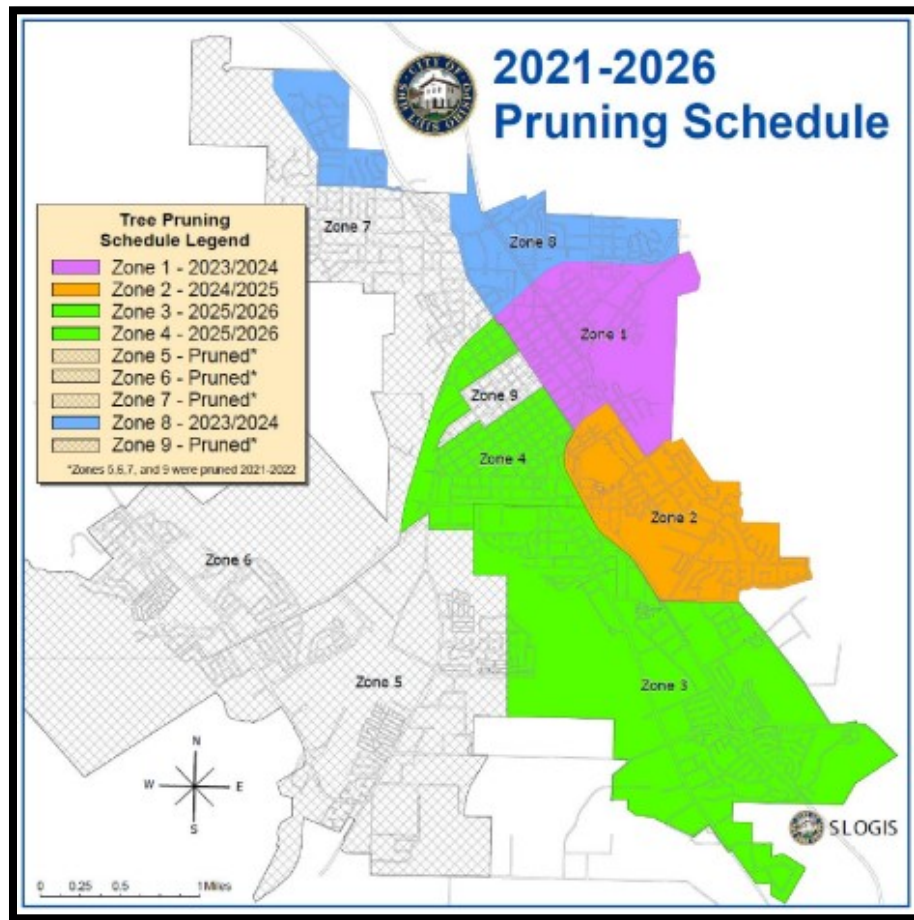


Figure 6. The City's 2021-2026 Tree Pruning Schedule by Zone (Pavement Area). Source: City of San Luis Obispo Public Works Department.

IV. Introduction

Urban forests provide a myriad of social, economic, and environmental benefits to a city’s residents, visitors, and business owners (Nowak, 2016; Janowiak et al., 2021; see Figure 7). Urban trees and landscaping beautify our cities (Schroeder, 1989), cool our buildings through shading and evapotranspiration (Ko, 2018), and create wildlife habitat (Strohbach et al., 2013). They support public health and safety by cleaning our air (Nowak et al., 2006), reducing flooding, erosion, noise, and wind (Livesley et al., 2016), and fighting climate change through the storage of greenhouse gases (GHGs) in the form of wood (Nowak and Crane, 2002).

Trees also calm traffic, increasing motorist and pedestrian safety (Dumbaugh and Gattis, 2005), extend pavement life (Burden, 2006), enhance property value and increase business traffic (Staats and Swain, 2020), increase happiness and social interaction (Kwon et al., 2021), and reduce crime (Schertz et al., 2021). Their presence encourages us to engage in outdoor recreation, strengthening our physical and mental health (Pretty et al., 2005). Some trees warrant special treatment, such as heritage tree designation, because they have outstanding traits or significant cultural value (Jim, 2017).

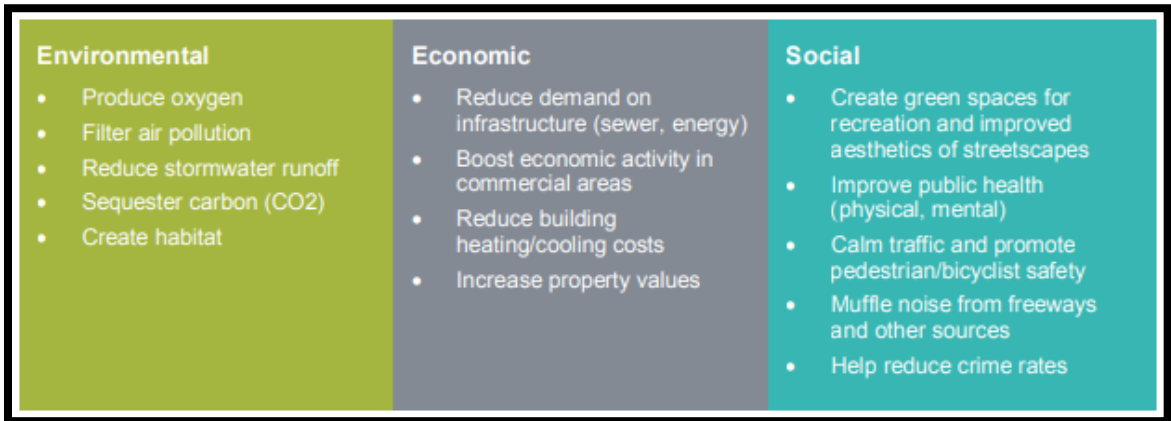


Figure 7. A partial list of the benefits provided by urban trees. Source: AECOM, 2013.

These benefits are worth billions of dollars annually to the 83 percent of Americans who live in urban areas (University of Michigan Center for Sustainable Studies, 2021). Trees are a good investment as well – in California, every dollar put into street tree planting and care returns nearly \$6 to its community in ecosystem services and increased property values (McPherson et al., 2016). Yet despite growing recognition of the value created by urban forests, the United States is losing many tens of millions of trees per year due to development, pests and disease, wildfire, and extreme weather (Nowak and Greenfield, 2018; USDA Forest Service Region 5, 2023).

San Luis Obispo’s urban forest is not immune to this trend. For instance, destructive, non-native insects and disease that have wreaked havoc elsewhere in California are approaching our county from both north and south, and the record-setting winter storms of 2022-2023 resulted in notable tree losses across San Luis Obispo County. Furthermore, until recently the City’s roughly 12,500 public street, park, and facilities trees suffered from a multi-year backlog of deferred maintenance due to staff injuries, retirements, and the effects of the Covid-19 pandemic.

San Luis Obispo residents and officials have long supported efforts to maintain and expand the city’s urban forest. The City is a 39-year participant in the Arbor Day Foundation’s “Tree City USA” program (Arbor Day Foundation, 2022; Figure 8). Additionally, in adopting the 2020 and 2022 climate action plans (CAPs) and recognizing urban forest stewardship as part of San Luis Obispo’s 2021-23 Major City Goals, the City Council has endorsed revitalizing tree operations and maintenance as well as the planting of 10,000 new trees within the city by 2035 (the 10 Tall Initiative). This Community Forest Plan is intended to work together with the City’s general plan, municipal code, CAPs, and other guiding documents to support City efforts to become carbon-neutral by 2035 and to adapt to the disruptive effects of a rapidly changing climate.

San Luis Obispo’s publicly owned urban forest contributes greatly to “the SLO life” and the high quality of life enjoyed by residents and visitors alike. By highlighting the valuable benefits provided by the City’s urban trees, acknowledging the challenges faced in their care, and striving to include the public in adaptive management-based forest planning and activities, it is hoped that this plan and its future iterations will contribute to enhanced community health and well-being in San Luis Obispo for many years to come.



Figure 8. The City of San Luis Obispo has been a Tree City USA participant since 1983.

V. Historical Context

Due to its geographic location and climate, the San Luis Obispo area has historically had relatively little native tree cover. However, the planting of many thousands of non-native trees in the city over the past two centuries has resulted in the area now having far more trees and species diversity than at any previous time in human history (Seymour, 1986, p. 50).

The Chumash people who occupied what is now the city of San Luis Obispo for over 10,000 years likely lived in a landscape dominated by grassland and chaparral with patchy woodlands of coast live oak, California bay laurel, toyon, and perhaps a dozen other tree species. Watercourses were dominated by riparian species such as California sycamore, black and Fremont cottonwood, and arroyo willow.

The era of Euroamerican settlement and urbanization in the San Luis Obispo area began over 250 years ago with the establishment of Mission San Luis Obispo de Tolosa in 1772 (Figure 9). The arrival of the missionaries saw the beginning of landscape conversion to agricultural and eventually urban uses. Up to half of the area’s native tree cover may have been lost fairly quickly, as there was a continuous need for building lumber as well as heating and cooking fuel (Carotenuti, 2006).



Figure 9. Excerpt from an 1874 map of San Luis Obispo. The Mission is seen in the center between Broad and Chorro Streets (“11. Catholic Church”), with the Mission orchard and grounds to the north and northwest, respectively. Source: History Center of San Luis Obispo archives.

With the establishment of the Mission, the missionaries began to grow food crops including olive, fig, pear, grape, and prickly pear cactus, as well as grains and vegetables. Olive oil and wine were needed for use in religious ceremonies. In the mid-1830s California's missions were secularized by the Mexican government. Despite the resulting changes experienced by the residents, Mission San Luis Obispo never ceased being an active church and never fell to complete ruin as did some of the other missions (Engelhardt, 1933; Carotenuti and Olson, 2004).

By the post-Civil War era, tree planting and creation of park-like landscapes had begun to capture the fancy of the American public. In San Luis Obispo, local newspapers sang the praises of urban trees in their pages and lamented the general citywide lack of them, citing their beauty, their value as sources of "relief and coolness," and their usefulness as sources of lumber, food, and medicinal products (e.g., eucalyptus oil).

In fact, the area briefly went through a timber speculation craze when blue gum eucalyptus was planted widely in anticipation of a lumber shortage in California (e.g., *San Luis Obispo (Weekly) Tribune*, November 2, 1872, p. 2). Unfortunately for the state's prospective timber barons, blue gum makes a poor building material due to its tendency to split and warp while drying and the predicted boom fizzled.

Over the years, hundreds of non-native tree and plant varieties from across the globe were brought to San Luis Obispo. One notable example is the two rows of camphor trees (*Cinnamomum camphora*) along Mill Street between Pepper Street and Johnson Avenue, which were planted in 1912 by D.J. Riley of Riley's Department Store (Zeuschner, 1989). The surviving trees are now 110 years old, make the block uniquely beautiful, and indeed define the Mill Street Historic District (Figure 10).



Figure 10. Mill Street Historic District.

Yet despite sporadic efforts to plant trees throughout the city, San Luis Obispo remained largely depauperate of greenery for decades (Figures 11 and 12), to the extent that new residents and visitors passing through found it worthy of comment (Fairbanks, 1989). Historical photographs of downtown San Luis Obispo taken prior to the 1960s show an urban setting that looks utterly desolate in comparison to its current verdant state (Middlecamp, 2021 Sep. 11).

Starting in the late 1950s, a beautification program initiated by City Councilman R.L. Graves and City Engineer (later Mayor) Dave Romero led to the green downtown we are familiar with today (Carotenuti, 2006; Middlecamp, 2021 Oct. 9). About a decade later the segment of Monterey Street in front of the Mission was torn out and the area was converted into a car-free pedestrian square, creating today's Mission Plaza. Beautifying the plaza with landscaping was a high priority for the City, which moved mature trees from elsewhere in the city to the Plaza, including two old olive trees that had once been part of the Mission's olive grove.



Figure 11. Looking east on Higuera Street at Garden Street, 1963. Source: Middlecamp, 2021 Sep. 11.

The City became an Arbor Day Foundation “Tree City USA” in 1983 and revived its Heritage Tree program several years later. Currently, 15 properties within the city host one or more designated (historically or otherwise significant) Heritage Trees (Andrews, no date; see Appendix B). Perhaps the highest-profile Heritage Tree in San Luis Obispo at present is the “Moon Tree,” a coast redwood that was planted as a sapling near Mission Plaza for the national

Bicentennial Celebration in 1976, five years after having visited the moon as a seed aboard Apollo 14 (Sheeler, 2018).

In 1989 the City's Commemorative Grove was established at Laguna Lake Park. Nine commemorative trees and 38 windbreak trees were planted for the occasion, with many more trees having been planted over the intervening years (City of San Luis Obispo, 2022a).

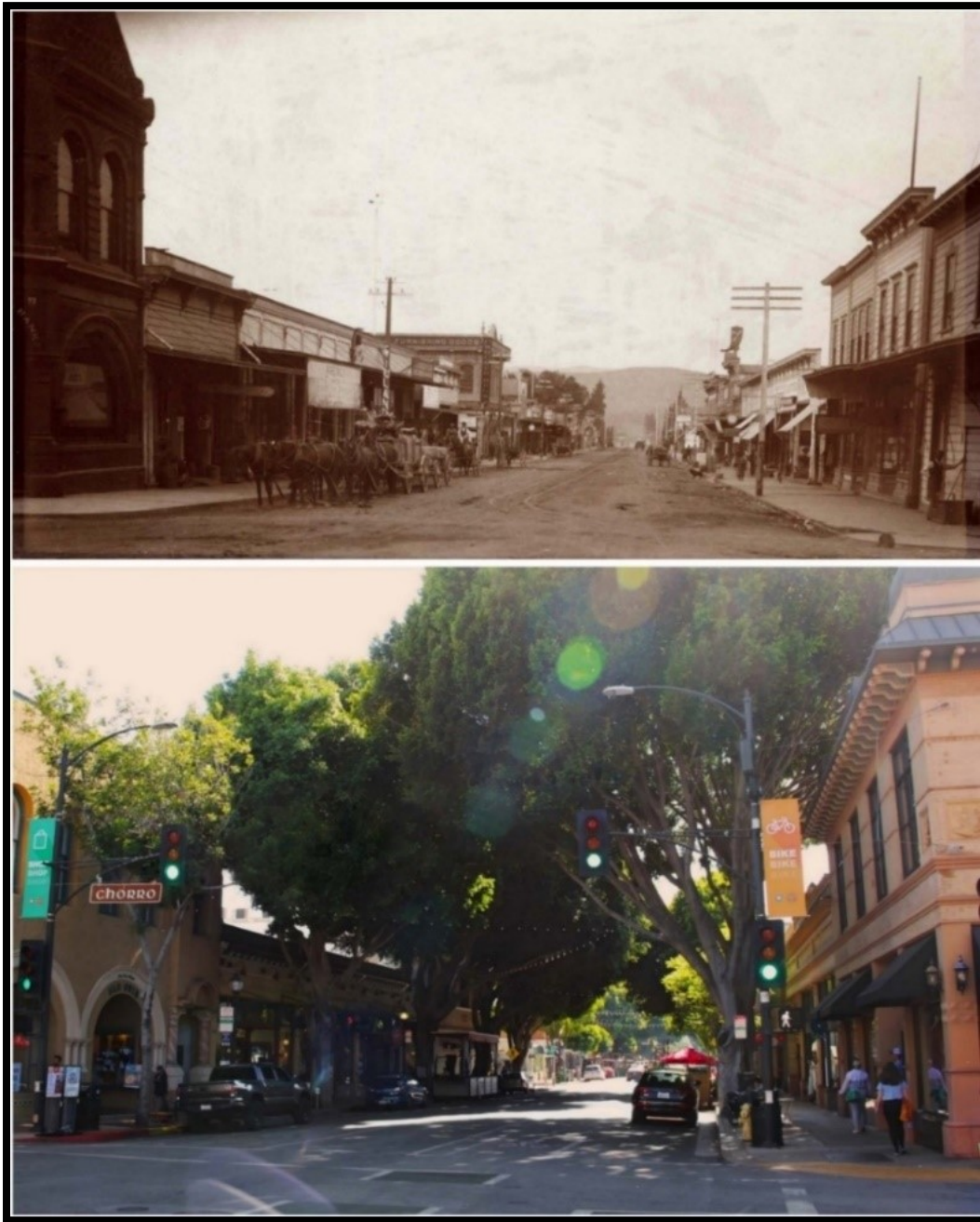


Figure 12. "Higuera Street then and now." Photo dates unknown. Source: Davey Resource Group, 2021.

VI. Relationship to Other City Documents

This Community Forest Plan supports and is supported by existing City of San Luis Obispo goals, regulations, and policies as set forth in the City’s general plan, municipal code, Major City Goals for 2021-2023, climate action plans, and other applicable plans, specifications, and standards. The CFP is also informed by the Davey Resource Group Organizational Assessment Report (2021) and the West Coast Arborists Urban Tree Inventory Update (2022).

A. General Plan

The **Land Use Element (2014)**, in its Sustainability policies, calls on the City to develop a long-term tree planting program and recommendations to renew and maintain the urban forest; the latter includes planting more trees.

The **Conservation and Open Space Element (2006)** addresses various facets of the urban forest in its policies relating to Materials, Natural Communities, and Views. The element specifically mentions fostering the reuse and recycling of lumber from removed trees; protecting “significant” trees (including Heritage Trees) and oak woodlands; and creating and maintaining “desired streetscape characteristics” through the planting and retention of trees, with an emphasis on California native species.

The **Parks and Recreation Plan and General Plan Element Update (2021)**, also known as the *Parks + Recreation Blueprint for the Future: 2021-2041*, calls for shading of play areas in part through the use of trees, and devotes a section to the selection of appropriate park trees.

The **Climate Adaptation and Safety Element Update (CASE; 2023)** combines two State-required general plan elements: Safety and Environmental Justice. The element addresses individual natural hazards such as wildfire, flooding, and extreme heat (and related urban forest concerns) in the overall contexts of climate resilience and diversity, equity, and inclusion (DEI). The **San Luis Obispo County Multi-Jurisdiction Hazard Mitigation Plan** is incorporated by reference into the CASE.

B. Municipal Code

The San Luis Obispo Municipal Code, **Chapter 12.24 – Tree Regulations**, establishes policies, regulations, and specifications pertaining to installation, maintenance, and preservation of trees within the city. Topics include the City Tree Committee, street tree master lists and management, tree removal, tree protection, heritage trees, enforcement, and appeals, among others.



Figure 13. A West Coast Arborists crew trims a London plane tree (*Platanus × hispanica*) in front of the San Luis Obispo Repertory Theatre, August 2022.

C. 2021-23 Financial Plan

In its **Major City Goals** for the 2021-2023 Financial Plan period, the San Luis Obispo City Council included the following direction:

- The City will engage in projects and initiatives favoring accrual of the many benefits provided by trees, including shading and cooling, beautification, habitat, stormwater retention, and carbon sequestration;
- The City should focus renewed efforts on completing several urban forest-related tasks that will contribute to the adoption of an integrated, holistic, and equitable approach to urban forestry.

D. Climate Action Plans

The 2020 **Climate Action Plan for Community Recovery** (2020 CAP; City of San Luis Obispo, 2023a), under “Pillar 6: Natural Solutions,” called for increased carbon sequestration in the City’s greenbelt and urban forest as an important component of the City’s path to carbon neutrality by 2035. The 2020 CAP included the foundational action Natural Solutions 2.1, which directs staff to “Prepare the City’s first Urban Forest Master Plan by 2021 and plant and maintain 10,000 new trees by 2035.” Detailed implementation recommendations for this action include updating the tree inventory, identifying future tree planting opportunities with climate-ready species, and identifying strategies for ongoing operations and maintenance.

The 2022 CAP update – **Climate Action Plan Volume 3: 2023-27 Work Program** (City of San Luis Obispo, 2023a) – was adopted by the City Council in November 2022. This update continues and expands the strategies previously identified in the 2020 CAP and includes the FY 2023-25 work program task Natural Solutions 2.1A, directing staff to “Adopt and implement the Community Forest Plan and make significant progress on the 10 Tall goal of planting and maintaining 10,000 new trees by 2035.”

E. Other Planning Documents

Urban forest-related matters are further addressed in the following City documents:

- **Conservation Guidelines for Open Space Lands (2002)** and various **Open Space Conservation Plans**
- **Waterway Management Plan (2003)**
- **Community Design Guidelines (2010)**
- **Public Engagement and Noticing Manual (2015)**
- **Downtown Concept Plan (2017)** (see Figure 14)
- **Mission Plaza Concept Plan (2017)**



Figure 14. The City's Downtown Concept Plan visualizes Downtown SLO as a verdant, highly walkable destination. Source: City of San Luis Obispo Community Development Department, 2017.

F. Urban Forest Services Organizational Assessment and Tree Inventory Update

This Community Forest Plan is in part informed by an Urban Forest Organizational Assessment Report (OA) prepared by Davey Resource Group (DRG; 2021) and an Urban Tree Inventory Update completed by West Coast Arborists (WCA; 2022). These efforts were commissioned by the City's Public Works Department to help address some of the same urban forestry challenges that have been experienced by cities nationwide in recent years: declining tree age and species diversity, undesirable effects of climate change (drought-induced water stress, increased susceptibility to pest and disease attack, damage from extreme weather events), and reduced staffing levels resulting in a significant backlog of deferred maintenance.

DRG's OA summary report contains extensive information and recommendations, including the results of stakeholder interviews and a month-long community survey, that informed the writing of this Community Forest Plan. WCA's updated public tree inventory provides a foundation on which annual work plans and budgets, and thus an effective tree care program, can be based.

Certain OA recommendations (e.g., inventory update, expedited contractor pruning, hiring of a City volunteer coordinator) have already been implemented, and the WCA inventory update was successfully completed in 2022. Both documents are available to the public on the City's Trees and Urban Forestry webpage at <https://www.slocity.org/living/natural-resources/trees-and-urban-forestry>.

VII. Sustainability

Sustainability is commonly defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). As awareness of global climate change, increasing pollution, and other environmental issues has entered the general consciousness in recent years, the importance of urban forestry has begun to receive more attention from the public.

Tree planting has increasingly come to the fore as a “low-hanging fruit” climate change solution (Mandel, 2021). In many locales, planting sites are numerous and trees and volunteer labor are readily available. The number of tree planting initiatives sponsored by government agencies, corporations, and other entities has dramatically increased since the beginning of the 21st century. However, planting in the wrong location, planting species that may not be able to withstand the local effects of climate change, or failing to provide adequate care to young trees until they establish can diminish or negate the desired outcomes. Thus, planning ahead is essential to avoid undesirable results.

The preparation of this Community Forest Plan involved extensive research and discussion around multiple aspects of sustainability, including the following topics. Please refer to Appendix A, Section E for additional discussion on each of these.

- **The “Right Tree, Right Place” Philosophy.** A thriving, productive urban forest contains a mix of species and individual trees that are appropriate for the physical location and environmental conditions in which they were planted. Urban trees experience more challenging conditions than trees in natural environments, have shorter lifespans (averaging 19 to 40 years; Roman and Scatena, 2011), and require regular maintenance with associated costs. Like other cities in California, San Luis Obispo has begun to reevaluate its approved tree species lists for improved resilience in the face of climate change (see “Climate Readiness” below).
- **Climate Readiness.** Climate readiness refers to the resilience of an urban forest to environmental stressors caused or amplified by the effects of global climate change (McPherson et al., 2018). Climate change has been predicted to inflict increasing heat, drought, wildfire, and extreme weather events on California in the coming years, along with secondary effects including increased urban tree exposure to insect and disease attack. The San Luis Obispo Public Works Department and City Tree Committee have recently worked with Cal Poly San Luis Obispo’s Urban Forest Ecosystem Institute (UFEI) to revise the City’s Street Tree List, emphasizing climate-resilient trees and eliminating types no longer considered appropriate for projected hotter and drier climatic conditions.

- Urban Forest Diversity.** Diversity is a core ecological concept that refers to the variety and relative abundance of a species (Magurran, 1988). High species diversity, age diversity, and geographic distribution are believed to lead to greater overall ecosystem resilience. Although urban forests in the United States – including San Luis Obispo’s – typically have far higher species diversity than adjacent native forests or woodlands (Robertson and Mason, 2016), 80 percent of inventoried communities in California were identified as being over-reliant on a single species of street tree, typically either London plane, sweetgum, Chinese pistache, velvet ash, or Callery pear (McPherson et al., 2016). When one of these trees dies or is removed, it may be wise to consider replacing it with a different type to enhance both diversity and climate resilience of the urban forest.
- Pests and Disease.** With each passing decade the number of non-native, invasive pests and diseases in California increases through commercial activity or other means of transportation from distant areas, over time resulting in significant economic damage and mortality to crops, wildlands, and urban plants and trees. Furthermore, the effects of climate change actively contribute to the spread of invasive species (Finch et al., 2021). San Luis Obispo County has been living with one such invasion since at least the early 1990s – *Fusarium circinatum*, a.k.a. Monterey pine pitch canker – which has caused enormous morbidity and mortality of pines. Numerous additional threats including sudden oak death (SOD) and invasive shothole borer/fusarium dieback (ISHB/FD; Figure 15) are either confirmed to be or are potentially headed towards SLO County from both north and south. Thus, monitoring and early detection are essential. The City should work with its partners to keep up with the latest information and best practices, and must be ready to respond to fast-breaking situations using an “early detection, rapid response” mantra.
- Adoption of a Lifecycle Perspective.** The United States generates 46 million tons of urban lumber annually (Nowak et al., 2019). This potential job- and income-producing resource is worth anywhere from \$89 million to \$786 million, yet it is largely wasted. The material is commonly chipped, burned, cut into firewood, or buried in a landfill. In



Figure 15. Invasive shothole borer-infested tree in southern California. Source: Nobua-Behrmann, 2018.

each case, the carbon stored in the wood returns to the atmosphere, exacerbating the effects of global climate change. This Community Forest Plan includes a recommendation for the City of San Luis Obispo to develop and implement an urban wood lifecycle plan, which would require consideration of end-of-life use in addition to other desired characteristics when choosing tree species to plant. The lifecycle plan would also include a replacement program based on planned rotation (replacement age; probably 20-30 years) and “right tree, right place” principles. The lumber retrieved could be used in a variety of ways, including for handcrafted furniture, benches, sheds, cabins, flooring, paneling (see Buffalo, 2016), or as public art. Additional uses for urban lumber include cogeneration (energy production from waste biomass), biochar (Hawken, 2017, pp. 64-65), feedstock for engineered woods, landscape mulch, soil conditioner, animal bedding, compost additive, sewage sludge bulking medium, and boiler fuel (CalRecycle, 2022c).

- **Soil Enhancement and Stormwater Management.** Street trees often exist in harsh urban environments with large amounts of impervious surface, lack of growing space, poor soil and drainage conditions, and high exposure to pollutants. These conditions can significantly limit tree health and lifespan (Lawrence et al., 2012). The City could consider piloting or continuing the use of new technologies developed for the dual applications of stormwater infiltration/water quality improvement and urban tree growth enhancement. These products are designed to improve infiltration and remove soluble pollutants while facilitating the growth of larger trees than would otherwise be possible in confined urban settings, without damaging sidewalks, streets, or utilities. The City is also subject to a 2022-2026 compost procurement target of 3,685 tons per year (CalRecycle, 2022b) under California’s Short-Lived Climate Pollutant Reduction law (SB 1383). This material could potentially be used in City tree planting and care if various concerns, including plastic contamination, can be addressed.
- **Public Safety.** Both the City’s 2023 General Plan Climate Adaptation and Safety Element (CASE; City of San Luis Obispo, 2023b) and San Luis Obispo County’s 2019 Multi-Jurisdiction Local Hazard Mitigation Plan (LHMP; County of San Luis Obispo, 2019) address potential hazards to public health and safety that may relate to San Luis Obispo’s urban forest; specifically, these include wildland fire, adverse weather, flooding, and tree mortality resulting from drought stress and pathogen attack. The Community Forest Plan recommends that the City continue to work with CalFire, SLO County, and other City partners to identify and proactively work to reduce these hazards.
- **Water Conservation.** Despite the record-setting rainfall seen across California in early 2023, the overall trend towards increasing unreliability of winter rains in central California means that water conservation will necessarily continue to be an important

part of the conversation around San Luis Obispo’s urban forest. New policies, practices, and technologies – as well as increased reliance on existing ones – are needed going forward. Substantial and as yet unrealized water savings are possible in California through more stringent water conservation, recycling, and stormwater capture efforts (Gleick et al., 2014). The City currently uses tree watering bags and recycled water (indicated by purple signs and piping) for irrigation of street and park trees (City of San Luis Obispo, 2022b), and has piloted the use of water-retaining hydrogels in new plantings. The Community Forest Plan makes several recommendations around water conservation; please refer to Table 5, Implementation Matrix.

- **Sustainability Indicators.** Sustainability indicators are an urban forestry analysis tool described by Clark et al. (1997). The tool uses specific criteria that can be used in conjunction with measurable indicators to evaluate current urban forest conditions and therefore identify areas in need of improvement. The Davey Resource Group Organizational Assessment (OA) report provides a sustainability indicators analysis for San Luis Obispo’s urban forest as of 2021. Going forward, the City’s Urban Forest Services program may choose to use this tool to assess, evaluate, and indicate performance levels. Please refer to Appendix A, Section A.5, and the OA report for additional discussion.



Figure 16. Cork Oak (*Quercus suber*), Lincoln Street – a City Heritage Tree.

VIII. Public Engagement and Outreach

San Luis Obispo has worked with a variety of external partners to maintain and expand its urban forest for many years now, and the potential exists for additional partnerships in the future (Table 1). These relationships are essential for increasing awareness of the value of our urban tree cover and promoting public interest and participation. Volunteers bring their energy and enthusiasm to both tree planting and the long-term care that is necessary for young trees to establish and grow. In 2023, the City created a new Volunteer Coordinator position that will work across all departments to facilitate and increase volunteer involvement.

Table 1. Selected Existing and Potential City Urban Forest Partners.

California Conservation Corps
California Department of Transportation (CalTrans), District 5
California Polytechnic State University, San Luis Obispo (Cal Poly)
Downtown SLO (Downtown Foresters program)
The Environmental Center of San Luis Obispo County (ECOSLO)
Northern Chumash Tribal Council (NCTC)
One Cool Earth
Pacific Gas & Electric (PG&E)
Rotary de Tolosa Service Club
San Luis Coastal Unified School District
San Luis Obispo County Fire Safe Council
yak tit'yu tit'yu yak tihini Northern Chumash (ytt)

Several types of outreach helped inform this Community Forest Plan. Over a dozen stakeholder interviews were conducted, some by Davey Resource Group (DRG) in the preparation of their Urban Forest Organizational Assessment Report, and some by a Cal Poly San Luis Obispo graduate student working on a Master’s in City & Regional Planning degree. Davey also conducted an urban forestry community survey for the City. This online survey received 644 responses, a relatively high response rate for this type of outreach.

In addition, the Office of Sustainability & Natural Resources held three technical stakeholder meetings (“Natural Solutions forums”) as part of its climate action planning outreach in 2022 (Figure 17). Finally, preparation of the CFP has also benefited from continued collaboration between the City Public Works Department, the Office of Sustainability & Natural Resources, and the City Tree Committee throughout the 2022-23 period.

Davey Resource Group Benchmark Community Survey

In September and October 2021, DRG conducted a Benchmark Community Survey as an initial assessment of the community’s interest in, and vision for, San Luis Obispo’s urban forest. The

online survey was widely advertised by the City through a press release, social media advertisements, Tree Committee and City Council meetings, and signage at City parks and open space trailheads. 644 responses were obtained. The complete survey and responses are available as part of the DRG Organizational Assessment report on the City's Trees and Urban Forestry webpage.



Figure 17. Climate Action Plan Natural Solutions Forum in Mission Plaza. Source: City of San Luis Obispo Office of Sustainability & Natural Resources, 2022.

The survey's nine questions covered topics that included the most important benefits provided by urban trees (further split out into environmental and socioeconomic benefits), most important planting locations, how to encourage planting on private property, and community awareness of and satisfaction with the City's Urban Forest Services (UFS) Program. Respondents were also encouraged to expand on their answers and offer thoughts and suggestions at the end if they desired.

According to survey respondents, the top five benefits of San Luis Obispo's urban trees are shading/cooling, beautification, wildlife habitat, improved air quality, and connection with nature (Figure 18). Additional high-level takeaways from the survey included the following:

- Top three most important places to plant trees: residential streets, parks, open space

- Top three best ways to encourage tree planting on private property: free or low-cost trees, water bill rebate, rebate on purchased tree
- Awareness of the UFS Program: 75 percent
- Level of satisfaction with UFS: somewhat satisfied, 38 percent; neutral/no opinion, 32 percent
- Equality of access to UFS services: unsure, 63 percent; not equal, 20 percent; equal, 16 percent.

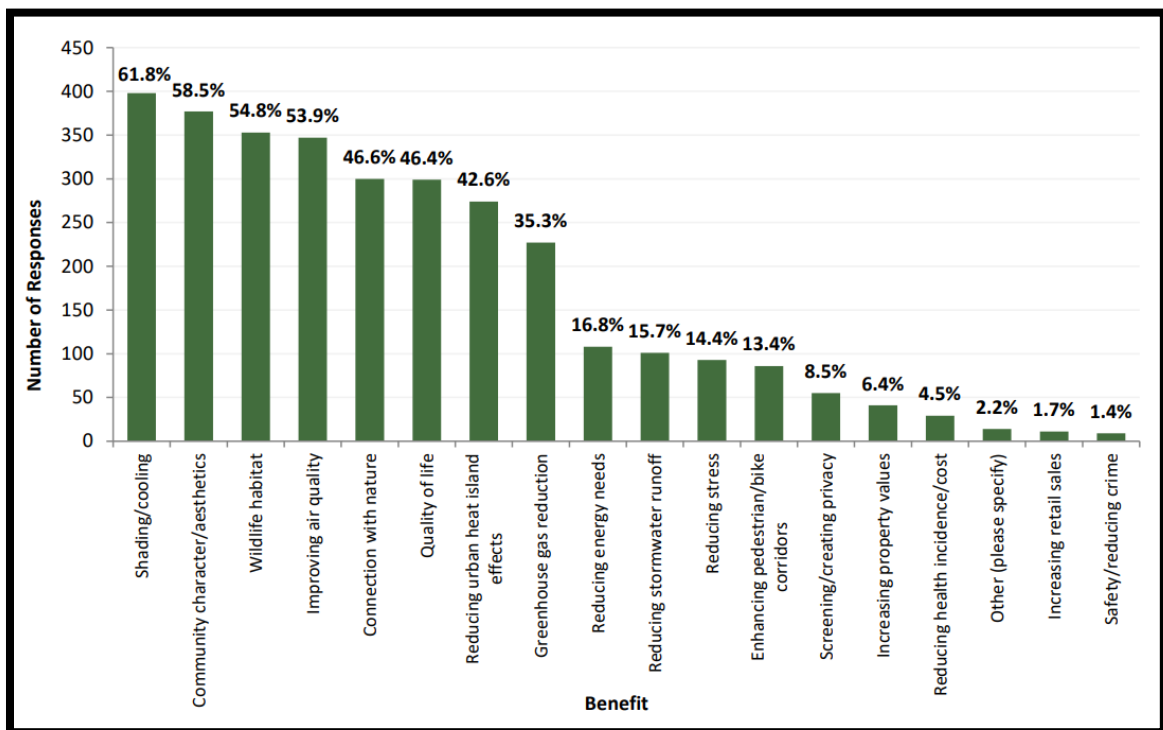


Figure 18. San Luis Obispo community member opinions on the most important benefits of trees. Source: Davey Resource Group, 2021.

Respondents also expressed interest in receiving more tree education and outreach from the City. The most common requests pertained to information about which trees to plant in San Luis Obispo, how often to water during drought conditions, and how to plant a tree.

Overall, survey respondents, CFP interviewees, and others consulted during the preparation of the CFP provided many suggestions for outreach around the City’s urban forest. Any outreach actions chosen for implementation will be conducted in accordance with the City’s Public Engagement and Noticing Manual. For a full listing of proposed outreach actions, please refer to Objective 7.0 in Table 5, Implementation Matrix.

IX. Equity

Urban neighborhoods throughout the United States that historically experienced systematic discrimination commonly lack adequate tree cover and other landscaping (Locke et al., 2021). As a result, residents of these areas are deprived of access to the many benefits associated with urban trees (e.g., shading and cooling; see Wilson, 2020) and experience disproportionately poor public health and safety outcomes as compared to individuals in wealthier neighborhoods. Furthermore, disadvantaged populations have the greatest vulnerability to the increasingly severe effects of climate change, such as extreme heat, drought, wildfire, and flooding (Islam and Winkel, 2017).

As stated in the City of San Luis Obispo's 2023 Climate Adaptation and Safety Element (CASE), "The City is committed to integrating diversity, equity, and inclusion (DEI) in its operations and delivery of community services. The intersection of equity, environmental justice, and public safety is particularly important as the impacts of climate change will inequitably affect vulnerable and disadvantaged communities." DEI is both a Major City Goal in the 2021-2023 Financial Plan and an important component of the City's climate action and other plans.

Davey Resource Group addressed equity in their 2021 Urban Forestry Organizational Assessment Report for the City Public Works Department, which contained the following recommendations:

- Conduct an assessment to explore the distribution of public tree canopy and associated benefits by neighborhood, census tract, and/or other geographic metrics (refer to CASE Section C.2, Equity and Environmental Justice, for additional information on this topic)
- Coordinate with the City's Diversity, Equity, and Inclusion Task Force to identify gaps in equity as regards urban forest access and benefits
- Develop equity strategies around the urban forest.

Please refer to Table 5, Implementation Matrix, for proposed actions regarding equity, and refer to Appendix A, Section H for additional discussion on this topic.

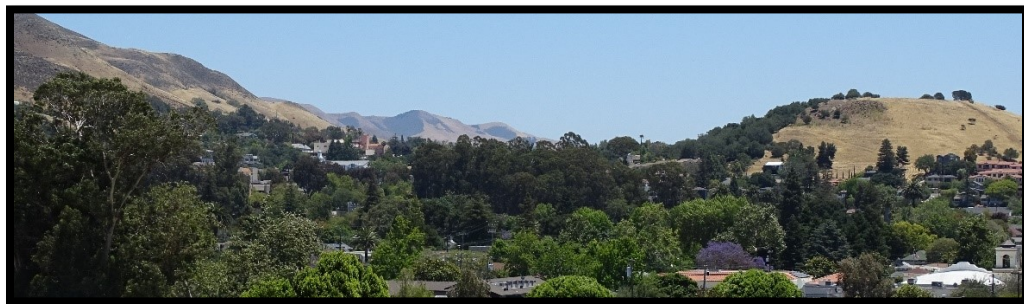


Figure 19. The Santa Lucia Range and Terrace Hill frame SLO's urban forest.

X. Implementation

The Implementation section summarizes proposed urban forest goals, objectives, and actions to be carried out by the City and its external partners. A full list of actions organized by objective is included in Table 5, the Community Forest Plan Implementation Matrix. All activities are intended to be informed by the CFP’s vision, mission, and goals.

This section also includes discussion on data collection, downtown’s urban forest, and the City’s plan to plant 10,000 new trees by 2035. Please refer to Appendix A for additional background information on these topics.

A. Goals and Objectives

The goals of the Community Forest Plan can be summarized as follows, while its objectives and the associated goals for each are shown in Table 2:

1. *Maintain and expand the urban forest*
2. *Promote sustainability and climate resilience*
3. *Pursue internal and external collaboration*
4. *Perform public outreach and emphasize equity*

Table 2. Community Forest Plan Objectives.

Plan Objective	Associated Goal
Objective 1.0: Accrue and Analyze Data	All
Objective 2.0: Strengthen Maintenance Practices and Clear the Backlog	1
Objective 3.0: Increase New Plantings and Implement the 10 Tall Initiative	All
Objective 4.0: Reexamine Tree Removal and Mitigation Policies	1,3
Objective 5.1: Focus on Sustainability – Climate Resilience	All
Objective 5.2: Focus on Sustainability – Lifecycle Perspective	All
Objective 5.3: Focus on Sustainability – Soil Enhancement and Stormwater Management	1
Objective 5.4: Focus on Sustainability – Safety	1,3,4
Objective 5.5: Focus on Sustainability – Water Conservation	2,4
Objective 6.0: Address Issues Unique to Downtown	All
Objective 7.0: Increase Outreach to Officials and the Public	All
Objective 8.0: Address Equity Issues	3,4

Table 3 lists the City of San Luis Obispo municipal departments and offices that are anticipated to be involved in urban forest planning and management going forward.

Table 3. Involved City Staff, Departments, and Offices.

Administration/Diversity, Equity & Inclusion	DEI
Administration/Economic Development	ECON
Administration/Information Technology	IT
Administration/Sustainability & Natural Resources	SNR
City Arborist	CA
Community Development	CDD
Fire Department	FD
Parks & Recreation	PR
Public Works	PW
Utilities	UT

Note: For implementation actions where more than one City Department is identified (see Table 5, Implementation Matrix), an inter-departmental, team-based approach is envisioned.

B. Targets and Metrics

The purpose of establishing goals and gathering data on the urban forest is to obtain information that is as complete and current as reasonably possible to help inform the City’s planning and budgeting processes. For instance, use of certain species or certain types of planting locations may need to be changed, pruning cycles may need adjustment, or program funding and staffing may undergo modification. Because of the likelihood that adjustments will be needed over time, it will be important for the City to retain flexibility by taking an adaptive management-based approach.

Targets can be thought of as goals or specific desired future conditions to aim for. The City’s 2020 and 2022 climate action plans, under “Pillar 6: Natural Solutions,” identified two targets for San Luis Obispo’s urban forest: plant 10,000 new urban trees in San Luis Obispo by 2035 (the 10 Tall Initiative), and reduce annual greenhouse gas (GHG) emissions by 1,490 metric tons of carbon dioxide equivalent (MTCO₂E) in 2035. Potential urban forest targets that may be chosen by the City in the future are numerous; examples include planting a given number of new trees per time period (e.g., year) or location (e.g., neighborhood); performing maintenance on a certain proportion of City-owned trees within a given time period; or attaining 100 percent stocking (filling) of vacant City tree wells and other spots where trees have been removed.

Metrics are measures of specific characteristics. They can be used to obtain a one-time “snapshot” of current conditions; however, metrics are more useful when measurements are taken on the same trees repeatedly over time, allowing for observation of trends that can guide management actions and confirm whether targets are being attained. Basic examples of urban

forest metrics include average tree diameter, height, and condition; percent survival of newly planted trees at x years (5, 10, 20...); or percent canopy cover (percent ground area, as viewed from above, that is shaded by tree crowns). The City's 2022 tree inventory update, conducted by West Coast Arborists, documented roughly two dozen metrics for each surveyed tree.

Please refer to Appendix A, Section A for additional discussion of targets and metrics.



Figure 20. ECOSLO volunteers planting trees at Throop Park. Source: ECOSLO, 2022.

C. Downtown San Luis Obispo's Trees

San Luis Obispo's central business district would be unrecognizable to most locals without its big, beautiful trees – notably including its iconic, roughly 60-year-old Indian laurel figs (*Ficus microcarpa*; see cover photo). As in other cities across California, downtown's *Ficus* trees were planted during an urban beautification movement in the 1960s based on their reputation as hardy "miracle trees" that could withstand heat, drought, air pollution, and other hardships (Gordon, 1996).

For decades now, these evergreens have provided an ambience that enhances and serves as backdrop for special events, the weekly Downtown Farmer's Market, and everyday shopping, dining, and entertainment opportunities. Their large, shady canopies confer a pleasing "sense of place" that enhances walkability, increases contentment, and encourages us to spend time outdoors. The presence of these trees also raises property values and drives increased retail business traffic.

However, the same trees drop debris; attract birds and insects that can enter businesses; disrupt sidewalks and underground utilities; block views and street signs; and incur ongoing taxpayer expense through their need for expensive maintenance. By the mid-1990s, cities throughout California had either stopped planting *Ficus microcarpa* for these reasons or were actively removing and replacing them, often with palms (Gordon, 1996). Although some cities have opted to play the waiting game by performing root trimming, installing underground root barriers, and replacing sidewalks with stone pavers around the trees, the overall feeling on the part of arboricultural professionals is that this is a case of “wrong tree, wrong place” – that many *Ficus* trees in downtown have simply gotten too big for their surroundings.

As the number of *Ficus* and other large, 1960s-era trees in downtown San Luis Obispo dwindles through attrition, the City may consider implementing a replacement program based on planned rotation and “right tree, right place” principles. The most likely plan is for a regular 20- to 30-year replacement cycle to be established. Some trees of the same species, including *Ficus microcarpa*, may be replanted but they will not again be allowed to attain such enormous size in cramped sidewalk spaces. Other species that were planted in the past but do not particularly thrive in the San Luis Obispo area may be used less or not at all. The hope is that the downtown San Luis Obispo of the future will have a more diverse, mixed-age and mixed-species tree palette containing a preponderance of species that, while still beautiful and inspiring, will be more appropriate for their surroundings.



Figure 21. ECOSLO volunteers with a newly planted oak sapling. Source: ECOSLO, 2023.

D. 10 Tall: An Initiative to Plant 10,000 Trees by 2035

In 2019, local stakeholders created the 10 Tall tree planting initiative to raise awareness of the benefits of urban trees and expand the city’s urban forest. 10 Tall is a City campaign nested in the 2020 CAP, Pillar Six: Natural Solutions. 10 Tall continued to be a priority area of focus in the City’s 2022 CAP update (CAP Volume 3, the 2023-2027 Work Program).

City staff anticipate that a large proportion (perhaps 40 percent) of the 10,000 trees proposed for planting will be native species that will be planted in City open space areas and creek corridors. Many of these will be planted by volunteer groups in coordination with the City’s external partners.

A rough estimate of the allocation of tree planting responsibilities under the 10 Tall Initiative between 2020 and 2035 is shown in Table 4.

Table 4. Estimated allocation of tree planting responsibilities for the 10 Tall Initiative.

Responsible Party(ies)	Number of Trees Allocated (Estimate)
City of SLO (Streets, Parks, Open Space, Riparian Areas)	
<ul style="list-style-type: none"> • Public Works (Streets, Parks, Right-of-Way, Facilities) 	1,000
<ul style="list-style-type: none"> • Natural Resources & Ranger Services (Creeks, Open Space) 	1,500
Standards for New Development	3,000
Volunteers and External Partners ¹	1,000
Private Residents and Property Owners through complimentary trees	1,500
Trees planted to date since 2020 CAP (approximate)	2,000
Total	10,000

¹ Volunteers and external partners will be employed largely to plant trees in public right-of-way and open space areas.

E. Community Forest Plan Implementation Matrix

Table 5. Community Forest Plan Implementation Matrix.

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
Objective 1.0: Design and Implement the Program; Accrue and Analyze Data						
1.1	Ensure Urban Forest Services’ tree database can incorporate data from the 10 Tall website into the City’s records on a quarterly basis	3,4	CA, PW, SNR	IT, EXT	Near-term	Ongoing
1.2	Continue to research and apply for public grant funding opportunities for the community forest and urban lumber uses	1,3	CA, SNR	EXT	Near-term	Ongoing
1.3	Incorporate urban forestry into the City’s existing Green Team process to ensure interdepartmental implementation	1,3	CA, PW, SNR	CDD, UT, PR	Near-term	Expanded
1.4	Identify urban forest targets and metrics	1,4	CA, SNR	CDD, EXT	Near-term	Expanded
1.5	Utilize the GIS land cover and equity analysis (tree cover, impervious surfaces, socioeconomic characteristics) from the City’s Climate Adaptation and Safety Element (CASE) to inform tree planting and care priorities (see also Actions 1.3.4 and 1.8.2)	All	SNR, DEI	CA, PW, IT, EXT	Near-term	New
1.6	Acquire an updated LIDAR dataset for entire City (public and private trees) for improved canopy cover and species diversity analysis, as resources permit	1	IT, SNR	PW, EXT	Mid-term	New
1.7	Collaborate with Cal Poly to conduct a contingent (nonmarket) valuation study of City right-of-way trees using i-Tree Eco or equivalent software	1,4	SNR	CA, EXT, IT, ECON	Mid-term	New

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
1.8	Plan to update the tree inventory every five years	1	PW	CA, SNR, EXT	Mid-term	New
Objective 2.0: Strengthen Maintenance Practices and Clear the Backlog						
2.1	Continue with expedited pruning by contractors to catch up on maintenance backlog	1	PW	CA, EXT	Near-term	Ongoing
2.2	Ensure that palms, cottonwoods, and other high-maintenance species are maintained at recommended intervals (1-2 years), i.e., more frequently than the regular ~5-year pruning cycle	1	PW	-	Near-term	Ongoing
2.3	Conduct annual, or as needed, “windshield surveys” to identify higher-priority existing or incipient problems	1	CA	PW	Near-term	Expanded
2.4	Follow up on every City-required replacement planting after tree removals	1	CA, CDD	EXT	Near-term	New
Objective 3.0: Increase New Plantings and Implement the 10 Tall Initiative						
3.1	Maintain existing relationships with external City partners (and establish new ones) for tree planting, long-term care (e.g., watering), outreach, provision of training, etc. across public and private property in the city	1,3,4	CA, PW, PR, SNR	EXT	Near-term	Ongoing
3.2	Implement the 10 Tall goal of planting 10,000 new trees in the City by 2035 (see also 1.7.6, below)	All	CA, PW, SNR, PR	CDD, EXT	Near-term	Expanded
3.3	Create and implement a detailed, comprehensive tree planting plan adopting “right tree, right place”	All	CA, SNR, PR	PW, CDD, EXT	Near-term	New

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
	as its guiding principle; specify planting sites and installation procedures					
3.4	Achieve 100 percent stocking of empty street tree wells (~350 as of 2023) and consider creating new tree wells based on land cover assessment and equity goals (see also Actions 1.1.5 and 1.8.2)	1,4	PW	CA, SNR, DEI CDD, EXT	Mid-term	Expanded
3.5	Pilot a City tree and mulch giveaway program if outreach efforts indicate public interest	1,3,4	PW, SNR	CA, UT, EXT	Mid-term	Expanded
Objective 4.0: Reexamine Tree Removal and Mitigation Policies						
4.1	Work with the Tree Committee and community to adopt stronger protections for existing, mature trees that would be affected by planned new development	1	CA, PW, CDD	-	Near-term	New
4.2	Set a minimum target size(s) for replacement trees (mitigation planting) that will maximize survival chances and benefits provided (e.g., carbon sequestered)	1,3	CA, PW, CDD	EXT	Near-term	New
4.3	Require compensatory planting after tree removal to match total diameter of mature trees removed, or another determined metric that ensures that compensatory tree planting efforts are commensurate with impacts	1,3	CA, PW, CDD	-	Mid-term	New
4.4	In cases where on-site replanting after private property tree removal is infeasible, explore the possibility of compensatory planting in ecologically	1	CA, PW, PR, CDD	SNR	Mid-term	New

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
	appropriate locations which may include City open space, parks, or other properties within the city					
4.5	In cases where on-site replanting after private property tree removal is infeasible, explore the possibility of modifying regulations to add an in-lieu fee option with funds to be paid into a formal, dedicated urban forestry fund	1	CA, PW, CDD	SNR	Mid-term	New
4.6	Evaluate modifying City engineering standards for new development (currently 1 street tree per 35 ft of sidewalk) with a required number of trees per dwelling unit (residential), sq. ft. (commercial), or floors (multistory, all zones)	1,3	PW, CDD	CA	Mid-term	New
Objective 5.1: Focus on Sustainability – Climate Resilience (“Right Tree, Right Place”)						
5.1.1	Continue working with external City partners (e.g., Cal Poly and interested wholesale growers) to identify and obtain promising new climate-ready tree species; update the City's Tree List(s) accordingly	1,2	CA, EXT	SNR, PR, CDD	Near-term	Ongoing
5.1.2	Monitor overall urban forest health and avoid planting tree species known to be invasive or highly susceptible to existing or incipient pests and disease, to reduce future tree losses	1,2,3	CA, PW, SNR, EXT	PR	Near-term	Ongoing
5.1.3	Work with contractors and partners to monitor tree health citywide for new pest and disease outbreaks; plan for a coordinated, rapid response to threats	1,3	CA, PW, SNR	PR, EXT	Near-term	Ongoing

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
5.1.4	Use or require tree species that are considered suitable for urban spaces, climate change-ready, and appropriate for their proposed location and desired benefits	2	CA, PW, SNR, PR	CDD, EXT	Near-term	Expanded
5.1.5	Plant in locations that maximize long-term tree health and growth while minimizing potential conflicts relating to infrastructure and other concerns	1,2	PW, UT	CA, SNR, PR, CDD	Near-term	Expanded
5.1.6	Focus on planting where canopy cover is lowest to maximize urban forest benefits (underserved neighborhoods, parking lots, schoolyards, transportation corridors)	2	SNR, CDD, DEI	CA, PW, EXT	Near-term	Expanded
5.1.7	Use up-to-date Best Management Practices (BMP) resources such as “Climate Adaptation Actions for Urban Forests and Human Health” (Janowiak et al., 2021) to help guide future City urban forest policy and actions	All	CA, PW, PR, SNR	CDD	Near-term	Expanded
5.1.8	Consider adopting the use of sustainability indicators (Clark et al., 1997) to regularly assess, evaluate, and indicate the current performance levels of the urban forest	1	CA, SNR	CDD	Mid-term	New
5.1.9	Ensure that open space and riparian plantings use native tree and shrub species in ecologically appropriate areas (e.g., oaks are most appropriate on north-facing slopes and in drainages)	2	SNR, PR	EXT	Mid-term	Expanded

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
5.1.10	Create multiple City tree lists for different locations (street, park, creek, open space) and tree well sizes	2	CA, SNR, EXT	PW, PR, CDD	Mid-term	New
Objective 5.2: Focus on Sustainability – Lifecycle Perspective						
5.2.1	Prepare a detailed, comprehensive lifecycle plan for City trees that includes long-term care, replacement strategies for aging trees, and end-of-life lumber uses	All	SNR, EXT	CA, PW, CDD, PR	Near-term	New
5.2.2	Work with internal and external stakeholders (businesses and nonprofits) to establish a multi-use facility that will handle and distribute organic debris that is too large for the Hitachi-Zosen anaerobic digester; this "green sort yard" could potentially host composting, biochar, cellulosic ethanol, and/or electricity generation uses	2,3	SNR, UT, EXT	PW, PR, ECON	Near-term	New
5.2.3	To support the above actions, work with partners to place roll-off bins at strategic locations where feasible (e.g., tree companies' yards) to collect the raw material; allow the public to drop off materials at these locations	2,3	SNR, EXT	PW, UT	Near-term	New
5.2.4	Promote reuse and recycling of, and work to increase supply of, urban wood waste and lumber for multiple uses: furniture, small buildings, interior decoration, fencing, artwork, biogas and biofuels, mulch	All	SNR, UT, EXT	PW, PR	Mid-term	New

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
5.2.5	Set a target requirement for urban wood waste and lumber to be used in construction or otherwise dedicated to sustainable use within the city, where feasible (including but not limited to the uses described above)	2,3,4	SNR, UT, CDD	EXT	Mid-term	New
5.2.6	Place a QR code or other mechanism on newly planted trees to connect the public to educational information on publicly accessible recycled urban lumber products (e.g., park benches, fencing, downtown public art)	4	SNR, UT	EXT	Mid-term	New
5.2.7	Organize educational opportunities to inform industry professionals and the public on sustainable uses of urban lumber and its place in the circular, carbon-neutral economy	3,4	SNR, UT, EXT	-	Mid-term	New
Objective 5.3: Focus on Sustainability – Soil Enhancement and Stormwater Management						
5.3.1	Consider the use of technology including engineered soils, soil cells, permeable hardscape, and new planter designs, for optimal tree health and stormwater management outcomes in high-profile locations with space constraints or poor soils (e.g., downtown streetscapes) and implement as appropriate	1	PW	UT, EXT	Mid-term	New
5.3.2	Evaluate requiring the use of SB 1383-procured compost in all new plantings and implement as feasible	1	CA, UT, SNR	PW, EXT	Mid-term	New

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
Objective 5.4: Focus on Sustainability – Safety						
5.4.1	Continue to work with CalFire, SLO County, and other City partners to identify and reduce wildfire hazards, flooding, and other vulnerabilities in the city as per the Climate Adaptation and Safety Element (CASE)	1,3,4	SNR, PW, FD, PR, EXT	–	Near-term	Ongoing
5.4.2	Continue to monitor and maintain locations within the City’s creek drainages where flooding could be exacerbated by fallen trees in the wake of storms, wildfires, and/or large-scale tree mortality events	1,3,4	SNR, PW, FD, PR, EXT	–	Near-term	Ongoing
Objective 5.5: Focus on Sustainability – Water Conservation						
5.5.1	Prioritize water conservation in all urban forest-related actions	2,4	UT, PW, SNR	EXT	Near-term	Ongoing
5.5.2	Require mulching around existing and newly planted trees; check once a year and supplement if needed	2	CA, PW, SNR	UT, EXT	Near-term	Ongoing
5.5.3	In City open space areas, plant new trees near natural drainages where possible	2	SNR, PR	EXT	Near-term	Ongoing
5.5.4	Work with City partners to perform outreach to property owners about correct watering of trees during drought conditions	2,4	CA, UT	EXT	Near-term	Expanded
5.5.5	Continue to pilot the use of existing or upcoming water-conserving technologies such as tree bags, hydrogels, pervious (permeable) hardscape	2	CA, PW	EXT	Near-term	Expanded

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
	materials, engineered soils, soil cells, wireless tree data monitoring, etc.					
5.5.6	In hardscape areas, consider redirecting stormwater runoff to new or existing trees and landscaping as feasible	2	PW, CDD, UT	-	Mid-term	New
Objective 6.0: Address Issues Unique to Downtown						
6.1	Continue to implement downtown streetscape improvements as described in the DCP and the Community Design Guidelines	All	PW, CDD	SNR, EXT	Near-term	Ongoing
6.2	Continue to work with internal and external City partners to address tree-related problems affecting the downtown area to ensure citizen safety, comfort, and tree health (e.g., evaluation and as-needed replacement of tree grates; sidewalk repairs; bird and insect control)	All	PW, SNR, ECON, CDD	EXT	Near-term	Ongoing
6.3	Continue to support and provide training for the existing Downtown Foresters volunteer group	1,4	CA, PR	EXT	Near-term	Expanded
6.4	Ensure that the proposed urban wood lifecycle plan (see Objective 5.2) includes substantial discussion on downtown's <i>Ficus microcarpa</i> trees, as these are of high public interest	1,2,4	CA, CDD, ECON, UT, SNR	EXT	Near-term	New
6.5	Perform a trial(s) with growth-regulating chemicals where trees are installed in space-constrained areas downtown	2	PW	CDD, EXT	Mid-term	New

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
6.6	Support implementation of the City’s Downtown Concept Plan (DCP) and Mission Plaza Concept Plan (MPCP)	All	PW, CDD, ECON, PR, SNR	EXT	Long-term	Ongoing
Objective 7.0: Increase Outreach to Officials and the Public						
7.1	Continue to maintain the City's 39-year long "Tree City USA" designation	3,4	CA, PW	-	Near-term	Ongoing
7.2	Continue to work with external partners to publicize urban forestry’s importance in climate action and natural resources management, emphasizing long-term urban forest care and health over merely “planting trees”	2,3,4	SNR, EXT	PW	Near-term	Ongoing
7.3	Tie in urban forestry outreach with other City marketing or tourism-oriented programs (e.g., “Keys for Trees”)	3,4	SNR, ECON	EXT	Near-term	Ongoing
7.4	Update the City’s urban forest website: add pruning schedules; create a publicly viewable, interactive online map of all City-owned trees; add photos and descriptions of Heritage Trees; add discussion of ecosystem services values	3,4	CA, PW, SNR, IT	-	Near-term	Expanded
7.5	Use more storytelling in urban forestry public engagement: honor volunteers, partners, and sponsors in annual or semiannual outreach events and/or with tree tags or plaques	3,4	ADMIN, SNR, PR	EXT	Near-term	Expanded

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
7.6	Support development of the 10 Tall Initiative website; go live with it by the beginning of FY 2023-24	3,4	SNR, PW	EXT, IT	Near-term	New
7.7	Create an interpretive/commemorative plaque program for street, park, and Heritage trees	3,4	CA, ECON, SNR, PR	EXT	Mid-term	Expanded
7.8	Attract statewide or national urban forestry conferences to San Luis Obispo	3,4	CA, SNR, ECON	EXT	Mid-term	Expanded
7.9	Explore initiating a program to provide financial support to income-qualifying private landowners for needed care and maintenance of their trees	1,3,4	SNR, CDD, DEI	EXT	Mid-term	New
7.10	Work with City partners to create an “urban forestry community outreach week,” possibly combined with the City's annual Earth Day or Arbor Day celebrations	3,4	CA, SNR, PR, EXT	-	Mid-term	New
7.11	Approach Cal Poly and/or Cuesta College to create a new student urban forest steward club or program (possibly including a tree nursery) that would work with the City	3,4	SNR, EXT	-	Mid-term	New
7.12	Develop a strategy around alternate locations and resource needs to continue the City Commemorative Grove program, as suitable for consideration under the 2025-27 Financial Plan	1,4	CA, PW	-	Long-term	Expanded

Action Number	Action	Primary Associated Goal(s)	Lead(s)	Partners (EXT = External)	Timeframe (Near-term, Mid-term, Long-term)	Status (Ongoing, Expanded, New)
Objective 8.0: Address Equity Issues						
8.1	Continue to conduct City outreach in, at a minimum, English and Spanish; consider additional languages as well, if deemed warranted based on Census or other demographic data and indicators	4	SNR, DEI	EXT	Near-term	Ongoing
8.2	When planning tree planting activities, prioritize and perform outreach in areas of the City identified as low-income, vulnerable to heat stress, and in tree-poor areas where residents express interest in new trees (see also Actions 1.1.5 and 1.3.4)	3,4	SNR, PR, DEI	PR, IT	Near-term	Expanded
8.3	Coordinate regularly with the City’s DEI Manager, local indigenous leaders, and other external equity-focused partners on tree planting activities	3,4	SNR, DEI	PW, PR, EXT	Near-term	Expanded

XI. Next Steps

Upon adoption of the CFP by the City Council, the most pressing actions for the City will be to continue catching up on the tree maintenance backlog, moving forward with the hiring of new City urban forest staff and seeking new sources of urban forest funding (as resources allow), and continuing to work with City partners to implement the 10 Tall Initiative to plant 10,000 new trees by 2035.

Other high priorities include creating urban tree planting and lifecycle plans, and considering modification of the City's engineering standards and/or municipal code around tree removals and mitigation requirements.



Figure 22. Murray Avenue's unique tree-lined pedestrian median, San Luis Obispo.

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Figure 23. Terrace Hill and Islay Hill beyond Court Street Plaza in downtown San Luis Obispo.

Appendix A: Additional Background Information and Research

The following information is intended to provide additional detail and discussion around some of the major issues identified by the CFP and serves as the basis for the recommendations in the CFP.

1. Design and Implement the Program; Accrue and Analyze Data
 - a. Davey Resource Group – Organizational Assessment Report (2021)
 - b. West Coast Arborists – Tree Inventory Update (2022)
 - c. Urban Forest Ecosystems Institute (UFEI) Data
 - d. Targets
 - e. Metrics
 - f. Data Analysis
2. Strengthen Maintenance Practices and Clear the Backlog
3. Increase New Plantings and Implement the 10 Tall Initiative
4. Reexamine Tree Removal and Mitigation Policies
5. Focus on Sustainability
 - a. Right Tree, Right Place
 - b. Climate Readiness
 - c. Urban Forest Diversity
 - d. Pests and Disease
 - e. Lifecycle Perspective
 - f. Soil Enhancement and Stormwater Management
 - g. Safety
 - h. Water Conservation
6. Address Issues Unique to Downtown
7. Increase Outreach to Officials and the Public
8. Address Equity Issues

Additional information included in this section was provided by Cal Poly San Luis Obispo’s Urban Forest Ecosystem Institute (UFEI).

A. Design and Implement the Program; Accrue and Analyze Data

1. *Davey Resource Group Organizational Assessment Report (2021)*

DRG reviewed the structure and operations, background documents, and existing policies of the City’s Urban Forest Services program, which is housed in Public Works. They also engaged key partners and community members, including conducting an online survey to gauge community awareness and support for the urban forest.

DRG's findings were summarized in a 145-page OA report that included approximately 150 recommendations in the categories of Urban Forest Resource, Operations and Programs, Urban Forest Partners, and Organizational Structure and Staffing. Additional discussion centered on Policy and Regulation, the Benchmark Community Survey, and Analysis of Sustainability Indicators.

Some of the OA's more significant recommendations for improving the health and strength of the urban forest, and therefore of City residents and visitors, included:

- Update the City's inventory of street, park, and City facilities trees (completed in 2022)
- Continue to use contract services for tree pruning and move toward a proactive, 5-to-6-year maintenance cycle
- Update the City Street Tree List to focus on climate-resilient species
- Create a tree planting and care plan, and an urban wood lifecycle plan
- Strengthen social and environmental equity by assessing and working to enhance tree cover in disadvantaged neighborhoods
- Reexamine compensatory planting requirements related to development-related tree removals; any changes made may ultimately impact the role, responsibilities, and authority of the Tree Committee
- After tree removal, require follow-up monitoring of replanting by City staff
- Require City arborist review of all development plans
- Implement a comprehensive urban forest database management system that allows for multiple administrative functions and facilitates internal/external partner access to the inventory for updating purposes
- Restart the Commemorative Grove program as resources become available
- Expand engagement with key stakeholders and the community.



Figure 24. Bishop Peak Natural Reserve.

2. West Coast Arborists Tree Inventory Update (2021-22)

The urban forest inventory update conducted by WCA was another important step in moving forward with efforts to protect, strengthen, and expand the City-owned portion of SLO's urban forest. Urban forest planning and budgeting efforts achieve the best outcomes when they are based on complete and up-to-date information.

WCA inventoried 12,455 trees in the City's public right-of-way (streets, parks, and City facilities). Address, species, diameter, height, condition, and other data were gathered for each tree. In their summary report, WCA estimated the total value of these trees at over \$39 million (West Coast Arborists, 2022).

90.4 percent of the inventoried trees were characterized as being in good condition, with another 4.2 percent being considered fair. Approximately two-thirds of the inventoried trees were 12 inches or less in diameter (measured at 4.5 feet above the ground) and were under 30 feet tall.

The 10 most common species and their estimated value are shown in Figure 25:

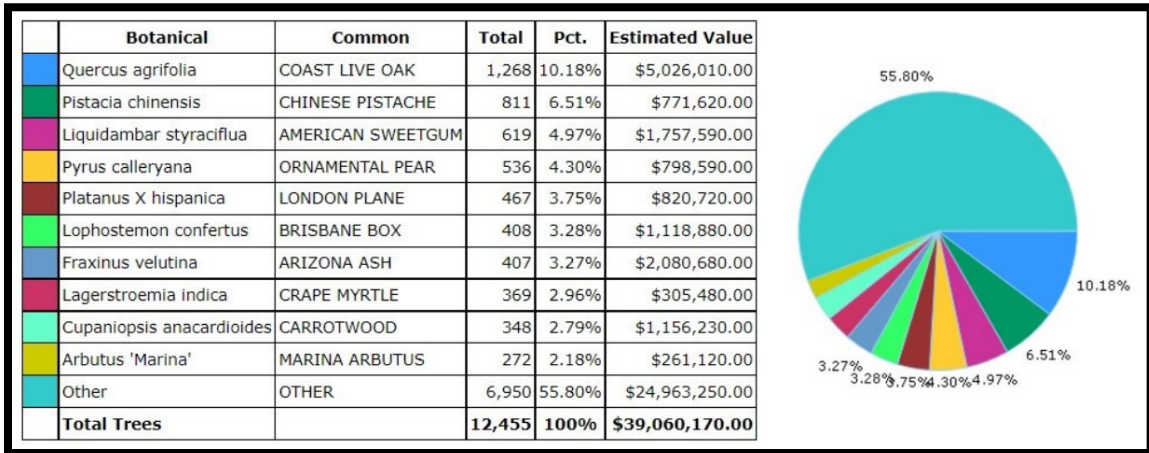


Figure 25. Ten most common urban tree species in San Luis Obispo. Source: West Coast Arborists, 2022.

Based on their inventory findings, WCA made several recommendations which broadly match recommendations provided in the DRG OA:

- Establish a grid trimming schedule to prune all trees on a routine cycle (most agencies average 3 to 5 years per cycle)
- Initiate inspection and mitigation for trees identified at risk of disease or decline
- Create a tree removal plan
- Create a planting plan to fill vacant sites
- Provide young tree maintenance to ensure proper establishment.

3. Urban Forest Ecosystems Institute (UFEI) Data

Cal Poly’s Urban Forest Ecosystems Institute (UFEI) (<https://ufei.calpoly.edu/>) maintains a statewide street tree inventory database based on data provided by California’s largest tree companies (UFEI, no date). For San Luis Obispo, this inventory shows a current tally of 12,496 trees encompassing at least 221 species. This number of trees tracks closely with WCA’s inventory of 12,455 street, park, and City facility trees.

UFEI is also host to an image-processing tool called the Urban Tree Detector. Recent UFEI research used this artificial neural network-based algorithm to process aerial photography from the National Agriculture Imagery Program (NAIP), resulting in an estimate of 48,710 trees (public and private) within San Luis Obispo’s urban boundary as of 2020. This figure is likely an underestimate for the city as a whole, as it does not include areas of dense closed canopy such as oak woodlands that are within the city limits.

4. *Targets*

Targets can be thought of as goals or desired future conditions. Currently identified targets for San Luis Obispo's urban forest include the following:

- Plant 10,000 new urban trees in San Luis Obispo by 2035
- Reduce annual greenhouse gas (GHG) emissions by 1,490 metric tons of carbon dioxide equivalent (MTCO₂E) in 2035.

Potential urban forest targets may include:

- Plant a certain number of new trees per given time period (e.g., year, two-year Financial Planning timeframe)
- Plant a certain number of new trees per given geographic area (e.g., square kilometer/mile, pavement maintenance area, neighborhood, special-status area [e.g., low-income])
- Attain 100 percent City tree well stocking
- Attain 100 percent replacement of other City trees that were previously removed (e.g., in parks)
- Attain a specified percent tree canopy cover for the City as a whole or by geographic area, including privately owned trees (refer below to "Metrics" for further discussion on percent canopy cover)
- Prune/mulch a specified number of trees per year
- Sequester a specified annual rate of MTCO₂E per year
- Attain a specified total carbon storage amount (MTCO₂E) in the City's trees
- Designate primary- and secondary-priority species of City-owned trees for each City block, street segment, and/or neighborhood
- Produce neighborhood-level tree maps and make them publicly available online, similar to the City of Santa Monica
- Attain a given, high percentage of "climate-ready" (resilient to the projected effects of climate change), City-owned trees across the city or by geographic area
- Achieve a certain dollar value(s) in specified ecosystem services, as determined by nonmarket (contingent) valuation studies.

5. *Metrics*

Metrics are measures of progress. They can be used to obtain a one-time "snapshot" of current conditions but are more useful when measurements are taken repeatedly over time, allowing for observation of trends that can guide management actions.

Potential urban forest metrics, measured by neighborhood and/or on a citywide basis, could include the following examples. Some of these would necessarily be estimates:

- Percent tree well stocking
- Percent potential park tree stocking
- Percent survival of newly planted trees at x years (1, 5, 10, 20...)
- Percent canopy cover
- Species composition/diversity
- Annual carbon sequestration and total carbon storage
- Percent public trees vs. total trees
- Percent private vs. public tree ownership
- Percent impervious surface cover (this metric is negatively correlated with urban tree cover).

Percent canopy cover is a commonly used metric that measures the percentage of ground covered by a vertical projection of the overall tree canopy (i.e., both publicly owned and privately owned trees). Currently in the United States, there is a trend towards increasing urban canopy cover in multifamily residential and office/business zones, while cover is decreasing in single-family residential (SFR) zones.

As of this writing, the City does not have a current estimate of percent canopy cover across San Luis Obispo; however, a 2012 study using aircraft-obtained remote sensing (LIDAR) data estimated San Luis Obispo's canopy coverage at 13.2 percent (Nessen, 2012). Canopy cover was found to vary by land use category, being highest for office properties (19.6 percent) and residential areas (19.2 percent) and lowest in business parks (2.5 percent).

If 13.2 percent is an accurate measurement of San Luis Obispo's canopy cover, it does appear borderline low when compared to the average of 15 to 19 percent across California's urban areas (McPherson et al., 2017; USDA Forest Service, no date). If the City decides to set a community forest target using percent canopy cover, it should first consider obtaining an updated estimate based on a current LIDAR dataset.

Urban forest professionals have noted that one potential downside to reliance on percent canopy cover is that it is difficult for a government agency to significantly influence tree cover on a large (e.g., citywide) scale, because most trees are located on private property. It may be more important to quantify what the City's existing trees are doing in terms of providing benefits, and to translate that into dollar amounts that can be highlighted in outreach efforts.

Sustainability indicators are an urban forestry analysis tool described by Clark et al. (1997) in their Journal of Arboriculture article, "A Model of Urban Forest Sustainability." The tool uses specific criteria that can be used in conjunction with measurable indicators to evaluate current

urban forest conditions and therefore, to identify areas in need of improvement. The Davey Resource Group Organizational Assessment (OA) report provides a sustainability indicators analysis for San Luis Obispo’s urban forest as of 2021 (Table 6); please refer to the OA for additional discussion. Going forward, the City’s Urban Forest Services program may choose to use this tool to assess, evaluate, and indicate performance levels.

Table 6. Davey Resource Group Sustainability Indicators Analysis for San Luis Obispo’s Urban Forest (Public and Private). Source: Davey Resource Group, 2021.

Indicators of a Sustainable Urban Forest		Assessed Performance Level		
		Low	Medium	High
The Trees	Urban Tree Canopy			
	Equitable Distribution			
	Size/Age Distribution			
	Condition of Public Trees - Streets, Parks			
	Condition of Public Trees - Natural Areas	n/a	n/a	n/a
	Trees on Private Property			
	Species Diversity			
	Suitability			
	Soil Volume			
The Players	Neighborhood Action			
	Large Private & Institutional Landholder Involvement			
	Green Industry Involvement			
	City Department/Agency Cooperation			
	Funder Engagement			
	Utility Engagement			
	State Engagement			
	Public Awareness			
	Regional Collaboration			
The Management Approach	Tree Inventory			
	Canopy Assessment			
	Management Plan			
	Risk Management Program			
	Maintenance of Publicly-Owned Trees (ROWs)			
	Maintenance of Publicly-Owned Natural Areas	n/a	n/a	n/a
	Planting Program			
	Tree Protection Policy			
	City Staffing and Equipment			
	Funding			
	Disaster Preparedness & Response			
	Communications			
Totals		9.5	15.5	3.5

6. Data Analysis

The purpose of gathering data on the urban forest is to supply the planning and budgeting process with information that is as complete and current as reasonably possible. Repeated measures of the same metrics over time will provide the data to allow managers to determine whether or not the City's targets are being achieved.

Evaluation of this data may illuminate forest health- or growth-related trends that require action. For instance, use of certain species or certain types of planting locations may need to be changed, pruning cycles may need adjustment, or program funding and staffing may undergo modification. Because of the likelihood that adjustments will be needed over time, it will be important for the City to retain flexibility by taking an adaptive management-based approach.

A number of private-sector firms specialize in forest management analysis software and/or offer consulting services to cities and other agencies. Thus, the City may choose either to analyze its urban forest data in-house or to hire a vendor to do so.

B. Strengthen Maintenance Practices and Clear the Backlog

As discussed in the DRG OA report, as of 2021 the City's urban tree maintenance was estimated to be one full cycle (8-10 years) behind due to staff injuries, retirements, and the effects of the Covid-19 pandemic. Deferred maintenance can lead to tree decline and death from a variety of maladies; thus it is important to properly care for existing trees to maximize their health, longevity, and therefore the many benefits they provide. In 2021, in addition to performing the City's public tree inventory update, West Coast Arborists (WCA) was contracted to begin an expedited pruning program to address the City's multi-year tree maintenance backlog.

The WCA Inventory Overview summary report provided recommendations to the City around routine trimming (pruning), removals and inspections, and planting, as follows:

- Routine Trimming: Systematic tree maintenance based on a grid system can help protect urban forest health and reduce costs over the long term. WCA's summary report identified:
 - 10,156 public trees in the city that should receive routine trimming
 - 114 diseased or declining trees that may soon need to be removed
 - 29 trees in need of greater pruning intervention to address structural defects, and
 - 1,703 young trees that are still staked and will continue to need a higher level of care until they have established.

Zonal pruning is currently being carried out by contractors based on the City's nine designated pavement maintenance areas. WCA recommends that the City commit to a roughly three-to-five-year pruning cycle, except in the case of palms and other trees that require more frequent maintenance.

- **Removals and Inspections:** WCA recommended the removal of 127 City-owned trees and 327 other trees (owned by another agency or an HOA) due to their being dead, diseased, or declining among other reasons. One additional tree in poor condition was referred to City staff for inspection.
- **Planting:** WCA documented several hundred locations that once held trees but are now either vacant (379) or contain only a stump (134). The former can be considered "low-hanging fruit" that should be given high priority for planting and may also facilitate the acquisition of grant funding by the City. The latter will require more preparation (stump grinding) but should still be targeted for priority planting.

The City may also consider having a staff arborist conduct ad hoc "windshield surveys" of public trees annually in order to detect existing or incipient problems in a timely manner.

C. Increase New Plantings and Implement the 10 Tall Initiative

There is wide agreement among urban forest experts and stakeholders (including the general public) that increased tree planting is needed to counteract ongoing losses and to ensure the presence of a future urban forest that maximizes social, economic, and ecosystem benefits to city residents and visitors. Impacts resulting from excessive tree loss may be more pronounced in cities that have little natural tree cover to begin with, like San Luis Obispo.

In the past few years, the City has collaborated with local community groups including the Rotary de Tolosa Club and ECOSLO to plant several hundred new trees across San Luis Obispo. Building on these efforts, the City's 2020 Climate Action Plan for Community Recovery (2020 CAP) called for rejuvenation and expansion of the City's urban forest through the planting of 10,000 new trees by 2035. Subsequently, the City Council incorporated this proposal into the City's 2021-2023 Major City Goal for Climate Action, Open Space & Sustainable Transportation.

Streetscapes, City parks and facilities, creek corridors, open space areas, and private property are all appropriate locations in which to consider the planting of additional public trees. The City may also want to consider modifying its engineering standards to increase the number of trees required in new development, including along sidewalks (currently, one tree per 35 feet) and in parking lots. Alternatively, the City could require a specified number of trees per new dwelling unit (residential), sq. ft. (commercial), or floor (multistory, all zones).

In parking lot areas, the City could consider requiring that groups of trees be installed in larger islands to provide more cooling benefit to reduce public health concerns related to the urban heat island (UHI) effect. Schoolyards are another type of land cover with large expanses of blacktop; thus, students would also benefit from the shade and cooling provided by increased tree canopy.

In 2019, local stakeholders created the 10 Tall tree planting initiative to raise awareness of the benefits of urban trees and expand the city's urban forest. 10 Tall is a City campaign nested in the 2020 CAP, Pillar Six: Natural Solutions. 10 Tall continued to be a priority area of focus in the City's 2022 CAP update (CAP Volume 3, the 2023-2027 Work Program). City staff anticipate that a large proportion (perhaps 40 percent) of the 10,000 trees proposed for planting will be native species that will be planted in City open space areas and riparian corridors. Species diversity will continue to be an important consideration, as best forestry practices suggest a forest composition of no more than 10 percent of any single tree species, no more than 20 percent of species in any tree genus, and no more than 30 percent of species in any tree family (Santamour, 2004).

Community engagement will also be an important part of the 10 Tall program. Dr. Jenn Yost at Cal Poly San Luis Obispo has been working with computer science students at the university to create a website where any community member – individual, household, or organization – will be able to easily register trees they have planted within the City limits. The database linked to the website will be accessible to the City and its tree care partners, and will be updated quarterly to facilitate monitoring of progress toward the 10,000 tree goal as well as the recording of urban forest metrics (e.g., diversity of species planted or survival at various time points).

Survival of newly planted urban trees is typically much lower than 100 percent; one study found that a “middle of the road” scenario is 50 percent survival at 13 to 18 years (Hilbert et al., 2019). It is not presently known how close the planting of 10,000 new trees would bring the City to a target of 25 percent canopy cover (approximately double the 2012 estimate by Nessen), or when exactly that might occur if the City chose to pursue that target.

D. Reexamine Tree Removal and Mitigation Policies

Tree removal and replacement requirements are provided in Section 12.24.090 of the municipal code. In 2019, the City's Public Works Director oversaw revisions to this section of code in order to make the standards clearer and more objective; however, various concerns voiced by the public around both construction and non-construction related tree removals remain.

Most removals of otherwise healthy trees within the City, whether public or private, require a permit and replacement planting plan approved by the City Arborist. If the removed trees are

replaced on-site the replacement ratio is 1:1, while off-site replacement is at a 2:1 ratio (two new trees for each removal). The City Arborist has the discretion to increase the required mitigation on a case-by-case basis if deemed warranted. Depending on the nature of the removal request, residents may appeal the denial of a permit to the City Tree Committee, Community Development Director, and ultimately the City Council.

Concerns raised by residents often involve non-permitted tree removals on neighboring properties, lack of City follow-up to ensure that replacement trees actually get planted, and lack of an alternative to replanting – such as an in-lieu fee paid into an urban forest or open space acquisition fund – in cases where replanting is excessively burdensome or infeasible. Residents have also expressed concerns over whether the code-specified replacement ratios are adequate when large, healthy trees are approved for removal, as in the case of new development.

City Tree Committee

The City's Tree Committee is an advisory body that makes recommendations to the City Council, staff, and Planning Commission on tree policies and regulations. The Tree Committee ordinarily consists of one representative of the City Parks and Recreation Commission, one representative of the Architectural Review Commission, and five members from the general public – one of whom must be a horticultural expert.

The Tree Committee reviews development proposals, hears appeals of tree removal applications that were denied by the City Arborist, and makes recommendations on heritage tree and "significant tree" designations as defined in the City Municipal Code and the General Plan Conservation and Open Space Element. As noted previously, the Tree Committee may also assist in updating the Street Trees Master List in cooperation with City staff and partners.

There are currently some uncertainties surrounding the Tree Committee. The following observations regarding the Tree Committee were raised in the Davey Urban Forestry Organizational Assessment (Davey Resource Group, 2021, p. 58):

- The roles, responsibilities, and authority of the Tree Committee are ambiguous
- The Tree Committee is housed within the Public Works Department yet spends the majority of deliberations on topics relating to private trees
- The community is undergoing a significant amount of infill development, partially related to an increased demand for housing, commercial sites, and the recent state Housing Mandate. Increasingly, the Tree Committee is being asked to review these development plans
- (In some cases,) The Tree Committee is the last governing body to review large development proposals. In most situations, by the time these projects are presented to

the Tree Committee, they have already been approved and the Tree Committee's recommendations may or may not be taken into consideration

- There is no requirement for City staff involved with the proposal process to report back so that the Tree Committee knows whether or not their recommendations are being implemented
- Currently, neither the Tree Committee nor the City Arborist serve as a liaison/support for the Architectural Review Commission, yet this Commission reviews projects that involve consideration for tree preservation and removal permits
- The Tree Committee has a limited advocacy role for urban forestry budgeting through an annual report to the City Council that includes desired improvements.

Furthermore, CFP interviewees offered the following observations about the Tree Committee:

- Members of the Tree Committee would like to have decision-making authority regarding development proposals, but there is no consensus on the topic among interested parties
- Cases have arisen in which the Tree Committee requested more than one hearing on a development-related tree issue, leading to conflict because of California Permit Streamlining Act requirements. This piece of legislation limits hearings on development projects to a total of five for any given issue, and City staff believe that two of those slots should always be reserved for City Council deliberations. This may not be possible if the Tree Committee, Planning Commission, or other applicable advisory bodies hold multiple hearings on a project
- Some CFP commenters felt that the City has a surplus of advisory bodies as it is, and that the Tree Committee could be replaced by one City staffer plus one member of the public who has expertise in arboriculture.

If the City was to move forward with replacing or modifying the duties of the Tree Committee, it would be appropriate to consider whether (and if so, how) this would affect the ability of interested members of the public to observe and provide input into tree-related City actions.

E. Focus on Sustainability

As awareness of global climate change has entered the general consciousness in recent years and calls for action have become more urgent, the importance of urban forestry has begun to receive more attention from the public. Tree planting has increasingly come to the fore as a "low-hanging fruit" climate change solution (Mandel, 2021). In many locales, planting sites are numerous and trees and volunteer labor are readily available. The number of tree planting

initiatives sponsored by government agencies, corporations, and other entities has dramatically increased since the beginning of the 21st century.

However, the issue is more complicated than it may seem. Planting trees is just one small part of sustainable urban forest management; without long-term care, new tree survival rates are significantly lower than with regular maintenance. Furthermore, opportunities for missteps abound in urban forestry – for instance, planting in the wrong location or planting species that may not be resilient to the local effects of climate change. Thus, comprehensive planning is needed in order to avoid outcomes that diminish or negate the desired social, economic, and environmental benefits that motivated planting in the first place.

1. *Right Tree, Right Place*

The “right tree, right place” concept ties together various aspects of sustainability that are discussed on the next several pages.

A thriving, productive urban forest contains a mix of species and individual trees that are appropriate for the physical location and environmental conditions in which they were planted. Urban trees, particularly street trees, are subjected to more challenging conditions and have shorter lifespans than trees in more natural environments when compared to open space or wildland trees (Smith et al., 2019). Average street tree lifespan has been estimated at 19 to 28 years (with a survival rate of new plantings ranging from 94.9 to 96.5 percent), while overall average urban tree lifespan (including parks and residential trees) is estimated as 26 to 40 years (Roman and Scatena, 2011).

Thus, determination of what constitutes “right tree, right place” should be made for each individual combination of planting site and tree to maximize health, productivity, and longevity. Failure to do this may result in reduced tree vigor, premature illness, and death, or premature tree removal due to unwanted impacts on utilities or other infrastructure, not to mention reduced or unrealized urban forest benefits.

Broadly speaking, sidewalk parkways and road medians are generally more suitable for smaller trees that generate less organic debris, while larger species that drop more biomass but store more carbon and create better wildlife habitat are appropriate for use in parks, riparian corridors, or open space areas. While urban foresters commonly favor large-growing tree species for maximization of ecosystem services (USDA Forest Service, 2004), city residents tend to prefer smaller, fruiting or flowering trees for their aesthetic benefits (Eisenman et al., 2021).

One example of a species that is not particularly well-suited for San Luis Obispo is the coast redwood (*Sequoia sempervirens*). The city’s climate is very dissimilar to the fog-shrouded, damp coastal environment where redwood grows naturally. While some local redwoods are

reasonably healthy, many others are in poor condition, unable to thrive in our present climate and presumably even less so in the future considering the predicted effects of climate change.

As another example, the huge, beautiful Indian laurel figs (*Ficus microcarpa*) in downtown San Luis Obispo, while widely admired, have outgrown their environment. Cramped city sidewalks are no longer an optimal location for these trees at their present size. On the other hand, palms, although they do not offer much in the way of cooling or carbon sequestration, provide some degree of wildlife habitat and are appropriate for planting in areas of limited space. Furthermore, palms are culturally important in southern California.

Lastly, interest in urban agriculture and edible landscaping have increased in recent years, with many cities creating city gardens and even a few orchards. Many citizens have wondered why food-producing trees are not typically included in urban street or park plantings. This, again, is mostly a case of “wrong tree, wrong place.” Fruit and nut trees are avoided in most public urban forest settings for a number of reasons: they’re highly susceptible to pests and disease, relatively small and short-lived, create potential liability issues, and are generally very high-maintenance. Thus, the most appropriate potential settings for public food-producing trees are either a municipal orchard on public land, or possibly plantings on school grounds as part of an urban agriculture educational program.

Tree Lists

A municipal tree list is a compilation of city-approved tree varieties that is maintained by some, though not all, cities. Examples of factors that may go into a municipal tree list include whether a given species has a propensity for disrupting sidewalks and utilities, is a nuisance due to dropping debris or releasing excessive pollen, is compatible with local climate and soils, and is aesthetically suitable for its intended location.

In some cases, municipal tree lists have been perceived as limiting and drawn complaints from the public. The San Luis Obispo City Arborist has the authority to approve planting of additional, non-listed species on a case-by-case basis. In addition, the City Tree Committee may work with City staff and partners to update the tree list as often as once a year to remove less-than-desirable trees (for example, those that require excessive amounts of water) and replace them with climate-ready varieties. On the other hand, the City may also consider other options including eliminating the tree list altogether (some cities do not have one), creating multiple lists (one for streets, one for parks, one for open space, etc.), or adopting a list of *non*-approved trees – i.e., banning the most problematic species while not regulating other species.

Given the already alarming effects of climate change, with worse projected to come, Californian cities with urban tree lists are now in the position of having to update their lists for the future. As of early 2023, San Luis Obispo has been working with Dr. Matt Ritter at Cal Poly San Luis Obispo’s Urban Forest Ecosystem Institute (UFEI) to finalize a revised City Street Tree List

focused on climate-resilient trees, which will be presented to the City Council for approval later in 2023.

Ideally, decisions about the City Street Trees List will continue to be informed by the latest research on climate-resilient trees, like that occurring at UFEI. However, even when or if such species are found, the desired trees may not be commercially available. A small number of wholesale growers in California have expressed interest in experimenting with new species of climate-ready trees to meet projected demand, but thus far these have been the exception, not the rule.

Thus, identification of what constitutes “right tree, right place” in 21st century San Luis Obispo is work in progress. Regardless, it can no longer be considered appropriate to simply choose urban trees based on cost alone or on whatever is available in the greatest quantities, without accounting for resilience to changing environmental factors.

2. *Climate Readiness*

Climate readiness refers to the resilience of an urban forest to environmental stressors resulting from the effects of global climate change (McPherson et al., 2018). Climate change has been predicted to inflict increasing heat, drought, wildfire, and extreme weather events on California in the coming years and decades, while also increasing exposure to attack by current or emerging insect pests and pathogens. Furthermore, these effects may be exacerbated in cities due to the urban heat island effect, air and water pollution, poor soils, and accidental or intentional damage (vandalism).

Lack of irrigation water may also become cause for concern. As with many other cities, San Luis Obispo contains numerous examples of ornamental trees that originated in wetter climates and which require substantial irrigation in order to thrive. These varieties are not considered adaptable to the projected, increasingly harsh environmental conditions accompanying climate change and therefore will likely experience increasing decline and death in the coming years, whether directly from climatic conditions or from property owners reducing or discontinuing irrigation (on the other hand, water conservation measures and recycled water are still largely untapped resources whose use may be expanded). Drought-weakened trees will also increasingly comprise a public safety hazard, with associated financial costs. For all these reasons, research to identify and test the resilience of potential new urban tree species is urgently needed to protect the long-term stability of urban forests (McPherson and Berry, 2015).

In California, researchers with the University of California, UC Davis, and the USDA Forest Service are conducting a study on this subject. The Climate Ready Trees project aims to identify the suitability of underutilized but promising tree species for urban planting in the context of

climate change pressures (McPherson et al., 2018). Dozens of trees have been planted for evaluation in the Sacramento area and throughout southern California. Although growth and survival monitoring is ongoing, initial observations from southern California indicate that some species native to hot, dry landscapes are performing better in inland locations than in coastal locales, while others are tolerant of coastal conditions but require frequent pruning for optimal growth and health (McPherson et al., 2020). Overwatering is a stressor for some of these species and can result in crown growth that outpaces root growth, with poor outcomes.

3. *Urban Forest Diversity*

Diversity is a core ecological concept that refers to the variety and relative abundance of a species (Magurran, 1988). High species diversity, age diversity, and geographic distribution are believed to lead to greater population resilience because although decimating factors (e.g., pests and disease, natural disasters, exploitation by humans) may act upon specific portions of a diverse population, a single event is unlikely to eliminate the entire population of that species. In contrast, monocultures or other areas of limited diversity are theoretically at higher risk of being eliminated by a single decimating event. High tree species diversity can also enhance benefits including aesthetics and wildlife habitat.

Urban forests in the US typically have far higher species diversity than adjacent native forests or woodlands (Robertson and Mason, 2016). In California, overall urban tree species diversity is considered adequate, but 39 of 49 inventoried communities were identified as being over-reliant on a single species of street tree (typically London plane, sweetgum [liquidambar], Chinese pistache, velvet ash, or Callery pear) (McPherson et al., 2016). This is in part because commercial tree growers naturally meet demand by focusing on varieties that are easiest to grow and sell most readily to high-volume buyers. When one of these trees dies or is removed, it may be wise to consider replacing it with a different, more appropriate species. One suggested best practice for urban forestry is to aim for a forest composition of no more than 10 percent of any single tree species, no more than 20 percent of species in any tree genus, and no more than 30 percent of species in any tree family (Santamour, 2004).

San Luis Obispo contains some individual trees of uncommon species that were planted long ago but for which replacements from the same species are no longer available, contributing further to concerns about declining species diversity in the city over time. The 2022 West Coast Arborists tree inventory update commissioned by Public Works should be helpful in assessing urban tree diversity in the city, even though it only includes street, park, and City facility trees in the public right-of-way.

4. Pests and Disease

With each passing decade the number of non-native, invasive pests and diseases in California increases through commercial activity or other means of transportation from distant areas. When these organisms establish self-sustaining populations, the result can be tens or hundreds of millions of dollars in damage and mortality, whether to crops, wildlands, or urban plants and trees. Furthermore, the effects of climate change are contributing to the spread of invasive species (Finch et al., 2021). In urban forestry, the costs associated with managing pests, disease, and dead trees are unavoidable; action must be taken due to public safety hazards such as falling trees and increased wildfire risk.

San Luis Obispo County has been living with one such invasion since at least the early 1990s. The disease pitch canker, caused by the fungus *Fusarium circinatum*, was inadvertently introduced to California (Santa Cruz County) in 1986. This pathogen has caused enormous die-off of pines in California, including the widely planted Monterey pine (*Pinus radiata*). In San Luis Obispo County, pitch canker was first detected in Cambria in 1994. Cambria's native stand of Monterey pine – one of three in California – is generally acknowledged to be in poor condition due in part to the effects of this disease. The associated concerns include increased wildfire and falling tree hazards, as well as reduced property values.

It is possible that this unfortunate situation could be repeated in other tree species in San Luis Obispo County before long. Sudden oak death (SOD), caused by the fungus-like microbe *Phytophthora ramorum*, is estimated to have killed over one million trees, mostly oaks and tanoaks, in coastal California since its discovery in the mid-1990s (UC Riverside CISR, 2022). SOD also infects dozens of other native plant and tree species, and it is currently documented in southern Monterey County – just a few miles from the San Luis Obispo County line. Research indicates that the strongest predictor of SOD is the presence of California bay laurel (*Umbellularia californica*; California Oak Mortality Task Force, 2021) – a native tree that grows in abundance in San Luis Obispo's riparian and open space areas.

The invasive shot hole borers (ISHB), two closely related species of tiny wood-boring beetles from Vietnam and Taiwan, were first detected in large numbers in southern California between 2012 and 2014. These beetles infest over 65 tree species in California, killing the trees in two ways: by girdling (tunneling through living tissues), and through the cultivation of their food source – fungi of the genus *Fusarium* – inside the tree. These activities disrupt and clog the tree's vascular tissues and prevent the movement of water and nutrients, resulting in a symptom called *Fusarium* dieback (FD). In 2017, ISHB-FD was predicted to have the potential to kill 27 million trees in southern California (Eskalen and Lynch, 2017). As of this writing (spring 2023) only one ISHB specimen has been found in San Luis Obispo County, in 2016. The County Agricultural Commissioner's Office is conducting limited monitoring for this pest.

In each of these cases and others of concern not discussed here (e.g., goldspotted oak borer – *Agrilus auroguttatus*), widespread establishment of the pathogenic organism would be a serious threat to anywhere from one to dozens of native and urban trees species in San Luis Obispo County. For this reason, the CFP must address the City’s response to invasive species affecting the City’s urban forest. In addition, some types of urban trees may themselves be considered invasive species, e.g., tree of heaven (*Ailanthus altissima*), black locust (*Robinia pseudoacacia*), Peruvian pepper (*Schinus molle*), Canary Island date palm (*Phoenix canariensis*), and certain *Acacia* and *Eucalyptus* species.

Monitoring and early detection are essential; the City must work with partners including San Luis Obispo County, CalFire, Cal Poly, PG&E and others to keep up with the latest information and best practices. As noted previously, one factor strengthening an urban forest is species diversity. In reforesting the City’s open space and creek areas as part of the 10 Tall campaign, it is natural to focus on planting San Luis Obispo’s native riparian tree species (sycamores, cottonwoods, willows, maples). However, consideration must be given to the susceptibility of these species to each invasive pest of concern, to the extent possible.

For instance, the experience with ISHB in southern California has shown that the riparian tree species listed above seem to be these insects’ most highly preferred hosts. Thus, in light of the potential threat to San Luis Obispo County, it may be prudent to consider reducing the proportions of those species planted in the City’s open spaces and creeks, replacing them with less-affected ISHB host species such as coast live oak (*Quercus agrifolia*), or with species like California black walnut (*Juglans californica*) that have not been identified as hosts of ISHB.

Upon detection of a novel pest, a rapid, IPM (integrated pest management)-based response will be required. The basic steps include quarantine, cultural practices including tree removal where indicated, and use of insecticides and biocontrols (as available and deemed necessary). Thus, the City should have funds available to respond to fast-breaking situations using an “early detection, rapid response” mantra.

5. Lifecycle Perspective

Upon removal, urban trees have traditionally been considered to have little value and chipped, burned, cut into firewood, or buried in a landfill (Nowak et al., 2019). However, these practices either quickly or eventually allow the carbon stored in the wood to escape to the atmosphere. Furthermore, a potentially useful job-producing and income-producing resource – to the tune of 46 million tons of wood per year, worth anywhere from \$89 million to \$786 million – is largely wasted. Even a year’s worth of leaf litter from the US is estimated to contain \$551 million in nutrients that could be turned into mulch or fertilizer (Nowak et al., 2019).

Thus, one way in which the CFP can contribute to sustainability is by promoting adoption of a lifecycle perspective toward urban trees – that is, acknowledging that each tree serves one or more distinct purposes from planting through removal and subsequent use of the lumber and other organic debris. This concept requires a philosophical shift from “planting trees” to “growing trees” (Mandel, 2021); that is, a change of focus to long-term maintenance practices that encourage a lifetime of arboreal health.

As such, the CFP includes a recommendation for the City to develop and implement an urban wood lifecycle plan, which would include a replacement program based on planned rotation (age at replacement) and “right tree, right place” principles. Probable replacement age for at least some of the City’s newly planted street, park, and City facility trees that survive to maturity would be between 20 and 30 years. This is an important concept because trees that have outgrown their optimal growing space result in higher maintenance costs for City taxpayers than smaller trees, as seen with downtown San Luis Obispo’s 60-year old Indian laurel fig (*Ficus microcarpa*) trees (see Appendix A, Section F – Address Issues Unique to Downtown).

Interest in alternative uses of urban waste lumber has been rising for a number of years now. The benefits of this approach include reduced wood waste in landfills, increased urban jobs, reduced need for harvesting rural forests, and potentially avoided carbon emissions and enhanced municipal forest management revenue (Nowak et al., 2019). The lumber can be used in a wide variety of ways, including as feedstock for engineered woods, landscape mulch, soil conditioner, animal bedding, compost additive, sewage sludge bulking medium, and boiler fuel (CalRecycle, 2022c).

However, waste lumber can also be used in the creation of boutique furniture or wood paneling, public art, or infrastructure such as fencing or benches. These uses store the carbon within wood indefinitely. Public installations using this material could be installed throughout the city with educational signage around sustainability. San Luis Obispo company Pacific Coast Lumber was featured in a 2016 news story using urban lumber to create just such products, building handcrafted cabins, sheds, benches, tables, chairs, and flooring among other products from dead and diseased Monterey pines that were removed from Cambria’s pine forest (Buffalo, 2016). In order for this idea to work long-term in a city setting, urban forest managers would need to consider lumber quality in addition to the various other desired benefits from trees under their care when choosing trees to plant.

In a related project, in 2020 the local nonprofit ECOSLO received a CAL FIRE Urban and Community Forestry grant for a program called “Full Circle: A Sustainable Approach to Urban Lumber in San Luis Obispo” (CAL FIRE, 2020). This multifaceted project would divert 600 urban logs from the waste stream over three years, plant 240 new trees, and create a new college and vocational curriculum, donating wood to and working with local schools to teach students about the sustainable processing and use of urban wood. ECOSLO contracted with local business

Deadwood Revival Design for program implementation. As of this writing, the Full Circle program is in progress.

Urban lumber can also be used in cogeneration, the creation of bioenergy (electricity, heat, fuel) from waste biomass. Although some carbon dioxide is generated and escapes to the atmosphere in this process, the net effect is reduced GHG emissions and air pollution (including methane) through the replacement of dirtier, fossil-fuel based equivalents. Finally, waste biomass from tree removal can be used to create biochar, a charcoal-like material that when added to soil can store carbon in the ground for thousands of years, while improving the soil's nutritional and moisture-holding capacity (Hawken, 2017, pp. 64-65).

The Hitachi Zosen-INOVA dry anaerobic digester near the San Luis Obispo airport reduces greenhouse gas emissions by diverting green waste and food waste from the Cold Canyon landfill and recycling them into compost, liquid fertilizer, and electricity (Hitachi Zosen Inova AG, 2021). However, the facility cannot process large woody debris; SLO County does not currently have any facility that can do so.

6. *Soil Enhancement and Stormwater Management*

Street trees typically exist in harsh urban environments with poor soil conditions. Urbanization results in the conversion of natural land cover to impervious surfaces, changing natural drainage characteristics and inhibiting infiltration of water, gases, and nutrients into the soil. Furthermore, urban trees commonly suffer from other challenging growth conditions including lack of growing space, soil compaction, high salinity, and/or unfavorable pH, and they can be damaged by pollution and physical interference from infrastructure. These conditions can stunt trees and plants, significantly limiting their health and lifespan (Lawrence et al., 2012).

Compost Procurement under SB 1383: California's Short-Lived Climate Pollutant Reduction law (SB 1383) establishes methane reduction targets through diversion of organic waste that would otherwise go into the landfill (CalRecycle, 2022a). The law requires recycling of food waste and addresses hunger through the recovery of edible food from the waste stream. Under SB 1383, counties and cities are required to procure a certain tonnage of compost each year for their own use or for donation to the community. The City of San Luis Obispo's compost procurement target for 2022 through 2026 is 3,685 tons per year (CalRecycle, 2022b). Because this amount of compost exceeds current known uses for it, a potential exists for the surplus to be used in City tree planting and care, as well as in application to City open space rangeland (carbon farming) if various concerns, including plastic contamination, can be addressed.

Soil- and Infiltration-Enhancing Technologies: In recent years a variety of new soil-enhancement technologies have been developed for the dual applications of stormwater infiltration/water quality improvement and urban tree growth enhancement. These products are designed to

improve infiltration and remove suspended solids and other soluble pollutants while facilitating the growth of larger trees than would otherwise be possible in confined urban settings, without damaging sidewalks, streets, or utilities.

One of these solutions is engineered soils, which consist of specific, proprietary blends of gravel, sand, silt, clay, and organic matter. By improving soil structure and chemistry, engineered soils can enhance tree and landscaping root growth and therefore overall health. This can be especially important in physically constrained planting sites such as small tree wells or planters. However, this type of product must be used with carefully chosen tree species due to its sometimes low nutrient content.

Engineered soils are sometimes considered one of the most practical and cost-effective soil technologies for a city to use, although they are not inexpensive. For example, approximately 11 yd³ of Cornell engineered soil (CU-Structural Soil®; Denig, 2015) is recommended for the planting of a single street tree. At a typical price of \$40 per yd³ (range = ~\$35 to \$75/yd³), this comes out to \$440 per tree.

Another tree growth-enhancing product is soil cells such as the Silva Cell (Deeproot Green Infrastructure, 2022). These “modular suspended pavement systems” consist of crate-like structures, posts, panels, geotextile fabric, and mesh that are assembled in excavated trenches where trees will be planted and backfilled with planting soil.

Soil cells work well although their cost – \$14 to \$18/ft³ installed, or approximately 10 times more expensive than the Cornell soil referenced above – makes them likely to be cost-prohibitive for most public planting situations. On the other hand, their proven ability to enhance long-term tree growth and health means that these products might be suited for limited use in challenging, streetside planting areas such as along Monterey, Higuera, and Marsh Streets in San Luis Obispo. Private commercial or residential development can also benefit from the use of soil cells; the City might consider requiring soil cell installation as a condition of new development under some circumstances.

Additional products that the City might consider include water-absorbing polymers (hydrogels) added to the soil, rubber sidewalks, suspended sidewalks, and pervious (permeable) concrete or other hardscape surfaces.

7. Safety

In January 2023, the San Luis Obispo City Council adopted a revision of its general plan safety element. The new version – the Climate Adaptation and Safety Element (CASE, City of San Luis Obispo, 2023b) – serves as both a safety element and an environmental justice element, promoting public health and safety relating to damage from both natural disasters (e.g., wildfire,

drought, flooding) and exposure of disadvantaged communities to toxic conditions (e.g., pollution).

The City of San Luis Obispo is also a participant in the 2019 Multi-Jurisdiction Local Hazard Mitigation Plan (LHMP) spearheaded by San Luis Obispo County (County of San Luis Obispo, 2019). The LHMP relies on risk and vulnerability assessments to craft goals, objectives, and actions that provide “practical, meaningful, attainable and cost-effective mitigation solutions to reduce vulnerability to the identified hazards,” thereby reducing human and financial losses. The LHMP evaluates 16 potential hazards facing the county and its communities, identifying tree mortality resulting from drought stress and pathogen attack as a significant hazard. Other tree-related hazards include adverse weather and wildfire.

Wildland Fire: Homes and other buildings throughout the city are located in close proximity to, or interspersed with, hillslopes containing stands of native trees and brush. This zone of mixed land cover is known as the wildland-urban interface (WUI). The past two decades of increasingly severe and uncontrollable fires in the western US have shown that the physical effects of climate change on wildfire behavior (e.g., higher wind speeds, lower relative humidity and fuel moisture, potential for large areas of drought- or pest/disease-killed vegetation) have now, in many instances, intensified beyond the point at which fire suppression efforts are effective let alone safe for fire crews. However, this reality does not obviate the need for the City to continue to strengthen its defensible space regulations and conduct fuel reduction treatments in the WUI; thus, urban forest planning must assess wildfire vulnerability.

Flooding: Much of the city’s urban development is located near the city’s creeks, within or in proximity to 100-year and 500-year flood zones. Flooding can be caused by rocks, trees, and other debris falling into waterways and blocking culverts and creek channels. This effect may be exacerbated after a wildfire, particularly in steeper watershed areas, as the lack of vegetation and eventual decay of fire-killed roots mean that the soil is more vulnerable to erosion. Other effects of flooding can include inundation of structures, impact damage from flood flow and debris, crop destruction, and release of hazardous materials including untreated sewage. Flooding is appropriately considered in an urban forest management plan, as trees can both help mitigate flooding, and contribute to it.

8. *Water Conservation*

Given the increasing unreliability of winter rains in central California, water conservation is necessarily an important part of the conversation around San Luis Obispo’s urban forest. New policies, practices, and technologies – as well as increased reliance on existing ones – are needed going forward.

Substantial, and as yet unrealized, water savings are possible in California through more stringent water conservation, recycling, and stormwater capture efforts (Gleick et al., 2014). The City of San Luis Obispo currently uses tree watering bags on many of its trees, and uses recycled water (indicated by purple signs and piping) for irrigation of other street and park trees (City of San Luis Obispo, 2022b). While a detailed examination of water-saving methods is outside the scope of the CFP, irrigation practices bear brief discussion here.

The City currently uses sprinkler, drip, and manual irrigation to water public landscaping, including turf and trees. In many park and some street tree locations, as well as in new development, the City is using or requiring use of recycled water. Minimization of turf and conversion of sprinkler irrigation to drip should be a high priority for the City. Newly planted trees planted in streetscapes, medians, parks, and other locations in the public right-of-way can be located so as to take advantage of existing irrigation, but in some cases the City may choose to install temporary or permanent drip irrigation to serve new plantings. If the City decides to try any of the technologies described above in Appendix A, Section E.6 (Soil Enhancement and Stormwater Management), drip irrigation could be incorporated into the design.

F. Address Issues Unique to Downtown

For decades now, downtown San Luis Obispo has attracted thousands of residents and visitors year-round through special events held in Mission Plaza and City parks, the weekly Downtown Farmer's Market, and everyday shopping, dining, and entertainment opportunities. Downtown's lush tree canopy provides an ambience that enhances and serves as backdrop for these activities. Accordingly, the City's Downtown Concept Plan (DCP) and the Mission Plaza Concept Plan (MPCP) (both 2017) recognize and support the importance of maintaining downtown's urban forest.

In fact, San Luis Obispo's central business district would be unrecognizable to most locals without its big, beautiful trees – notably including its iconic, roughly 60-year-old Indian laurel figs (*Ficus microcarpa*). These enormous evergreen trees were planted widely across urban California during a beautification craze in the 1960s, based on their reputation as hardy “miracle trees” that could withstand heat, drought, air pollution, and any other number of hardships (Gordon, 1996).

These trees dominate downtown San Luis Obispo and many other cities in California, contributing tremendously to aesthetics and sense of walkability. Their large, shady canopies confer a pleasing “sense of place” that encourages spending time outdoors, whether alone or in social gatherings, and increases contentment. The presence of these trees raises property values and drives increased retail business traffic.

However, the same trees drop leaves, twigs, and fruit on pedestrian walkways; attract birds and insects that can cause distress by entering businesses; block views and street signs; invade sewer lines; and, crucially, incur ongoing taxpayer expense through their need for expensive maintenance. According to Cal Poly San Luis Obispo's SelecTree website, *Ficus microcarpa*'s branch strength is "medium weak," they are a potential human health irritant due to the allergens and latex-containing sap they produce, and they are not "powerline friendly" (SelecTree/UFEI, 1995-2022).

By the mid-1990s, cities throughout California had either stopped planting *Ficus microcarpa* for these reasons or were actively tearing them out and replacing them with palms, often to the consternation of tree lovers (Gordon, 1996). Some southern California cities, reluctant to cut down these popular features of their downtowns, have opted to play the waiting game by performing root trimming, installing underground root barriers, and replacing sidewalks with stone pavers around the trees. However, the overall feeling on the part of arboricultural professionals seems to be that this is a case of "wrong tree, wrong place" – that these trees have simply gotten too big for their surroundings.

As the number of *Ficus* and other large, 1960s-era trees in downtown San Luis Obispo slowly dwindles through attrition, it is likely that a replacement program based on planned rotation and "right tree, right place" principles will be created, as discussed previously under "Lifecycle Perspective." The most likely plan is for a regular 20- to 30-year replacement cycle to be established. Some trees of the same species, including *Ficus microcarpa*, may be replanted but they will not be allowed again to attain such enormous size in cramped sidewalk spaces.

In future decades, the vision for downtown SLO is that it will have a more diverse, mixed-age and mixed-species tree palette containing a preponderance of species that, while still beautiful and inspiring, do not have the potential to grow as large as the current specimens and cause the aforementioned problems.

G. Increase Outreach to Officials and the Public

The use of public outreach and engagement to build support and enthusiasm for urban forestry is essential. Although overall public support for tree planting is high, trees also have downsides – they drop organic debris and limbs, can damage sidewalks and utilities, constitute a safety hazard when they fall, attract insects, block views, and can be expensive to water and maintain (Conway and Bang, 2014). In some cases trees can trigger allergies with their pollen (Ziska et al., 2019) or emit volatile organic compounds (VOCs) that contribute to the formation of ground-level ozone, a respiratory health hazard, when combined with human-generated pollutants (Churkina et al., 2017). Nevertheless, many of these undesirable effects can be minimized through planning and regular maintenance.

The City and its partners can enhance public interest and participation in urban forestry efforts by continuing with existing outreach programs, creating new ones, and by planning for and hosting special events. One “low-hanging fruit” example would be to maintain the City’s existing Tree City USA designation with the Arbor Day Foundation. As of this writing, San Luis Obispo has been a Tree City USA participant for 39 years. The participation requirements include maintaining a tree board or department, having a community tree ordinance, spending at least \$2 per capita on urban forestry, and celebrating Arbor Day (Arbor Day Foundation, 2022). The City has also been the recipient of two Gold Leaf Awards from the International Society of Arboriculture (ISA).

One example of an opportunity to garner additional public support for the urban forest would be for the City to conduct or contract for an urban forest valuation study, the results of which could be publicized to City residents. Urban trees provide their many benefits in a more cost-effective way than human-made, “gray” infrastructure can (Nowak and Greenfield, 2018b). The value of just four urban tree-related ecosystem services in the United States is estimated at \$18.3 billion annually, namely: air pollution removal (\$5.4 billion), carbon sequestration (\$4.8 billion), lowered building energy use (\$5.4 billion), and avoided pollutant emissions (\$2.7 billion). In California alone, \$2.5 billion worth of street trees provide over \$1 billion in ecosystem services to state residents each year, including the removal of 567,748 tons of CO₂ annually, equivalent to taking 120,000 cars off the road (McPherson et al., 2016).

These dollar values can be significant at the city or metropolitan area level as well. For example, tree cover was estimated to have reduced stormwater storage costs by \$4.7 billion and generated annual air quality savings of \$49.8 million in a study of the Washington, D.C. metro area (Wolf, 2004). In another study, the USDA Forest Service calculated that the City of Santa Monica, California’s over 34,000 street and park trees are worth \$155 million and deliver \$5.1 million dollars’ worth of benefits to the community annually (McPherson et al., 2015).

Drilling down to the individual tree level, the planting and first three years’ care of a single urban tree (cost range = \$250 to \$600) was reported to return over \$90,000 in environmental benefits to its community (Burden, 2006). A 2002 study in Seattle, Washington reported that per-tree average annual net benefits were \$1 to \$8 for a small tree, \$19 to \$25 for a medium-sized tree, and \$48 to \$53 for a large tree (Wolf, 2004), although McPherson et al. (2016) reported a figure of over \$110 per tree for this (tree size not specified) in California. Assuming an average annual tree management cost of \$19, every dollar invested in tree planting or maintenance in California returns \$5.82 to its community in ecosystem services and increased property values (McPherson et al., 2016).

Estimates of the value of ecosystem services are often based on contingent valuation methods. Contingent valuation is a survey-based means of estimating the economic value of resources, often environmental benefits (for instance, air pollution removal) that are not typically traded in

economic markets (Jones, n.d.). The results of these studies may be useful for outreach to elected officials and the public because they translate sometimes arcane, intangible concepts into a format that is readily understood by all – dollar value.

However, it is also important to note that these often-impressive figures do not translate directly into revenue into the managing agency’s accounts, because they typically consist of avoidance of costs that would otherwise be borne by others. For example, if a city plants dozens of trees that eventually reduce household energy bills in a given neighborhood, the savings from those trees are realized by individual ratepayers, not by the city. On the other hand, from a broader perspective it can be argued that such projects have high value for all citizens because of the many co-benefits that become available as the trees grow, helping to justify the initial and operational taxpayer-based expenditures.

H. Address Equity Issues

Green infrastructure and the associated health benefits are not equitably distributed in the United States (Heynen et al., 2006; Landry and Chakraborty, 2009). Urban neighborhoods that were targeted for systematic disinvestment in the past (i.e., redlining) commonly lack adequate tree cover and other landscaping (Locke et al., 2021), depriving local residents of access to these benefits and exposing the residents to higher temperatures (due to the urban heat island effect) than are experienced in wealthier, tree-lined parts of the same city (Wilson, 2020).

This issue takes on even more importance in the context of increasingly severe climate change effects (e.g., extreme heat, drought, wildfire, flooding). The cumulative result is poorer public health and safety outcomes for the residents of tree- and landscaping-poor neighborhoods, leading to the question, “How can a city ensure that environmental, social, and economic benefits provided by the urban forest are equally distributed across all residents and neighborhoods, both now and in the future?”

In San Luis Obispo, Diversity, Equity, and Inclusion (DEI) is both a Major City Goal in the 2021-2023 Financial Plan and an important component of the City’s climate action plans as well as the 2023 Climate Adaptation and Safety Element (CASE). Davey Resource Group (DRG) addressed the topic of equity in their Urban Forestry Organizational Assessment for the City Public Works Department (Davey Resource Group, 2021). The Organizational Assessment states that while maintenance of trees in the public right-of-way is equally distributed across the entire city and public parks are located throughout the City, there are generally more opportunities for tree planting in newer neighborhoods than in older ones.

The DRG Organizational Assessment included the following recommendations regarding equity:

- Conduct an assessment to explore the distribution of public tree canopy and associated benefits by neighborhood, census tract, and/or other geographic metrics
- Coordinate with the City's Diversity, Equity, and Inclusion Task Force to identify gaps in equity as regards urban forest access and benefits
- Develop equity strategies around the urban forest.

The respondents to DRG's Community Benchmark Survey, conducted in support of the Organizational Assessment, were largely uncertain (63 percent) as to whether urban forest benefits are equally accessible to all in the city, while 20 percent said they are not and 16 percent believed they are.

The nonprofit organization American Forests maintains an online data tool called Tree Equity Score that estimates the equitability of tree canopy distribution in a city based on tree canopy cover, climate, and demographic and socioeconomic data (American Forests, 2022). The result is a score (0 = lowest, 100 = highest) that is calculated at the neighborhood (Census block group) level and aggregated to the municipal level.

San Luis Obispo has an overall Tree Equity Score of 74 out of 100 (Treeequityscore.org, 2022). The two highest scoring block groups are located between Broad Street and Santa Rosa Street, south of Foothill Boulevard and north of US 101 (score = 94; canopy cover = 27 percent), and an area mostly south of Foothill Boulevard including Ramona Drive and La Entrada Avenue (score = 91; canopy cover = 21 percent). The two lowest scoring block groups are an area around S. Higuera Street that includes Elks Lane, Bridge Street, and Fontana Avenue (score = 55; canopy cover = 9 percent) and the area immediately to the south of that but north of Tank Farm Road (score = 46; canopy cover = 7 percent). The Cal Poly campus, although not within the city limits, also earned a low score, 49 (canopy cover = 12 percent).

Appendix B: City of San Luis Obispo Designated Heritage Trees

San Luis Obispo's Heritage Tree Program serves to document the significant contributions of certain trees, illustrate their historical value, and call attention to specimens of significant arboricultural interest. Residents may nominate a tree for Heritage Tree status by contacting Urban Forest Services within the Public Works Department.

Currently 15 properties within the city host one or more designated Heritage Trees, as shown on the City's Heritage Trees GIS webpage (Andrews, no date):

<https://storymaps.arcgis.com/stories/fbc1b607a9454c66b4fc643518bfc1df>

The City's Heritage Trees are listed in Table 7. As of 2022, one of the Heritage Trees listed on the GIS webpage, a cajeput tree (genus *Melaleuca*) at 1359 Palm St., had been removed.

Table 7. City Heritage Trees by Site.

Heritage Tree(s) by Site	Address
Dawn Redwood (<i>Metasequoia glyptostroboides</i>)	237 Del Mar Ct.
Torrey Pine (<i>Pinus torreyana</i>)	60 Casa St. (behind Sagrado Corazon Townhomes)
Cork Oak (<i>Quercus suber</i>)	382 Lincoln St.
California Bay Laurel (<i>Umbellularia californica</i>)	Immediately south of Nipomo St. bridge over Brizzolari Creek
Coast Redwood (<i>Sequoia sempervirens</i>)	"Moon Tree" - south/west end of Mission Plaza
Japanese Maple (<i>Acer palmatum</i>)	Jack House & Gardens, 536 Marsh St.
Incense Cedar (<i>Calocedrus decurrens</i>)	The Monday Club, 1815 Monterey St.
Olives (<i>Olea europaea</i>)	1839 Conejo Ave.
Coast Redwood (<i>Sequoia sempervirens</i>)	1303 Higuera St.
Coast Redwoods (<i>Sequoia sempervirens</i>)	Dallidet Adobe & Gardens, 1185 Pacific St.
Deodar Cedar (<i>Cedrus deodara</i>)	1190 Buchon St.
Western Redbud (<i>Cercis occidentalis</i>)	1060 Pismo St.
Shamel Ash (<i>Fraxinus uhdei</i>)	Mitchell Park, 1400 Osos St.
California Sycamore (<i>Platanus racemosa</i>)	Old Mission Cemetery, 101 Bridge St.
Incense Cedars (<i>Calocedrus decurrens</i>) California Sycamores (<i>Platanus racemosa</i>) Queen Palm (<i>Syagrus romanzoffiana</i>) Blackwood Acacia (<i>Acacia melanoxylon</i>)	CalTrans District 5 Offices, 50 Higuera St.

The following pages contain photos taken at each Heritage Tree site in 2022. If visiting one or more of these trees, please be respectful of residents' privacy or posted hours of public access, as applicable.

A. Dawn Redwood, Del Mar Ct.





B. Torrey Pine, Casa St.





C. Cork Oak, Lincoln St.



D. California Bay Laurel, Brizzolari Creek





E. Coast Redwood, Mission Plaza (“Moon Tree”)





F. Japanese Maple, Jack House & Gardens





G. Incense Cedar, The Monday Club





H. Olives, Conejo Ave.



I. Coast Redwood, Higuera St.





J. Coast Redwoods, Dallidet Adobe & Gardens





K. Deodar Cedar, Buchon St.





L. Western Redbud, Pismo St.



M. Shamel Ash, Mitchell Park





N. California Sycamore, Old Mission Cemetery, Bridge St.





O. Incense Cedars, California Sycamores, Queen Palm – CalTrans District 5 Offices, Higuera St.









Appendix C: City Council Resolution

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RESOLUTION NO. 11407 (2023 SERIES)

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SAN LUIS OBISPO, CALIFORNIA, APPROVING THE COMMUNITY FOREST PLAN AND A DETERMINATION OF CATEGORICAL EXEMPTION FROM CALIFORNIA ENVIRONMENTAL QUALITY ACT

WHEREAS, San Luis Obispo residents and officials have long supported efforts to maintain and expand the city's urban forest; and

WHEREAS, urban forests provide environmental benefits including creating wildlife habitat, reducing stormwater runoff, filtering air pollution, producing oxygen; and

WHEREAS, urban forests provide social benefits including creating green spaces for recreation, improving aesthetics of streetscapes, improving public health, calming traffic and promoting pedestrian and cyclist safety, reducing noise pollution, and helping to reduce crime rates; and

WHEREAS, urban forests have been found through peer-reviewed academic literature to provide economic benefits including increasing property values, reducing building cooling costs and energy use due to shading and cooling effects of trees, increasing economic activity in commercial areas, and reducing demand on capital infrastructure; and

WHEREAS, investments in street tree planting and care therefore result in positive returns to communities by accruing environmental, social, and economic benefits; and

WHEREAS, despite the growing recognition of the value created by urban forests, the United States as a whole, and San Luis Obispo specifically, is losing trees due to development, pests and disease, wildfire, extreme weather, and deferred maintenance; and

WHEREAS, the City of San Luis Obispo Community Forest Plan provides a vision for a strengthened and expanded urban forest, and all the attendant multiple benefits to residents and visitors; and

WHEREAS, the Community Forest Plan comprises part of the City's climate action planning efforts through its addressing of the proposal to plant 10,000 trees by 2035, which would sequester and store carbon that would otherwise remain in the atmosphere; and

WHEREAS, on August 18, 2020, City Council adopted Resolution 11159, which approves the 2020 Climate Action Plan for Community Recovery and provides foundational actions to establish a trajectory towards achieving those goals, including an action to prepare a Community Forest Plan; and

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WHEREAS, on December 13, 2020, City Council adopted Resolution 11381, which approves the Climate Action Plan 2023-27 Work Program and provides work program tasks to advance climate action, including a task to adopt and implement the Community Forest Plan and make significant progress on the 10 Tall goal of planting and maintaining 10,000 new trees by 2035; and

WHEREAS, the preparation of the Community Forest Plan is also identified in the Major City Goal work program for Climate Action, Open Space, and Sustainable Transportation that is included in the City's 2021-23 Financial Plan; and

WHEREAS, the Community Forest Plan is categorically exempt from CEQA under Section 15262, Feasibility and Planning Studies, as an advisory planning document which has no binding effect on future activities; and

WHEREAS, as an overarching planning and guidance document that provides recommendations only, without regulatory authority or entitlement of projects that can be implemented directly that would have a physical effect on the environment, the project is also exempt under the General Rule, Section 15061 (b)(3) since it can be seen with certainty that the Community Forest Plan will not have a significant effect on the environment.

WHEREAS, as an implementation action of the Climate Action Plan, the proposed Community Forest Plan is consistent with the Climate Action Plan Negative Declaration filed with the County-Clerk Recorder and with the State Clearinghouse on August 19, 2020; and

WHEREAS, on February 27, 2023, the Tree Committee received a presentation on the City of San Luis Obispo Community Forest Plan and recommended that City Council approve the plan.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of San Luis Obispo as follows:

SECTION 1. Recitals. The recitals set forth above are hereby adopted as the findings of the City in adopting the policies herein.

SECTION 2. Environmental Review. The City Council has determined that the Community Forest Plan is categorically exempt from CEQA under Section 15262, Feasibility and Planning Studies, as an advisory planning document that has no binding effect on future activities. As an overarching planning and guidance document that provides recommendations only, without regulatory authority or entitlement of projects that can be implemented directly that would have a physical effect on the environment, the project is also exempt under the General Rule, Section 15061 (b)(3) since it can be seen with certainty that the Community Forest Plan will not have a significant effect on the environment.

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SECTION 3. Community Forest Plan. The City Council hereby approves the Community Forest Plan.

Upon motion of Council Member Mayor Stewart, seconded by Council Member Shoresman, and on the following roll call vote:

AYES:	Council Member Francis, Pease, Shoresman, Vice Mayor Marx, and Mayor Stewart
NOES:	None
ABSENT:	None

The foregoing resolution was adopted this 4th day of April 2023.

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 Mayor Erica A. Stewart

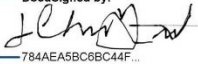
ATTEST:

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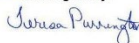
 Teresa Purrington
 City Clerk

APPROVED AS TO FORM:

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 J. Christine Dietrick
 City Attorney

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of San Luis Obispo, California, on 4/20/2023 | 11:41 AM PDT.

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 Teresa Purrington
 City Clerk

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