URBAN TREE PLANTING CHALLENGES IN SAN DIEGO COUNTY

SEPTEMBER 2022

TREE SAN DIEGO

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TREE SAN DIEGO

Tree San Diego is a 501(c)3 nonprofit dedicated to enhancing the quality, density, and sustainability of the region's urban forests for the benefit of all communities and the environment.

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California Department of Forestry & Fire Protection	Sacramento	California
City of San Diego	San Diego	California
Dudek	Encinitas	California
Forever Balboa Park	San Diego	California
Friends of the Urban Forest	San Francisco	California
Urban Corps of San Diego County	San Diego	California
West Coast Arborists	La Mesa	California

DEAR READER,

The effects of climate change have accelerated the conversation surrounding sustainable solutions to heal a warming planet. A popular topic within this discussion is the demand for tree planting as a natural remedy to issues stemming from urban heat islands, increased energy use, and environmental inequity.

Tree San Diego identified a number of challenges hindering the tree-planting process, many of which paused fieldwork programs and ultimately halved our planting efforts. We began reviewing the complexities of urban tree planting throughout the region and decided to collect insights from partners and like agencies to verify whether or not our limitations were faced by others.

What we have learned throughout this six-month review of project analyses, planting feasibility assessments, and funding allocation research is that no two urban forestry organizations are identical in their struggles – but tree planting as a practice is becoming more complicated throughout the state. While there are many challenges outlined in this report, also discussed are multiple solutions that are opportunities for project impact expansion, organizational growth, and reframing of funding campaigns to support existing and future urban forestry initiatives.

This report serves as the start to an ongoing conversation about unique, regional challenges to planting urban trees and the solutions needed to overcome them. We invite you to take part in this dialogue and to continue exploring ways to support your community's urban forest.

In service,

Elektra Fike-Data
Director, Tree San Diego

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INTRODUCTION

As concern continues to grow about the impacts of climate change in San Diego County, tree planting and urban forestry projects have become increasingly popular among city leaders and stakeholder groups. However, expanding the tree canopy through tree planting, especially in disadvantaged communities, is complicated and slowed by numerous challenges. This report seeks to evaluate those challenges and provide recommendations to streamline and improve future tree-planting initiatives.

In 2018, the United Nations' Department of Economic and Social Affairs reported that at least 68 percent of the world's population will live in urban environments by 2050. For the United States, the total jumps to 89 percent (1). In recognition, urban regions like San Diego County are developing plans to create greener and healthier environments for their growing populations.

Tree planting has become a top priority in local climate action plans (CAPs), in part due to the numerous benefits trees provide (2). These benefits include, but are not limited to urban heat island reduction, increased biodiversity, greenhouse gas sequestration, energy conservation, added property value, and improved mental health. All of the 16 CAPs proposed by local jurisdictions include tree-planting measures that commit to at least one urban forestry or tree-planting initiative per year (3).

Considered the "low hanging fruit" of CAP measures, tree planting, in theory, is a low-cost, low-impact mitigation strategy that serves communities for decades (or the full lifespan of newly planted trees). While the demand for expanded tree canopy and the growing interest of residents to participate in and support tree-planting projects is inspiring, the simple act of planting a tree is becoming increasingly difficult for a multitude of reasons.

From drought conditions and dated infrastructure to budget cuts and limited planting locations, agencies looking to plant trees for a greener future are facing an uphill battle. Exploring these challenges, however, has fostered collaboration throughout the region, and proposed solutions outlined in this report are encouraging.

COMMUNITY INSIGHT

"It was a surprise to learn how much consideration and thorough planning goes into planting trees. Understanding these best practices is important for city planners and community members alike."

– City Heights Resident

METHODOLOGY

To better understand tree-planting processes and their correlated challenges, Tree San Diego began quantitative and qualitative research throughout San Diego County. Stakeholder interviews and quarterly reports from state-funded mass tree-planting projects yielded the most comprehensive explanations for why tree planting has become difficult.

Stakeholder Interviews

Tree San Diego reached out to more than 20 organizations for discussion on this topic. Stakeholders contributing to the discussion about tree planting have represented cities, nonprofit organizations, colleges, arboricultural service companies, community groups, nurseries, and park agencies. Specialists consulted outside of the San Diego region are licensed tree-care professionals in the cities of Fresno, San Francisco, Los Angeles, Miami, Pittsburgh, and Tucson.

Funders of tree-planting projects were asked to anonymously share desires for ideal deliverables and metrics that would help define a successful planting project. This group of stakeholders included state agencies, national arboricultural organizations, existing project partners, one-time donors, corporate donors, and volunteers.

Preliminary Literature Review

In reviewing the existing literature published on urban forestry and the mitigation of climate change effects, three primary resources were identified for addressing tree planting as a specific measure to combat negative environmental change. These resources were CAPs, urban forestry management plans (UFMP), and traditional research publications such as journal articles and white papers.

Preliminary evaluation of CAP measures indicates that all of the local jurisdictions include a tree-planting component in their listed measures. These plans are often supplemented by a UFMP (4), which typically outlines the resources dedicated to maintaining a city's existing urban forest and the feasibility of expanding it. While the publication and implementation of a UFMP is not required of cities in San Diego County, the adoption of such a plan is highly recommended.

An expanded evaluation of CAP urban forestry measures by Tree San Diego is expected in late 2022. This report will outline the social, environmental, and economic challenges faced when implementing tree-planting measures at a city level. For the purpose of this report, Tree San Diego is focused on immediate challenges affecting tree-planting implementation countywide.

Journal articles and white papers referencing tree planting and the development of urban forests include a consistent discussion regarding the co-benefits of trees. Collective research conducted in 2022 drew connections between ecological and social concerns affected by local context and city capacity, while also creating a starting point to prompt management action and collaboration (5). Morzillo et al., also concluded that most urban forest management research has focused broadly and inclusively on all city trees (6), or emphasized planting of street trees and in parks (7).

With consideration of the expansive research that outlines the valuation of the environmental, social, and economic benefits of an urban forest (8), more data is needed to address the sustainability of introducing new trees to an urban environment and the long-term care of trees planted. While there is ample evidence that trees provide benefits across a balanced triple bottom line, more research into the challenges and complexities of implementing tree-planting projects is needed.

Fieldwork and Expertise

It should be noted that the Tree San Diego team (both staff and Board) has more than 70 years of combined expertise in the ISA Certified Arborist capacity. Partnering field teams and agencies working alongside Tree San Diego on mass planting projects add to this cumulative knowledge and provide additional insights to this discussion. With continued training and educational support from the Professional Tree Care Association, San Diego Regional Urban Forestry Council, University of San Diego, and the city of San Diego's Community Forest Advisory Board, regional arboriculture expertise continues to expand across sub-sectors.

IDENTIFIED CHALLENGES

Before analyzing the barriers to planting trees, it is important to consider the ideal planting project. Tree San Diego has outlined the elements of this hypothetical project as it pertains to planting in the San Diego region:

Ideal tree-planting project:

- Trees, materials, and labor are fully funded by a municipality, grant, or donor
- Arborist oversight is provided during planting activities
- A built-in irrigation system or watering plan is prepared prior to planting
- A low-water/drought-tolerant tree palette is utilized
- A 3- to 5-year maintenance plan is outlined and vetted prior to planting
- Planting takes place on publicly accessible land during ideal planting seasons for maximum environmental impact and higher likelihood of survival

In most cases, it is not difficult to plant a tree. One would only need a shovel, dirt, water, and the tree itself. This is a fairly easy task that does not require much planning for a homeowner. In an urban setting, planning is arguably the most important element for a successful planting. The lengthy logistical process of planting on public property in San Diego County makes planning imperative.

It is also essential to consider the planting process and what is required to ensure the livelihood of any tree planted. In its most simplistic form, this process begins with logistical planning and sourcing. Once these two steps are completed, planting and tracking will commence. Lastly, maintenance and monitoring must be conducted to ensure the health and stability of the tree.

Basic planting and care process:

Planning → Sourcing → Planting → Tracking → Maintenance → Monitoring

This six-step process is simple in theory but can be fraught with complications when people are hoping to plant outside of their own property. From insufficient funding and lack of political support to limited irrigation and sourcing issues, tree planting in San Diego County grows more complicated by the year.

In the following section Tree San Diego outlines the preliminary tree-planting challenges in San Diego County and later evaluates the unique logistics that dictate the feasibility of both small- and large-scale plantings. Secondary planting challenges are also included for reference.

Primary tree-planting challenges in San Diego County:

1. Limited planting locations and delays in inventories to identify planting zones
2. Lack of funding in select regions (e.g., can only plant in select census tracts)
3. Drought and lack of irrigation (e.g., irrigation is not included in project scope)
4. Lack of political support (e.g., resistance to CAP initiatives and implementation)
5. Compounding logistics* (e.g., specifications that dictate tree-planting success)

*See expanded content.

Secondary tree-planting challenges in San Diego County

1. Lack of project support or partnership and competing organizations
2. Workforce challenges (e.g., depleted workforce, turnover, inconsistent training)
3. One-time planting project funding does not cover labor or ongoing maintenance
4. Tree replacement requirements outweigh impacts of trees
5. Donor/grant restrictions and fiscal amount vs. impact (e.g., funders prioritizing planting in notable areas for project visibility instead of planting for greatest impact and benefit)

Of the identified challenges, locating places to plant trees currently dwarfs other limitations associated with regional planting projects in San Diego County. In many instances, organizations like Tree San Diego have received funding for labor and hundreds – sometimes thousands – of trees to plant throughout the region and cannot locate places to plant. Donations for trees peak during spring when Earth Day and Arbor Day are celebrated, and dozens of requests for planting-focused volunteer opportunities are received each year. While financing and support are sometimes available, planting zones are difficult to find, and volunteers are often turned away due to limited planting opportunities.

Delays in capturing tree inventories and the dwindling budgets to complete them lead to agencies depending on outdated maps to find places to plant. Few grants support the scouting of planting locations, which creates a dependency on cities to conduct inventories as well. There is community concern that local agencies are waiting for some trees to die so new trees can be replanted in the same location and thus count toward the current year's quota. Tree mortality data is needed to confirm this.

Urban forestry grants that require that trees be planted in select census tracts aim to address environmental justice concerns and effects of urban heat islands in neighborhoods disproportionately affected by climate change. When a region has fewer than 10 census tracts in which to plant, fewer planting zones are available. This causes focused saturation of planting on select streets, while other neighborhoods are neglected.

Complicating the search for planting locations is the paving-over of plantable areas. Hardscape materials like concrete and bricks are replacing viable planting zones in cities in need of expanded tree canopy.

Environmental challenges like drought and disease can delay tree planting if resources are not available to combat them. Irrigation systems, watering trucks and fully funded labor are needed to continue ongoing watering of newly planted trees. The same can be said for treatment and maintenance.

Political support for environmental programs often fluctuates based on the initiatives proposed. Urban forestry initiatives involve a number of bipartisan programs that many civic leaders support. Those initiatives, however, are at times folded into CAPs that are implemented if the entire plan is approved. Without the full support of a CAP to move forward, tree-planting measures become stalled. Support can wane based on changing political priorities and budget updates that impact new projects. It is possible that public works departments can continue their maintenance of existing trees and continue

to plant based on safety protocols, though without a robust planting plan or UFMP, the support for exponential urban forestry enhancement is limited.

Resistance by residents to take on the responsibility of planting or maintaining a tree is not uncommon. Through ongoing stakeholder surveys, Tree San Diego and its partners have learned that there is a common misconception that caring for a newly planted tree will require substantial financial investment by way of watering and trimming. Additional assumptions expressed by residents are that trees only provide aesthetic value and that their maintenance does not outweigh their co-benefits. Hesitation to have to water or clean up after trees is the chief reason for resistance experienced by Tree San Diego field teams.

A look at compounding logistics that dictate project feasibility helps to explain where the wish to plant a tree can turn into the dismissal of a planting event. Before planning a tree planting of any scale, the following preliminary questions need to be answered. These questions provide the foundation for the determination of feasibility:

- Is this tree planting part of a grant or contract, or is it a one-time event?
- Is funding available for trees and labor?
- Who is responsible for lifetime care and maintenance of the tree after planting?
- Is this planting scheduled for an ideal planting season?
- Which performance indicators or deliverables are being weighted most heavily? (e.g., Does the beneficiary of the tree planting have to be part of a priority population? Does the tree have to be planted on publicly accessible land?)

Tree San Diego is committed to conducting a thorough vetting process of all planting plans before moving forward with a project. This is paramount to the success of both the implementation of said project and the survivability of a tree. As the framework of a tree-planting project comes together, more information is needed to move forward during the planning phase. The logistics categories* evaluated are: location, workforce, species selection and sourcing, water, maintenance/monitoring/mapping, and materials.

*Topics not referenced: disease, infestations, soil health, contaminants

Trees requiring posts and supportive infrastructure need large wells and basins to hold water and allow for healthy rooting and establishment. Underground infrastructure should be checked before planting.

LOCATION

Query	Why is this important to consider?
Where is the tree being planted and is location limiting the feasibility of the project?	Locations of potential tree plantings need to be evaluated for suitability, access, and long-term care and maintenance. If a planting site is in a narrow right-of-way without irrigation, the tree is less likely to survive. Additionally, if trees are to be planted in a DAC, proper census tract maps must be consulted. Cultural considerations can also dictate where and how a tree is planted. Language barriers within multi-lingual neighborhoods need to be addressed when trying to educate the public about the benefits of trees. Some cities have "master street tree plans" that dictate where trees can be planted and what species are permitted; this can lead to strict tree palettes for physical planting locations vs general areas/regions or neighborhoods.
Who owns the land where the tree will be planted, and who is responsible for the tree after it is placed?	Many trees are available to be planted on residential property through partnerships with local community groups. Long-term care plans need to be considered if a renter or renting business agrees to care for a newly planted tree but later moves away.
Is this tree going to be planted on private or public land, and has approval for planting on this site been obtained?	Grants and funders sometimes require that trees need to be publicly accessible. In this case, trees would need to be planted on city/county land (e.g., park, street, canyon). Agreements obtained through the proper channels will be needed in advance of conducting a tree planting.
Is the overhead and underground infrastructure suitable for this planting?	Some cities have to abide by the local utility's tree-planting guide, which helps to determine the species planted under power lines to minimize fire danger. The same can be said for underground piping (sewage, water, electrical).
How are basin requirements starting to change where planting projects are implemented?	Depending on city ordinances and planning or zoning requirements, publicly accessed trees (trees along right of ways, in parks, or along accessible easements) may require minimum basin sizing. When dictated by state grants, the basin size requirement can limit the locations of where trees can be planted. More flexibility in basin size based on local conditions has been requested along with the institution of a minimum basin dimension.

WORKFORCE

Query	Why is this important to consider?
Are volunteers taking part in this planting?	Tree planting is an incredibly popular volunteer activity, particularly on Earth Day and Arbor Day in April. Having a volunteer workforce to assist in mass tree plantings can offload an ample amount of labor from a small team.
Are there any workforce liabilities? Are permits or waivers needed for this planting? Is insurance for volunteers, staff, or U18 needed?	Street closure and planting permits are often needed for public land plantings. Waivers for safety liabilities and even COVID-19 are required for staff and volunteers taking part in public and private planting activities. Consideration must also be given to paying prevailing wages for contracted work with public agencies.
Who is managing the initial planting efforts?	This information helps to identify who is responsible for gathering what is needed for a successful planting.
What materials are needed for laborers to successfully complete this planting?	The list of materials and the resources needed to procure them can often dictate how many trees are planted and when. Without adequate funding, tree stock, or tools, a planting of 100 trees might be scaled down to 10.
Who is responsible for ongoing communication about the tree(s)?	For some active grant cycles, agencies will require that the tree-planting organization remains in contact with the beneficiary to ensure tree health, site visits, and potential project auditing is addressed throughout the funding period. Grants that require trees to survive a certain amount of time after grants are completed improve accountability of the trees.

SPECIES SELECTION & SOURCING

Query	Why is this important to consider?
Is there an urban forestry management plan (UFMP) in this city?	The UFMP should always be considered before planning a planting and sourcing for a planting. If the preferred trees are not available or cannot be planted in a particular area, the scope of the planting will need to change. Biodiversity, stock quantities, and current environmental strains (e.g., infestations) should be considered.
Is there a city tree palette requiring select species to be planted?	Tree palettes (preferred species lists) help guide planting groups and organizations in selecting the right tree for the planting zone. If a city does not have a preferred palette, then the next factor to determine species selection must be considered (e.g., species that have high rates of GHG sequestration, trees with cultural or historical significance)
Is this tree planting part of a plan initiative (e.g., CAP)?	Perhaps a tree-planting opportunity will enhance an existing project. Trees planted as part of an independent project might be fruitful in data for a city's CAP or UFMP.
Where are the trees being sourced, and is the entire tree palette available?	Many considerations are discussed when selecting and sourcing trees, and "buying local" is part of the equation. Sourcing from a local nursery bolsters the local economy and provides local jobs. Palette diversification plays a role in how trees are sourced as well; this dictates where trees are purchased, which can lead to sourcing outside of the region.

WATER

Query	Why is this important to consider?
Where do the state and city policies stand on water use for trees and landscape during drought?	State-mandated water restrictions will have a significant impact on the ability to water trees. Government rebates are sometimes given to residents who discontinue irrigation and remove landscape and turf to cut back on water use. Trees are typically not set on separate systems from turf and landscape, leaving them vulnerable. Overhead sprinkler irrigation is extremely common and also typically the first irrigation type to be turned off as compared to drip irrigation systems. Drip systems are not always available for tree survivability during water restriction periods, thus leading to higher levels of tree mortality.
Is irrigation available? Is purple pipe water available?	Having adequate irrigation for a tree is as important as having adequate dirt, if not more so. San Diego County faces compounding drought-related issues that impede the survivability and sustainability of the existing urban forest, let alone of newly planted trees. To have additional water sources would be ideal. Purple pipe water is still being considered for irrigation.
How is the watering of a tree or the supporting irrigation infrastructure being financed?	A chronic limitation in tree-planting grants is the tree-to-water ratio, particularly reflected in budgets. Granters prioritize "number of trees planted" but do not want to cover the costs of watering the trees until the tree reaches its establishment period. If a planting agency requires that the planting of each tree includes the watering and maintenance for a three-year period, funders are often quick to find another planting organization to meet their "number of trees planted" KPI instead of commitment to survivability of trees planted.
Is mobile watering needed?	Many planting organizations utilize watering trucks to irrigate newly planted trees throughout urban landscapes. This is required because underground irrigation is not typically built into right-of-ways or along sidewalks, sometimes not even in parks. The rental or purchase of a watering truck is a significant budget item and therefore needs to be weighed before moving forward without established watering agreements.

MAINTENANCE, MONITORING & MAPPING

Query	Why is this important to consider?
Who is mapping/tracking this tree?	It is not always required to map and track a tree planted in San Diego County, but it is considered a best practice by urban forestry organizations. Mapping, tracking, and monitoring newly planted trees not only provide species and co-benefits data (such as that found on Tree Plotter and iTree; mapping sample shown on page 15), but also give urban foresters and the public an understanding of how trees are cared for in their region.
Which mapping details will be shared and with whom?	Some agencies require that sharing of tree mapping and GIS data remain limited. Others include tree-planting data on master planting maps that allow for tracking of independent projects and collective projects at the same time. Mapping and updating data typically require additional funding to maintain.
Who is handling quality control checks and how often?	In an ideal planting plan, ISA-certified arborists or tree-care professionals would assist in quality control checks for up to three years after a tree is planted. This long-term commitment needs to be considered in the early planning stages during development of the tree-planting scope to ensure that responsibility of care is properly assigned.
What is the ongoing care and maintenance plan for this/these tree(s)?	It is good practice to develop a maintenance/care plan before committing to a tree-planting project. This ensures that there is a responsible party taking care of the tree with both appropriate and adequate resources. Many grants require a multi-decade commitment to the maintenance of trees; this can be a difficult agreement to enter for nonprofit agencies looking to plant trees intended to live 40 years. Many community tree planting efforts are devastated by vandalism to new trees as well. This leads to higher mortality rates for some projects requiring trees to be planted in select census tracts.

Tree Inventory Sample Map, 2022

MATERIALS

Query	Why is this important to consider?
What is the budget for the tree planting?	In the majority of tree-planting projects, the budget will dictate what is feasible and what the KPIs are. Different species and sizes of trees require different materials with vastly differing prices (e.g., mulch, stakes, ties, tags)
Will hole digging or an auger be needed?	For large trees (e.g., 24" box) or in areas where dirt is tough, an auger might be needed to create an adequate hole for planting. This might also include the need for concrete removal, which could involve hiring additional support staff or contractors.
What size tree will be used for the planting (e.g., 5gl, 15gl, 24in box)?	The size of the tree requested will dictate elements of the budget that cascade into planning activities and determination of tools, staff, and scheduling.

DATA

Query	Why is this important to consider?
Which data need to be collected and why?	Ideally, data about each tree planted should be collected. This should include diameter at breast height (DBH), tree height, condition, species details, date of planting, and any issues with the planting site. Digital forestry data, including photogrammetry and multiple spectral imagining or LIDAR, help to explain canopy measurements and a tree's health. Mapping data further tell the story of an urban forest and allow for interpretation of broader trends (9).
Where are the current urban forestry data published for my city?	Urban forestry data are multifaceted and ever-changing. Cities will sometimes publish inventory data showing the number of trees tracked in an area or in the city's parks (e.g., ArcGIS or Tree Plotter maps where eco-benefits are quickly calculated and displayed), whereas LIDAR reports of entire regions can take months to prepare and might be shared through updated UFMPs. Regional and state agencies measuring wildfire impacts also include forestry data. Tree equity scores are produced by third party organizations to help draw attention to environmental justice issues too.
When and how should tree mortality data be shared?	Tree mortality should be shared publicly as often as tree-planting data is published. There is a large gap in reporting of this metric. The CAPs that include tree planting measures should include evaluation or audit of tree-planting projects on an annual basis.

Beyond logistical considerations, there is a philosophical concern regarding the "plant and walk away" mentality of tree-planting events hosted throughout the region. This is coupled with the common understanding that cities are reporting that they are planting trees every year, but few report those trees that do not survive or the number of trees that have been removed annually. This in turn skews the tree planting and co-benefits data that are published on behalf of CAPs, UFMPs, and celebratory Earth and Arbor Day acknowledgments. Consider this excerpt from Fargioni et al.:

While respondents to the forester survey reported substantial investments in site preparation practices prior to planting, most reported little investment into post-planting activities. Lack of post-planting activities, also known as "plant and walk away," can result in poor growth or survival of outplanted seedlings. A misplaced emphasis on how many trees are planted rather than how many survive and thrive can compromise reforestation success (10).

In addition, challenges with planting areas are occasionally ignored during initial scoping plans, which require on-site visits to planting zones. Those that were determined to be ideal settings for large trees are later deemed insufficient for even the smallest of species.

Narrow tree wells not suitable for planting approved street trees; San Diego, CA

The lack of proper maintenance and adequate watering is visible along select streets and in parks where infrastructure did not support the introduction of new trees. Poor tree placement, litter, and environmental neglect place strain on trees that are planted without a thorough approach to planting. Alterations to tree-planting plans can help mitigate and avoid the loss of trees in urban areas.
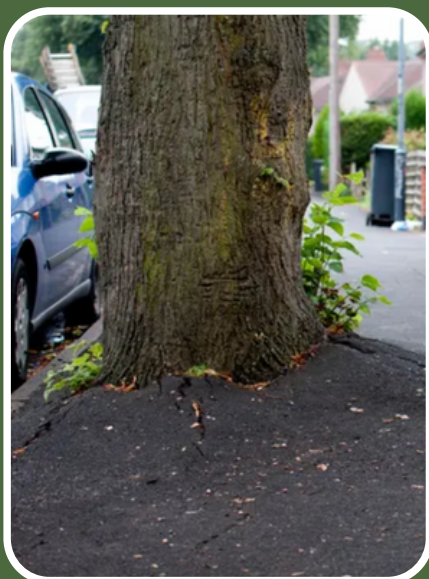
Trees suffering from inadequate watering, paving and planting; San Diego, CA

SOLUTIONS & OPPORTUNITIES

While additional funding helps to overcome barriers to tree planting, support for the urban forestry sector often takes different forms. Tree San Diego has identified a holistic approach to expanding tree-planting projects and impacts by highlighting opportunities that reach beyond the bank account. From redefining the role of the "environmental nonprofit" to restructuring grants, more can be done to champion urban forestry efforts and effectively bring the benefits of trees to more San Diegans.

Redefining stakeholder roles: Organizations dedicated to planting trees are part of a growing network of leading environmentally-focused stakeholders. While those like Tree San Diego continue to plant and care for trees in their respective regions, exploration of additional service lines and ways to increase stakeholder involvement has become paramount to amplifying urban greening projects. In addition to tree planting, environmental organizations and departments that plant trees need to promote urban forestry education, awareness, technology, and complementary initiatives throughout their project cycles. "We are not just a tree-planting team" has become a statewide echo amongst urban forestry crews, which further indicates the importance of holistic approaches to urban greening proposals.

Enhancing partnership and collaboration: Cities, communities and funders play significant roles in successful planting projects. Leveraging partnerships with corporate philanthropies and community leaders can help fortify messaging, demand for green solutions, and increased visibility of planting projects. Moreover, collaborating with other environmental agencies can help eliminate siloing and expand efforts to create sustainable solutions. Examples of this include Tree San Diego's partnership with Urban Corps of San Diego to train and educate tree workers in the field; City of San Diego collaborating with San Diego Gas & Electric to expand outreach efforts in DACs to bring awareness to free tree programs; and tree-planting groups supporting local nurseries to develop "buy [source] local" programs. Through these partnerships, different agencies can lean on each other to build stronger communities and reliable systems that elevate environmental projects.

Restructuring grants and financing: Public and private planting grants are beginning to face scrutiny as they continually fail to include irrigation and expanded planting zones in the parameters. If grants and donor stipulations allow for tree care and maintenance (including watering throughout a tree's establishment period, especially in drought-prone regions), tree mortality rates will come down and a more sustainable forest will be planted. Flexibility of planting zones would open up planting opportunities to neighboring communities and to East County cities that are often overlooked in grant beneficiary lists. Creating a financing plan for irrigation or conducting a watering resource audit of the

recipient (e.g., city or neighborhood) to verify that continued watering of newly planted trees is possible and probable would determine if the placement site is suitable.

Building long-term plans and goals: Advance preparation of one-time tree-planting opportunities requires continued donor giving and grant support beyond the planting season. One-time planting events are currently facing backlash due to the "plant it and leave it" approach by corporate donors looking to engage their employees during a one-time volunteer event. Long-term planning grants and urban forestry measures in CAPs and UFMPs will need fiscal support as well. Strategic planting opportunities need to be prioritized in urban heat islands and in neglected areas where grants based on target areas do not reach.

CONCLUSION

Tree planting is a popular and worthwhile initiative in San Diego County. It is also a difficult seasonal task when resources are scarce and there are few opportunities to plant. If an agency has a desire to plant more trees, all pre- and post- planting logistics should be considered to create suitable conditions for planting success. This includes but is not limited to identifying the proper location to plant, allocating funds for labor and materials, reviewing species and sourcing parameters, and building a planting project that meets the needs of the community while still meeting the aims and objectives of the grant or donor supplying fiscal support.

Learn more at www.treesandiego.org

PARTNER PLEDGES

"We need to ensure the livelihood of the existing urban forest before we introduce new trees without long-term care, watering, and maintenance plans."

– Certified Arborists, Otay Mesa-Nestor

SOURCES

(1)   World Urbanization Prospects, UN Department of Economics and Social Affairs, 2018

(2)   City Forests: Function, Scale, And Value of Climate and other Benefits, 2020

(3)   Tree Planting: A Climate Action Plan Measure of Promise, 2022

(4)   Urban Forest Management Project Protocol, Climate Action Reserve, 2019

(5)   Urban forest patch governance in four eastern US cities, 2022

(6)   Defining urban forestry: A comparative perspective of North America and Europe, 2006

(7)   Decision-making of municipal urban forest managers through the lens of governance, 2020

(8)   The benefits of trees for livable and sustainable communities, 2019

(9)   Digital Forestry: A White Paper, Journal of Forestry, 2005

(10)   Challenges to the Reforestation Pipeline in the United States, 2021

GLOSSARY

Biodiversity: The variety of life on Earth; often used more specifically to refer to the total variety of species within a certain region or ecosystem. Biodiversity can be subcategorized into four types of diversity: species, genetic, ecosystem, and functional. Biodiversity encompasses the cooperative nature of species' ability to work together to survive and maintain their ecosystems, or the overall global eco environment. Human consumption, pollution, climate change, and population growth are just some of the factors actively contributing to the exponential rise of the extinction of species, which, in turn, alters the biodiversity and survival of their respective ecosystems. Conservation efforts are necessary to preserve biodiversity and protect endangered species. Also called "biological diversity."

Carbon sequestration: The process of capturing and storing atmospheric carbon dioxide, often for long periods of time. This can be both a natural and artificial process, and refers to the storage of carbon before it is released into the atmosphere. There are two types of natural carbon sequestration: geologic and biologic. Geologic carbon sequestration refers to CO_2 collection in underground geologic basins by its pressurization into liquid form. Biologic carbon sequestration refers to the storage of carbon in vegetation, soils, woody products, and aquatic environments. In response to the high levels of carbon dioxide in the atmosphere (accelerated by climate change and the burning of fossil fuels), new technologies are being developed to capture and store carbon dioxide artificially, such as alterations in land use and forestry, and geoengineering techniques.

Climate Action Plan (CAP): A comprehensive roadmap outlining activities for a city or agency to undertake to reduce greenhouse gas emissions and other climate-related impacts. This is a detailed framework customized by municipalities that often involves activities including the measurement of existing greenhouse gasses, reduction goals or actions, and implementation strategies that identify required resources and funding mechanisms. The plans may also focus on strategies pertaining to clean energy, economic and social goals, or other supporting activities that aid the reduction of greenhouse gasses or general climate action.

Disadvantaged Community (DAC): A census tract identified as having a median household income (MHI) less than 80 percent of the statewide MHI. In California, however, CalEPA further defined and identified disadvantaged communities in response to the passing of the SB 535 legislation, to allocate funding for the reduction of greenhouse gasses statewide. These areas suffer most from a combination of economic, health, and environmental burdens, including poverty, unemployment, air and water pollution, presence of hazardous waste, and illnesses such as asthma and heart disease, among others. DACs are not specific to California and are designated differently from state-to-state.

Greenhouse gases (GHG): Gases that trap heat in the atmosphere and contribute to warming of the planet. This process is referred to as the "greenhouse effect" and is mainly caused by carbon dioxide, methane, nitrous oxide, water vapor, and fluorinated gasses. Human activities, such as the use of fossil fuel combustion and industrial processes, have drastically increased the proportion of these gasses in Earth's atmosphere, and subsequently led to an increase in global warming.

ISA-certified: This designation refers to professional arborists who have been certified by the International Society of Arboriculture. In addition to adhering to a specified Code of Ethics outlined by the ISA, accreditation requires passing an exam proving an applicant has been trained and is knowledgeable in all aspects of arboriculture. Applicants are required to have three or more years practical work experience in arboriculture, as well as a degree in the field of arboriculture, horticulture, landscape architecture, or forestry from a nationally accredited educational institute. The ISA certification must be maintained by annual CEU's (minimum 30 hours every three years) to keep the credential.

Outplanting: The act of transporting plants from a nursery bed, greenhouse, or other location to an outside area. A tree that has been outplanted has typically been purchased at a nursery or grown privately and relocated to a final destination for the remainder of its growth process. The success of outplanting requires careful consideration of many factors, including soil quality, proper site appropriation, temperature, planting and watering techniques, proper plant/tree species allocation, and more, to contribute to the healthy relocation of young greenery. Long-term monitoring is necessary to sustain the health of a given outplanted tree or plant.

Overhead vs underground infrastructure: The location of electrical wiring underground or overhead. Though overhead power lines are typically more economical, they are more susceptible to extreme weather, and potentially more dangerous. Aesthetics is often a driving factor on decisions about placement of electrical lines underground in residential or scenic areas. Overhead and underground infrastructure are common obstacles when undertaking tree planting efforts.

Purple pipe water: Recycled wastewater that has been filtered to a point where it is suitable for irrigation, agricultural and industrial use, although it is not clean enough for drinking. The name refers to the purple color the pipes are painted to differentiate them from those for drinking (aka "potable") water. This is seen as a way to supply water for irrigation in dry areas like San Diego without drawing on the potable water supply. This system is already in use by the city of San Diego and San Diego County, and in other states like Arizona and Colorado. There is some debate as to whether or not this is more cost-effective than purifying wastewater to a potable level and reintroducing this into the potable water supply through the existing infrastructure. Different from graywater, which is unfiltered water from non-toilet use.

Reforestation: The restoring of forests where they once existed but were diminished or destroyed, either by humans or by natural disasters/processes. This is done to regain the environmental and ecological benefits of forests and trees, with carbon sequestration often cited as a leading benefit. Involves promoting natural regeneration from existing trees or actual replanting, depending on the situation.

Tree canopy: The amount of overhead tree cover provided by the urban forest. It is considered a measure of an urban forest's ability to moderate temperature, filter air, and manage water runoff. The level of tree canopy coverage is often considered when assessing and setting goals for a community's urban forest, and is usually given as a percentage of the total ground area covered. Techniques and tools such as satellite or aerial imagery analysis are used to assess the amount of coverage. Alternatively: The top layer of a tree or trees, made up of the tree crown.

Tree palette: Tree species selected for a given project or situation. Diversity of species is key to prevent mass loss from invasive species or diseases, a constantly evolving problem in California. Water use and climate suitability, as well as the desired benefits, must also be considered. Often cities or other local governments will specify tree palettes for their urban forests, which may also be influenced by aesthetic concerns.

Urban forest: Trees in a city or urban area, both on private and public land. Urban forests are shown to have a wide range of benefits, including carbon sequestration, soil protection, physical and mental-health benefits, water runoff control, air filtration, and temperature moderation.

Urban Forestry Management Plan (UFMP): A document that a community, often a city, creates to outline its goals and practices involving its urban forest. It often includes an evaluation of the current urban forest, an explanation and analysis of the benefits of urban forestry, a statement of the city's goals, and the plans and methods the city will use to reach these goals and manage its urban forest.