Urban Greening Guide

Urban Greening in the Southern California Desert





The best time to plant a tree was 20 years ago. The second-best time is now.

- Chinese proverb

Coachella Valley Association of Governments

October 2021

CVAG

Introduction

The purpose of this guide is to share the benefits of sustainable tree planting with desert homeowners and local jurisdictions to promote urban greening. Urban greening refers to public landscaping and urban forestry projects that create mutually beneficial relationships between city dwellers and their environments. The guide highlights the benefits of trees for cooling, reducing energy consumption, enhancing climate resilience, and promoting wellness. Resources on urban tree planting include tree selection, proper placement for tree planting, and a tree palette.

The desert environment is changing, presenting challenges for growing and maintaining healthy trees. Within the last 20 years, the average yearly temperatures have exceeded the long-term average.[1] Mean temperatures recorded at Coachella Valley weather stations in Indio and Palm Springs have increased 5-6 degrees Fahrenheit over the last 40 years.[2] (WesternRegionalClimateCenterIndioFireStation). Other indicators of climate change affecting trees include drought, heatwaves, record-setting temperature extremes, and increases in damaging insects and disease. These indicators suggest that the desert region should make cooling services a priority, to build resilience to heat-related impacts. Trees offer many benefits to keep urban areas cool in the increasingly hot summers that lie ahead.

> Research done in the Coachella Valley found that areas shaded by trees or vegetation had a ground surface temperature more than 50 degrees F cooler in the summer compared to an exposed, paved parking lot.
>
> - Janet Hartin,
> Area Environmental Horticulture
> Advisor with UC Extension

The information in this guide was compiled from Coachella Valley Association of Governments (CVAG) cities and other desert programs. Arborists, landscape architects, and other landscape professionals were consulted on tree selection and tips for keeping urban trees healthy and long-lived. maintenance practices. These experts provided insight on trees most suitable for the desert climate that helped in development of the tree palette.

Trees, whether for a residential lot, a city park, or to shade a walking path, are an investment of time and money. And, under the best of circumstances, the desert is a challenging environment for trees to grow. Change in the desert climate is affecting the ability for trees to grow successfully and survive for their expected lifespan. Selecting the right tree and ensuring it has the best chance to survive will protect your investment, whether it is one tree for your home, or many trees for a public green space.
There are many great local resources on desert landscaping and trees and this guide is not intended to replace these publications. Check the Resources section to find links to sources with detailed information about planting, irrigation, maintenance, and tree selection.

Acknowledgements

This guide was developed through a collaboration between CVAG and CivicSpark. CivicSpark is a program of the Local Government Commission and Americorps, dedicated to building capacity for local governments by implementing community resilience and sustainability projects. CivicSpark Fellow Tory Brewster developed and authored the guide during her CivicSpark year with CVAG. Energy and Environmental Resources Department staff assisted with the guide development and provided editorial support.

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Section 1:
Benefits of Trees

NATURAL / ENVIRONMENTAL BENEFITS

Section 1: Benefits of Trees

The desert region is becoming increasingly urbanized. Green spaces in a community are of vital importance to the urban ecosystem. The benefits to humans from nature are known as ecosystem services, often defined as direct and indirect contributions of natural systems to human well-being. We depend on nature for local ecosystem services that have a substantial impact on the quality of life in our communities. Urban greening encourages communities to enhance urban green spaces including parks, street trees, urban trails, desert washes, and cultivated land.

Natural/Environmental Benefits:

Trees offer many environmental benefits in the urban environment. Trees will:

- Reduce energy use through cooling effects and shading buildings
- Improve air quality by absorbing and filtering pollutants
- Reduce urban heat island effect
- Provide habitat for wildlife and enhance biodiversity
- Manage stormwater, reduce flooding, and improve water quality
- Reduce greenhouse gases by carbon sequestration and avoided carbon emissions from reduced energy use
- Beautify a neighborhood
- Reduce exposure to harmful UV radiation[3]

Cooling Benefits of Trees

A significant benefit of urban trees is their ability to moderate temperature and microclimate. Planting the right tree in the right place is key to maximizing the energy-saving and other benefits that trees provide. When planted properly, a single tree can:

- save a homeowner up to 20% on energy costs.
- directly shade your home or buildings, decreasing the need for air conditioning and reducing your energy bill,
- make your home or office more comfortable
- protect your family's health by improving air quality, providing cooling shade for outdoor activities



Trees along the west facing side of buildings shade windows and walls from direct sun. Palm Desert City Hall

The cooling benefits of trees are enhanced by the tree's "canopy", the total amount of leaves and branches which intercept sunlight. Shade from tree canopies creates cool areas underneath by intercepting solar radiation and preventing the warming of the land surface. Selecting trees with broad canopies will provide more shade in parking lots and other urban spaces.

> In urban heat islands, nighttime temperatures can be as much as 22° F higher as the heat is gradually released from buildings and pavement.
>
> - *Center for Climate Change and Health*

Improve Air Quality

As urban temperatures increase, so too do airborne pollutants and smog.[4] Trees benefit urban environments by removing significant amounts of major air pollutants, equal to removing the carbon dioxide emissions from 138,510 cars. The ecosystem service urban trees provide is valued at $5.4 billion dollars. The value is based on avoided health care costs, productivity losses associated with adverse health events, and longer lifespans.[5]

> Across an entire city, small changes in air temperature could be a huge benefit as it can slow the formation of smog. Just a couple of degrees can also reduce peak power demand, by reducing the energy load from air conditioning.
>
> *-Lawrence Berkeley National Laboratory*

Provide Windbreaks

Trees also decrease the wind speed under their canopy and shield buildings from cold winter breezes.[6] The more compact the foliage on the group of trees, the more effective the windbreak.[7] To create windbreaks, plant trees north and northwest of a structure. Planting trees on the north and northwest of a building can reduce energy use in the winter.[8] In an area with consistently strong winds like the Coachella Valley, this is yet another benefit of trees.

Enhance Wildlife Habitat and Biodiversity

Just as they provide benefits to humans, urban trees and green spaces provide habitat for wildlife. A lot of attention has been focused on the importance of bees and other pollinators to the ecosystem and the agricultural economy. Selecting specific trees that meet the needs of pollinators encourage these beneficial critters and increase their chance of reproduction. Green spaces and urban trees, especially native species also:

- provide food for wildlife.
- offer nesting and roosting sites for many birds in an urban environment.
- serve as habitat corridors, providing pathways for wildlife to reach surrounding natural habitat.
- provide resources for urban animals, increase biodiversity in urban green spaces.



Desert willow flowers in a parking lot attract birds, bees, hummingbirds

Within urban green spaces, enhancing biodiversity by planting a variety of tree species improves the quality and quantity of habitat for wildlife, reduces the risk of pest infestations, disease, and increase resilience.[9] Sustainable ways of managing urban trees to attract wildlife include avoiding disturbance when pruning to nest sites during the nesting season and avoiding herbicide use. By managing urban trees sustainably, our communities will be enriched by the presence of birds, bats, bees, and other beneficial wildlife for years to come. New management options should be tested and incorporated into local plans to improve sustainable and biologically rich urban green areas.

> Ultimately we need to recognize that while humans continue to build urban landscapes, we share these spaces with other species.
>
> *David Suzuki*

Tree Inventory

Another way to promote biodiversity is to inventory the trees in a community to establish a baseline for setting management objectives. An inventory provides a way for a community to determine what trees they have and where they are planted. Tree inventories collect information on tree species, location, and overall health. Inventories can be conducted on all trees in a municipality, a sample of trees, or on select trees. Data can be used to identify management objectives, identify the diversity of species in an area, and provide information on tree age. Forest assessment tools include the American Forests' CITYgreens and the United States Forest Service's i-Tree (please see Resources section).

ECONOMIC BENEFITS & ENERGY SAVINGS

Economic Benefits:

Besides the beauty they add to urban green spaces, trees have many benefits, including economic benefits. For the United States, the total economic value of the natural benefits that trees provide, including cooling and reduced building energy use, pollution removal, carbon sequestration, and avoided pollutant emissions is $18.3 billion annually or $687 per acre of urban tree cover.[10]

Trees will:

- Save energy and cut costs for summer cooling (shade) and winter heating (windbreak)
- Increase property values, benefiting owners and increasing local tax revenues
- Boost business/commercial district activity and appeal

- Support green industry jobs
- Reduce costs to taxpayers for traditional “grey” infrastructure
- Increase pavement life
- Provide recyclable material such as mulch

Energy Savings:

> Trees can help reduce the roughly 40% of all US energy consumption that is generated by residential and commercial buildings.
>
> -*Vibrant Cities Lab*

Another significant benefit of urban trees is their ability to moderate temperature and microclimate. Shade trees intercept sunlight before it warms a building. Numerous studies suggest they keep your home and property cooler and reduce energy and cooling needs by 20 percent or more. Urban trees also reduce stormwater runoff, minimize soil erosion, and improve urban air quality by reducing smog, which also results in cost savings.

SOCIAL AND WELLNESS BENEFITS: EQUITY IN URBAN GREENING

Social and Wellness Benefits: Equity in Urban Greening

Cities globally have incorporated sustainable development into their planning and led the way in responding to the world’s ecological crisis by “going green.” In addition to natural benefits and cost savings, urban greening provides social and health benefits. Urban green space accessibility is considered as the key to urban sustainability progress, not only environmentally, but also economically and socially.

Though not an exhaustive list, some of these social and equity benefits include:

- Promote public health and wellness
- Encourage physical activity and strengthen community engagement
- Offer safe places to gather
- Reduce crime
- Enhance neighborhoods by creating attractive, shaded outdoor spaces
- Promote social equity and environmental justice in underserved communities
- Create visual and sound buffers
- Create and enhance walkable streets

Health

An increase in the number and intensity of heatwaves has been linked with heatstroke, hypothermia, and increased death rates. The health benefits of pollution removal by trees have been shown to reduce incidences of human mortality and significantly reduce incidences of acute respiratory symptoms.



A relaxing green space at Cancer Survivors' Park, Rancho Mirage

These benefits increase as population density increases because more people receive the pollution removal benefits of trees. Vegetation cover, greenness, has been associated with other health effects such as childhood obesity rates. In addition, research shows that urban trees and vegetation can increase mental energy, improve worker attitudes on the job, and reduce stress, anger, depression, and anxiety.

Supporting Underserved Communities

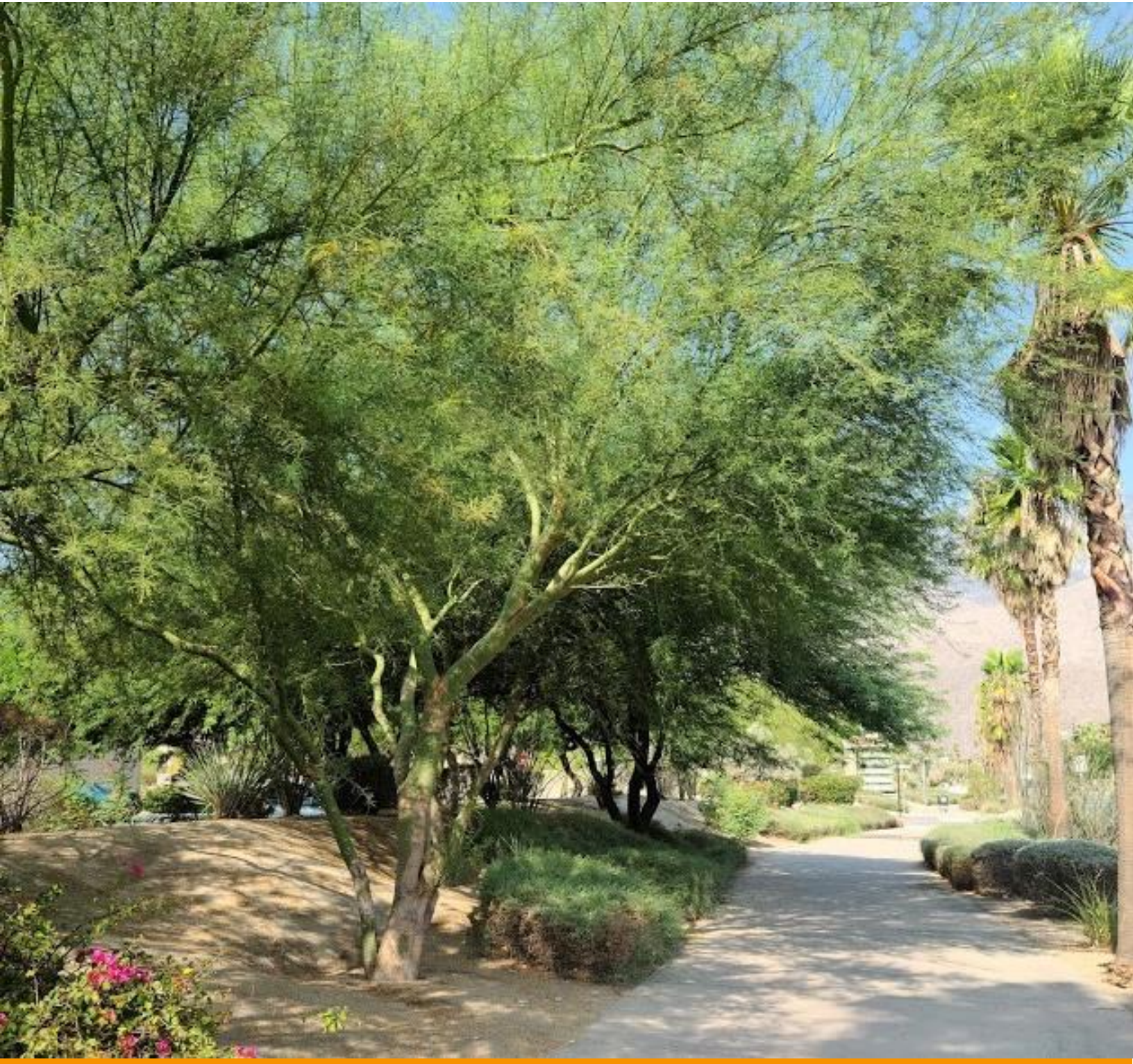
Inequalities in the availability of urban greening enhancements and associated benefits can occur in areas with fewer homeowners and more rental housing. Renters do not own and control the property where they reside and so may be less able to plant and maintain trees. Renters also have a higher rate of mobility than homeowners. Trees require long-term maintenance, and renters may be less able to take on the responsibility. Therefore, areas dominated by rental housing are less likely to have tree cover and receive the natural benefits trees provide.

Equity assessments should be done to consider the current distribution of greening services in traditionally disadvantaged and marginalized communities.

When people have access to natural elements, they experience better health outcomes.[11] Public housing residents report that they can better cope with major life stressors such as poverty, the threat of violence, and raising children in impoverished conditions when green spaces are available.[12]

> Growth is inevitable and desirable, but destruction of community character is not. The question is not whether your part of the world is going to change. The question is how.
>
> *-Edward T. McMahon*

When planning an urban greening initiative, it is essential to incorporate principles of environmental justice and involve community members from underserved communities.



Section 2:
Best Locations for Tree Planting

Section 2: Best Locations for Tree Planting

General Planting Considerations

Placement: Right Tree, Right Place

Proper tree placement can make a big difference in the benefits that tree provides for the urban ecosystem. Planting a tree that is too large for the space provided or in an area that is inadequate for the tree will reduce its success and likely reduce lifespan.[13] One of the principles of selecting the right location to plant trees is using the "Right tree, Right place" method.[14]



These trees have enough space to grow to mature height and are well-placed to provide shade for park seating, creating a natural "cooling center." Cathedral City Hall

Right Tree

In making a tree selection, think about the multiple benefits your tree will offer. A tree to provide shade can also support pollinators, provide nest sites for birds, and edible fruits for humans. Here are some suggestions to think about when selecting the right tree:

- The tree's full-grown size is suited for your site and the space available to plant the tree. The Tree Palette (please see Section 5) can be used to check the size of the tree.
- Only vigorous, healthy trees should be selected because unhealthy trees may present hazards, introduce disease, and unnecessarily increase costs.
- Native species should always be preferred when planting trees in urban areas.
- Native species are better adapted to the local environment, which means they will grow more efficiently and require less water and maintenance.
- Native species also provide better habitat resources for native bees, pollinators, birds, and other wildlife species.
- Cultivars and non-native species that are not invasive may also be selected. Make sure they are tree species that do well in the desert climate and are water efficient.
- When selecting plants for urban greening, think about future shifts in the range of native species due to climate change. As temperatures warm, the range of commonly used desert tree species and their natural boundaries will shift as well.[15]

- Other factors to consider are climate, soil, environmental conditions, planting space, existing vegetation, aesthetics, land ownership and regulations, social influences, and maintenance requirements.[16]

Right Place

Our experts emphasized the importance of planning and design considerations before planting trees. When considering the right place to plant a tree, here are some things to think about:



These trees provide shade at southwest corner of building. It is best to plant trees a minimum of 15-20 feet away from your foundation. Indio City Hall

- Purpose for planting the tree.
- Soil, sun, and moisture conditions
- Tree location (the right place),
- Species growth and form (the right tree)
  - **Height.** Will the tree bump into anything when it is fully grown? Size of a tree at maturity indicates how far away from pavement and powerlines trees should be planted.
  - **Canopy spread.** How wide will the tree grow? Trees with a large canopy provide the most shade and reduce heat.
  - **Form or shape.** Round and V-Shaped species offer the most shade. A columnar tree will grow in less space but may not offer as much shade.
  - **Is the tree deciduous or evergreen?** Will it lose its leaves in the winter?
  - **Growth rate.** How long will it take for your tree to reach its full height? Slow growing species typically live longer than fast growing species.
- Undesirable features. The type of litter a tree drops, such as flowers, berries, pods, sap, and thorns, should be considered for trees in parking lots and other public settings.
- Hardiness zone indicates the temperature extremes in which a tree can be expected to grow. To encourage longer tree life, plant trees in locations where they have enough space to grow. Depending on the mature size of the tree, suggested minimum widths of planting sites for trees are:
- 3 to 4 feet for small trees,
- 4 to 6 feet for medium trees, and
- Greater than 6 feet for large trees

A common theme in the comments from experts was that trees in this region don't live as long as they should, sometimes dying in 15 years or less. Factors that contribute to tree longevity include proper irrigation, permeable surfaces/pavements, quality of tree selected, space the tree needs to grow, and proper maintenance. Some of the challenges for urban trees in the desert region include:

- Improper maintenance and irrigation seem to be the most common issues affecting landscape trees in the desert region.
- Space needs to be big enough for tree to grow. Need larger planters, especially in parking lots.
- Use native species as much as possible.
- Select trees based on low water use.
- Good drainage is essential. Permeable pavers and other permeable materials allow some water to percolate.
- Irrigation is critical to success of trees. Trees need deep watering, not the same schedule as your lawn. Need more frequent watering at first, but over time more infrequent, longer duration (deeper) watering.
    - Drip irrigation allows water to slowly percolate into soil
    - Try an “ooze tube” – 25 ft soaker hose coiled around the base of the tree (less expensive too)
    - Smart timers help deliver water at best schedule
- Pruning and trimming practices need improvement. Don’t top trees as they are more likely to fail. Select trees that don’t interfere with powerlines.
- Allow trees to develop their own natural shape. Allow tree to develop with multiple trunks which better support the tree canopy at maturity and reduce branches breaking.
- Avoid monocultures – use a diversity of tree species.
- Plant palettes from ten years ago need to be updated. There’s a “new normal” affecting trees - extreme heat, climate change, new diseases, and problem insects.
- Plants with more leaves will absorb more CO_2.
- Trees that grow too fast can be weak, get too big, then branches snap.
- Prioritize shade for cooling benefits, reducing heat-related illness.
- Need to allocate money/resources to maintain trees. Avoid species that require too much maintenance.
- Use tree species that are “desert tested.” Our climate is very different from other regions; be cautious with “out of area” recommendations
- Incorporating water saving measures in urban greening projects reduces the cost of water. Creating natural drainage swales or basins that absorb water are two ways to save water.
- Education is needed about tree selection, maintenance, pruning, watering, trees that enhance biodiversity. Involve water agencies, master gardeners, others.



This multi-trunk tree provides shade for sidewalk and seating area and has enough space to grow into its mature height. Along Fred Waring, Palm Desert.

A local arborist or tree care professional, utility company, local nursery, or county extension office can help with proper tree placement.[17]

Shade

In the desert, shade is the first step to reduce energy consumption and save money. Placement of a tree is the key to energy savings. Shade trees do affect summertime electricity use, but the amount of the savings depends on the location of the tree. Strategically placed trees that shade roofs, walls, and walkways will block and dissipate the sun's rays, shielding buildings from unwanted heat.

So, determine the best location for tree planting to maximize the shade benefits of a tree. Trees planted on the south and west sides (or the southwest corner) of a building will create shade from the summer sun, especially in the afternoon, the hottest part of the day.[18] Planting trees on the west side of your property can save as much as 35 percent off air-conditioning bills. Planting trees to shade windows and walls also adds comfort and value to homes and other buildings.

> On the south side of a building, a medium size deciduous tree can reduce irradiance by 80% with leaves on it and 40% leafless, generating energy savings of 2 to 7%
>
> - *Vibrant Cities Lab*



Trees planted along this south-facing wall provide shade for this building during the hottest part of the day.

SPECIFIC SITE GUIDELINES

Specific Site Guidelines

This section looks at some of the things to consider when planting trees in specific sites and provides some suggestions. Consider the opportunities to take advantage of multiple benefits of trees. For example, a parking lot with broad canopy trees offers a lot of shade and also nesting sites for birds. Can the tree be placed to provide shade for a parking lot, a sidewalk, a building at the same time?



Trees planted along a sidewalk on the west-facing side of this building provide multiple shade benefits



Desert willow in parking lot provide shade and produce showy flowers that attract pollinators.

Public Spaces

The size of the tree canopy is an important factor when it comes to selecting trees for parking lots, sidewalks, and other areas where maximum shade is desired. Using the cooling services trees provide is enhanced by placing them in areas where shade is most needed, around well-used park benches, bus stops, walkways, or to shade buildings.

Parking Lots

- Make shade the priority in parking lots
- Larger planters will give trees the room they need to grow and support larger trees which provide more shade.
- Some trees produce sticky substances or fruits, less desirable in parking lots
- How many trees? Suggestions include one tree for four parking spaces, 13 to 15 trees per 1,000 square feet.



Mature Palo verde trees create deep shade in this parking lot. Cathedral City

- Select for lower maintenance, water efficiency, heat tolerance
- Also consider cool pavements, lighter colored to reflect more heat from the sun. Cool pavements reflect as much as 30 to 50 percent of the sun's energy, compared to only 5 percent for new asphalt and 10 to 20 percent for aged asphalt.



Tall slender trees offer limited shade in parking lots. Look for tree species with a broad canopy.



Date palm trees in a parking lot provide a visual statement but offer limited shade.



Trees with a broad canopy like these mesquite trees provide deep shade in a parking lot.



Allowing parking lot trees to develop multiple trunks helps support the canopy as the tree matures and creates more shade.

Sidewalks

Creating attractive sidewalks that offer shade and a welcoming environment are increasingly desirable as cities strive to make their streets and public areas more pedestrian and bicycle friendly. Sidewalk landscaping and street trees look attractive, provide habitat for birds and butterflies, and enhance community livability. Adding permeable paving and retention planters improve soil health and help reduce stormwater runoff.

- Planting strips for trees should be a minimum of 3 feet wide
- Use native and drought tolerant species
- Choose deep-rooted tree species which tolerate flooding or drought, need low or no irrigation when established.
- Look for trees that provide multiple benefits – shade, wildlife habitat, soil aeration
- If ongoing irrigation is needed, project should have access to metered water source



Trees provide shading to sidewalks along Highway 111 in Palm Springs.



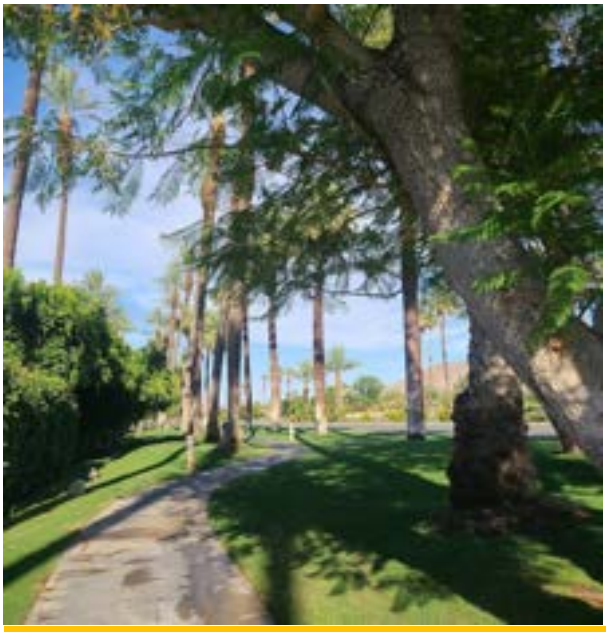
Cluster of mesquites, palo verde, and palms increase biodiversity and provide deep shade.

Bringing nature back into the city is a way to deal with sprawl. If cities feel a little more natural, people like to live there rather than moving out and dividing up another piece of land that shouldn't be touched.

- *Stone Gossard*



Which sidewalk . . .



. . . Would you rather walk on?

Medians

Attractively landscaped street medians provide esthetic and environmental benefits in urban settings. Streets in urban areas are often wider than necessary and can be enhanced with trees and landscaping. Center medians or landscaped buffers along the edge of urban streets can help reduce traffic speeds while providing beneficial environmental services, such as stormwater retention and greenhouse gas reduction. Additionally, increased pedestrian and bicycle use can improve the overall health of the population and reduce dependence on fossil-fuel based transportation. Here are some suggestions for planting trees in medians:



- Trees may be planted in medians four feet or wider, including curbs.
- Median trees should have arching canopy structures for visibility; upright and columnar trees work well.
- Tree species selected for planting on median strips that are 4 to 6 feet wide should be expected to grow to trunk diameters no greater than 12 inches.
- On median strips greater than 6 feet wide, trees obtaining larger diameters may be used.
- Choose drought tolerant / water efficient, low maintenance species
- Trees with columnar form are appropriate for narrower planting spaces such as small streets, alleys, and narrow medians.

- Trees located in medians should have a vertical clearance of the lowest branch of 8 feet in height over the median, and 14 feet in height for any portion of the tree that overhangs the roadway.
- Landscaped medians reduce impervious space in the roadway, allowing stormwater infiltration or retention in the exposed soil. Medians can also be designed to retain, cleanse, and infiltrate stormwater runoff from the roadway. Where stormwater management is intended in the median, the street should be graded to drain toward the median.

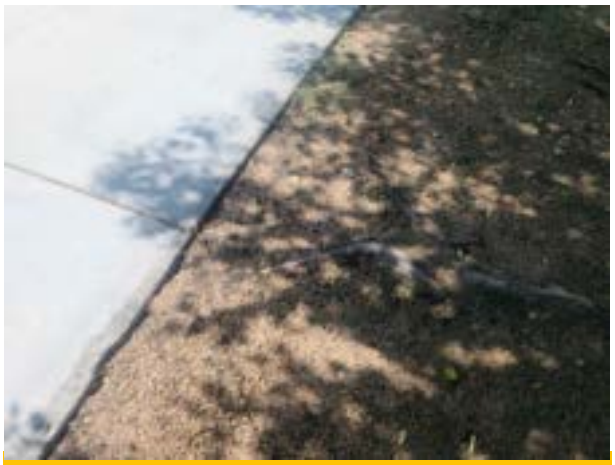


Use tall columnar trees, such as palms, and smaller trees in medians. Use broad canopy trees, such as mesquite, along sidewalks for maximum shade. Palms provide very little shade as a sidewalk tree.

Safety

Once a site is identified, make sure that it is suitable for trees. Some important considerations include:

- Safety—trees should not be planted very close to buildings or in locations where they could impair driver visibility or otherwise cause traffic problems.
- Trees should not be grown in an area where they are likely to interfere with existing underground or overhead utility infrastructure.



Consider utility lines, sidewalks, and driveways when choosing a location.

Conduct a visual inspection and use PA One Call (pa1call.org/PA811/Public/) to ensure that the proposed site will not require tree planting in a utility right of way.

URBAN GREENING AT HOME

Use the principles of Right Tree, Right Place. Before you plant a tree around your home, determine the best location to maximize the shade benefits of a tree. Spend some time observing the path of the sun and where shade on your roof, walls and windows is most needed, especially in the afternoon, the hottest part of the day.[19] Planting trees to shade windows and walls also adds comfort and value to your home.

Shade is the first step to reduce energy consumption and save money. Shade your:

- Walls & windows. Start on the south and west-facing walls
- Outdoor air conditioner – it will run cooler.[20]
- Concrete (driveways, patios) to reduce glare
- Concrete to reduce radiated heat (heat island effect)

Plant some trees to save some green:

- Trees enhance the microclimate and are the first line of defense against unwanted heat.
- Trees and green spaces around your home provides shade on buildings and can decrease air conditionings costs by 20%
- Select trees that balance shade and water use. Some trees just gulp too much water
- Trees add value to your property





Mature palo verde trees planted on the southwest corner (left photo) and south-facing (right photo) of the home provide shade during the hottest part of the day.

Irrigation is critical to the success of trees.

- Trees need deep watering, not the same schedule as your lawn. More frequent watering at first, but over time more infrequent, longer duration (deeper) watering.
- Drip irrigation allows water to slowly percolate into soil
- Try an “ooze tube” – 25 ft soaker hose coiled around the base of the tree (less expensive too)
- Smart timers help deliver water at best and most efficient schedule. Check with your water district about smart timer rebate programs.



Section 3:
Tree Palette

Section 3: Tree Palette

The following tree palette includes native and water efficient trees that are suited to the desert climate. The tree palette includes recommendations from local landscape experts consulted during preparation of this guide. Information presented about each tree was gathered using sources found in the Resources appendix.

The use of local native species is strongly encouraged. Native species are highlighted in green, including cultivars of native species.

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Scientific Name	Common Name	Evergreen (E) or Deciduous (D)	Height (Feet)	Width (Feet)	Longevity (Years)	Shade Low (L), Moderate (M), Dense (D) in Leaf	Maintenance Level High (H), Medium (M), Low (L)	Native	Litter	Pest & Diseases	Biodiversity	Health, Safety & Environmental Concerns	CO2 Sequestered (lbs.) Tree Lifetime	CO2 Sequestered ($) Tree Lifetime
Acacia aneura	mulga	E	15-20	15-20	50-150	M			dry fruit	invasive shot hole borer, root rot	attracts birds, not deer palatable	branch strength medium, root damage potential low, allergy health hazard	65.4	1.52
Acacia farnesiana	sweet acacia	D	15-25	15-25	<50	M			dry fruit	resistant to Texas root rot, susceptible to invasive shot hole borer, caterpillars, root rot	attracts birds, not deer palatable	branch strength weak, root damage potential low, allergy health hazard, biogenic emissions moderate	20	0.40

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Acacia greggii (now Senegalia greggii)	catclaw acacia	E	25	20-30		D		•			deer resistant			
Acacia stenophylla	shoestring acacia	E	20-30	10-20	<50	L			dry fruit	susceptible to invasive shot hole borer	attracts birds, not deer palatable	branch strength weak, allergy health hazard	558.3	12.99
Albizia julibrissin	silk tree, mimosa tree	D	20-35	20	<50	L	H		flowers, dry fruit	susceptible to invasive shot hole borer, caterpillars, armillaria, fusarium and root rot	attracts birds, not deer palatable	branch strength medium weak, root damage potential moderate, allergy health hazard, biogenic emissions moderate	56.3	1.31
Bauhinia variegata	purple orchid tree	D	20-35	20-35	40-150	M	M		dry fruit	susceptible to aphids	attracts birds	branch strength medium, root damage potential low, no known health hazard, biogenic emissions moderate	819.7	19.06
Brahea armata	Mexican blue palm	E	20-50	12-25	50-150	M	M		wet fruit	resistant to Texas root rot, susceptible to crown rot	attracts butterflies	branch strength medium, root damage potential low, no known health hazard	368.7	8.57
Butia capitata	pindo palm	E	25	10-12			M		edible fruit	susceptible to root rot and scales	deer resistant, attracts mammals			

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Callistemon viminalis	weeping bottlebrush	E	15-20	15-20	40-150	M	M		dry fruit	susceptible to armillaria and root rot	wildlife use fruit, attracts birds and bees, not deer palatable	branch strength medium, root damage potential low, allergy health hazard, biogenic emissions high, fire resistance favorable	56	1.30
Chamaerops humilis	Mediterranean fan palm	E	10-15	10-15	<150	M	M		fruit	resistant to Texas root rot	not deer palatable	branch strength strong, root damage potential low, no known health hazards	80.8	1.88
Chilopsis linearis	desert willow	D	15-30	10-20	40-150	L	M	•	dry fruit	resistant to Texas root rot, susceptible to root rot	attracts birds, wildlife use fruit	branch strength medium, root damage potential low, allergy health hazard, biogenic emissions moderate	136.7	3.18
Chorisia speciosa	silk floss tree, kapok	D	35-50	40-55		M	M		dry fruit	no concerns	attracts birds			
Cupressus arizonica	Arizona cypress	E	40	40		D	L			susceptible to leaf blight	deer resistant			
Eucalyptus microtheca	coolibah	E	35-50	25	50-150	D	M		dry fruit	resistant to Texas root rot and verticillium, susceptible to beetle borers, armillaria and root rot		branch strength medium, root damage potential moderate, no known health hazards	228.5	5.31

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Eucalyptus spathulata	swamp mallee	E	20-40	20	50-150	M	M		dry fruit	resistant to Texas root rot and verticillium, susceptible to beetle borers, armillaria, phytophthora and root rot	attracts birds, not deer palatable	branch strength medium, root damage potential low, no known health hazards		
Eucalyptus papuana	ghost gum	E	65	20-50		M	L		dry fruit	susceptible to armillaria, phytophthora, root rot and beetle borers, resistant to Texas root rot and verticillium	deer resistant, attracts birds	no known hazards		
Fraxinus uhdei	majestic beauty ash, evergreen ash	E	70-80	60	50-150	M	M		dry fruit	resistant to armillaria, susceptible to scales and white fly, root rot, sooty mold and verticillium	desirable wildlife plant	Branch strength medium, root damage potential moderate, allergy health hazard, fire resistance favorable	990	23.02
Geijera parviflora	Australian willow	E	25-35	20	50-150	M	M		dry fruit	resistant to armillaria	attracts bees, wildlife use fruit	branch strength medium, root damage potential low, no known health hazards, biogenic emissions moderate	7913.6	184.05

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Lagerstroemia indica	crape myrtle	D	25	25	50-150	M	M		dry fruit	resistant to Texas root rot, susceptible to aphids, powdery mildew and sooty mold	attracts birds	branch strength medium, root damage potential low, no known health hazards, biogenic emissions low	1353	31.47
Lysiloma watsonii v. thornberi	feather tree	D	15	12-15	<50		M		dry fruit	resistant to Texas root rot	deer resistant, attracts birds	no known hazards		
Melaleuca quinquenervia	cajeput tree	E	20-40	15-25	50-150	M	M		dry fruit	susceptible to phytophthora and root rot	attracts birds and bees, wildlife use fruit	branch strength medium, root damage potential low, allergy and irritant health hazard, biogenic emissions high		
Olneya tesota	desert ironwood	E	15-30	15-30	50-150	L	L	•	dry fruit		desirable wildlife plant	branch strength strong, root damage potential low, no known health hazards, biogenic emissions moderate	227.1	5.28
Parkinsonia x 'Desert Museum'	desert museum palo verde	D	15-20	20-25	40-150	M	M	•	dry fruit		desirable wildlife plant, attracts bees	branch strength medium, root damage potential low, no known health hazards, biogenic emissions moderate		

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Parkinsonia florida	blue palo verde	D	25	15-20	50-150	L	L	•	dry fruit		attracts birds and bees, wildlife use fruit	branch strength medium, root damage potential low, no known health hazard, biogenic emissions moderate	474.3	11.03
Phoenix dactylifera	date palm	E	80-100	20-40	50-150	M	M		dry fruit and leaves	resistant to Texas root rot	attracts birds, wildlife use fruit	branch strength strong, root damage potential moderate, allergy health hazard, biogenic emissions high	132.3	3.08
Pinus eldarica	Afghan pine, Mondale pine	E	30-80	15-25	50-150	D	L		dry fruit	resistant to verticillium, susceptible to aphids and armillaria	attracts birds and squirrels, not deer palatable, wildlife use fruit	branch strength medium strong, root damage potential moderate, allergy health hazard	2468.10	57.40
Pinus pinea	Italian stone pine	E	40-80	40-60	50-150	D	M		dry fruit	resistant to verticillium, susceptible to aphids, armillaria, phytophthora, root rot, pitch canker	attracts birds and squirrels, not deer palatable, wildlife use fruit	branch strength weak to medium weak, root damage potential moderate, allergy health hazard		
Pistacia chinensis	Chinese pistache	D	25-35	25-35	>150	M	M			resistant to armillaria, susceptible to verticillium and root rot	attracts birds	branch strength strong, root damage potential low, allergy health hazard, biogenic emissions moderate	1515.50	35.25

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Prosopis chilensis	Chilean mesquite	D	30	30	50-150	L	L		dry fruit		attracts birds	branch strength medium, root damage potential low, no known health hazards	563.2	13.10
Prosopis glandulosa v. glandulosa	honey mesquite	E	25-35	25-35		L	L	•	fruit and leaves		attracts birds and mammals, wildlife use fruit	root damage potential low	774.8	18.02
Prosopis hybrid phoenix	phoenix mesquite	E	30	30		M	L				attracts bees			
Prosopis pubescens	screwbean mesquite	D	10-33				L	•	twisted seed pods		attracts a wide variety of animals, host to the marine blue and Leda ministreak, and Palmer's metalmark butterfly		1347.60	31.34
Prosopis velutina	velvet mesquite	D	30	30	50-100	L	L		dry fruit		attracts birds and bees	branch strength medium, root damage potential low, no known health hazards	55.4	1.29
Prunus cerasifera	thunder cloud, purple plum	D	20	20	<50	D	M		wet fruit	susceptible to caterpillars, armillaria, root rot, rust, sooty mold and verticillium	attracts birds	branch strength medium, root damage potential low, no known health hazards, fire resistance favorable	471.7	10.97

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Punica granatum	pomegranate	D	20	15	50-100	D	M		wet fruit	resistant to Texas root rot, susceptible to plant bug, white fly, chlorosis and sooty mold	desirable wildlife plant	branch strength medium, root damage potential low, no known health hazards, fire resistance favorable		
Quercus virginiana	southern live oak	E	40-80	60-100	>150	M	M		dry fruit	resistant to verticillium, susceptible to insect galls, armillaria, phytophthora and root rot	attracts birds and squirrels	branch strength strong, root damage potential moderate, allergy and poisonous health hazard, biogenic emissions high	6717.10	156.22
Rhapis excelsa	slender lady palm	E	5-15	5-15	50-150	M	M		dry fruit	resistant to Texas root rot		branch strength medium, root damage potential low, no known health hazards, biogenic emissions low		
Rhus lancea	African sumac	E	20-30	20-35	50-150	M	M		dry fruit	susceptible to root rot and verticillium	attracts birds	branch strength medium, root damage potential low, no known health hazards, biogenic emissions low, fire resistance favorable	127.2	2.96
Sophora secundiflora	Texas mountain laurel	E	15-25	10-15	50-150	M	L		dry fruit		attracts bees	branch strength medium, root damage potential low, poisonous health hazards	117.5	2.73

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Syagrus romanzoffiana arecastrum romanzoffianum	queen palm	E	50	25-30			M			susceptible to butt rot, armillaria, root rot, scales, and spider mites, resistant to Texas root rot	deer resistant, attracts birds		750.1	17.44
Trachycarpus fortunei	windmill palm	E	30	10	50-150	D	M		dry fruit	resistant to Texas root rot		branch strength medium		
Ulmus parvifolia	evergreen elm, little leaf elm	D	45	35-50			M		dry fruit	susceptible to Dutch elm disease, armillaria, phytophthora, root rot, aphids, beetle borers, beetle leaves, and caterpillars		allergy health hazards	5086	118.28
Vitex agnus-castus	chaste tree	D	10-15	15-20	50-150	M	L		dry fruit	resistant to armillaria	attracts bees	branch strength medium weak, root damage potential low, no known health hazard	31.6	0.73
Washingtonia filifera	California fan palm	E	50-70	10-20	50-150	D	M	•	dry fruit and leaves	resistant to Texas root rot, susceptible to armillaria		branch strength medium strong, root damage potential moderate, allergy health hazard, biogenic emissions moderate, fire resistance favorable	480.6	11.18

SCIENTIFIC NAME	COMMON NAME	DESCRIPTION					MAINTENANCE						EMISSIONS REDUCTION	
Washingtonia robusta	Mexican fan palm	E	80-100	5-10	50-100	D	M		dry fruit and leaves	resistant to Texas root rot, susceptible to beetle borers		branch strength medium strong, root damage potential moderate, allergy health hazard, biogenic emissions moderate, fire resistance favorable	489.5	11.38



Section 4: Planning

Section 4: Planning

Initial Planning Guidance

Urban greening initiatives require hard work, dedication, and advanced planning. Most urban greening grants require the completion of a project proposal (See Appendix I for more information on grants). This section describes how to create a project proposal that can be used for both grant applications and local funding greening initiatives.

In the initial planning stages, it is crucial to outline urban greening goals, consider whether the project is eligible for urban greening grants, and complete a basic plan overview. Afterward, use the project outline to complete the advanced planning steps.

Define Project Objectives

To begin planning, start by defining the purpose of the urban greening project. Describe who the beneficiaries will be and what the intended services are. Examples of project objectives include:

- Improve the environment
- Increase the value of your property
- Provide a shaded space for recreation
- Prevent soil erosion by wind or water
- Provide habitat and food for wildlife
- Conserve energy



Cathedral City Council plants trees at Cathedral City Elementary School for Clean Air Day
Desert Sun, 10/17/2019

Project Plan Overview

After project goals have been determined, create a project overview to specify how this project will be implemented. Consult local experts to aid in this process. A project plan overview should include:

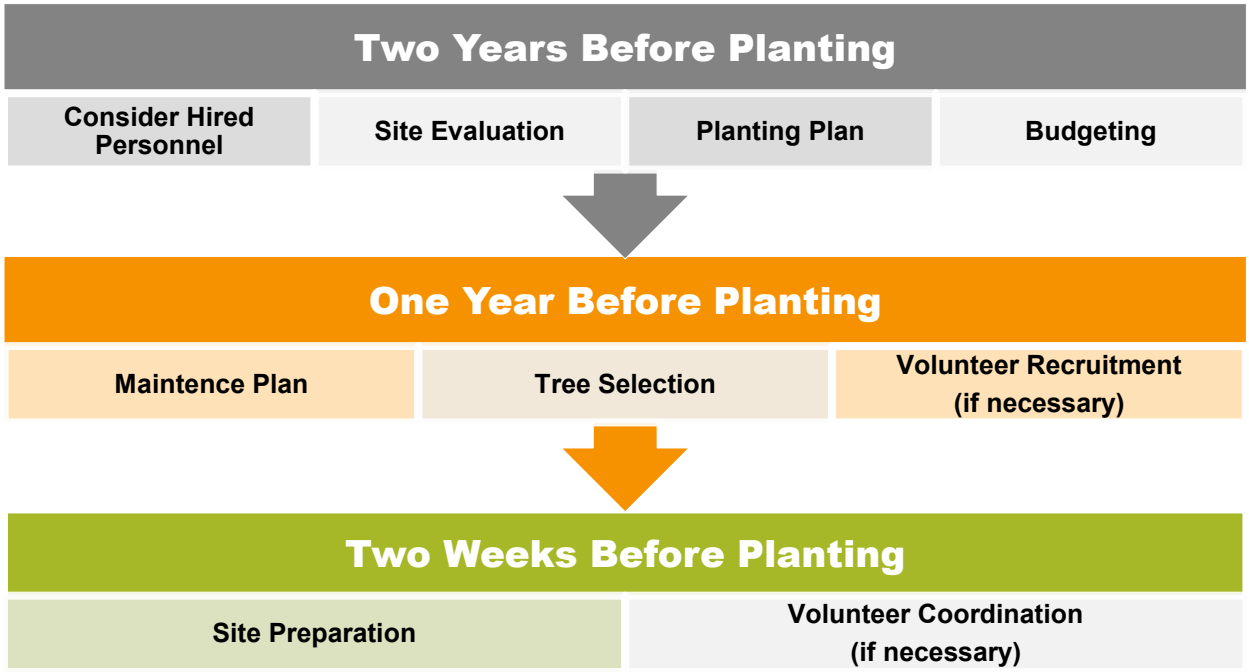
- A description of your objectives
- A map of the property and a site description
- Detailed plans for site preparation
- The number of trees required by species
- Planting arrangement and tree spacing
- Plans to control unwanted vegetation

Advanced Planning

Outline Plan for Project

Foster long-term sustainability within the project by outlining objectives for a year, two years, and beyond the initial tree planting. The purpose of the outline is to plan specific tasks that need to be finished.

Consider the following timeline and corresponding planning steps when outlining a project plan. An example outline is included in Appendix II.



Consider Hired Personnel

Consider which contracts and consultants will be working on the projects. Define who the personnel will be and how they will be contributing to the project.

Site Evaluation

Several factors about a site will determine what tree species will do well and what type of planting stock will be the most successful.

These factors include:

- Soil type and level of compaction
- Soil moisture and average precipitation rates
- Light availability

- Slope
- Air quality
- Level of foot traffic
- Existing vegetative cover

It is best to have an arborist or other landscape professional assess the site before developing a planting plan. Low or no-cost services may be available through local master gardeners. In addition, certain landowners may have people on staff, such as grounds managers or landscape architects, who can also help. Once a site evaluation is completed, the next step is to develop a planting plan.

Planting Plan

Essential elements of a planting plan will be influenced by the site conditions, project goals, and available budget, and include the following:

- Size of area to be planted
- Recommended tree density
- Species selection and number of each species
- Location of various species and spacing on the site
- Recommended planting stock type (bare root vs. containerized vs. ball and burlap)
- Inventory of other supplies needed (e.g., tree shelters, stakes, support cables, or zip ties)



Coachella Grapefruit Blvd. Urban Greening and Connectivity Project. City of Coachella. February 2021

Site Selection

Network with community stakeholders and interest groups to help identify sites that would benefit from additional trees. These include:

- Municipal officials and employees (public works departments, park and recreation departments)
- School districts
- Local environmental, social justice, gardening groups or other grassroots organizations
- Holders of large tracts of private land (commercial, industrial, and agricultural)
- Holders of large tracts of public land (state or federal facilities)

Maintenance Plan

A long-term maintenance plan is a good idea for any tree planting. A maintenance plan should include an irrigation plan, vegetation clearance plan. As well as information on spot inspections, how invasive species will be monitored, and the replacement of dead trees.

Irrigation/watering Plan: Does the planting plan call for any watering in addition to average precipitation? If so, the maintenance plan should describe who will water the trees and how often.

Vegetation Clearing: Vegetation should be cleared from around the base of newly planted trees at least once per year to decrease cover for voles and other rodents that like to chew on small trees.

The mulched spot around the young tree should be 4- to 6-feet in diameter. The maintenance plan should identify who will clear the vegetation and what method will be used. Vegetation clearing can generally be stopped once the trees reach 4- to 5-inches in trunk diameter.

> Unlike the urban development that I see taking over and swallowing up our precious soil, when we interact with our environment in a way that allows for regeneration and natural spaces, the outcome can be beautiful.
>
> - *Cory Trepanier*

Spot Inspections: The planting site should be spot-inspected twice a year, preferably once after leaf-out in May and once in October or November. During the examination, any downed or leaning trees should be straightened. Any damage to shelters or cages used to protect trees from animals should also be noted and corrected, if possible.

Finally, any dead or unhealthy trees should be emphasized. The maintenance plan should identify who will conduct these inspections and the person that will keep inspection notes from year to year.

Replacing Dead Trees: It is expected that some planted trees will die before maturity, and there is generally a strong relationship between the size of trees at planting and the rate of survivorship. Ball and burlapped trees and large containerized trees will survive significantly higher than tiny bare-root seedlings.

If there are project goals related to canopy cover or buffering a water body, replacing some or all the trees that perish may be necessary. The maintenance plan should identify who will make decisions about replacements and be responsible for coordinating replacements.

Invasive Species Monitoring: Invasive species are not native to a particular area and prone to establishing large numbers, out-competing, or otherwise harming native species. All newly planted tree sites should be monitored for new invasions with special

care to eliminate any species that are either known pests to trees or on the state noxious plant list.

Tree Selection (Year Before)

Most people aren't thinking too much about trees in the winter. But most large nurseries start collecting orders, substantial orders, during winter, several months in advance of planting. Ordering too late means you run the risk that nurseries will be out of trees in the species and sizes desired, requiring substitutions.

Orders should be planned for other supplies such as tree shelters or cages (the number and type should be specified in the planting plan), mulch, and stakes (numbers and lengths should be stated in the planting plan). Stakes made of white oak wood are the most rot-resistant and are recommended for wet sites. Drier upland sites will be fine with stakes made of other hardwoods, such as locusts.

Volunteers or Hired Labor

Tree planting is a great way to get people of all ages involved in bettering their local community. Engaging with various volunteer groups promotes community engagement.

The following types of groups may be ready and willing to supply volunteers.



Early on, agree on a planting date with each volunteer group, get a rough estimate of how many volunteers will be on-site, and obtain any government clearances that may be necessary to work with children or youth volunteers.

Site Preparation

Use the maintenance plan to prepare a site for tree planting. Consider the following site preparation steps when creating the maintenance plan:

- Remove any existing, unwanted plants through physical means (mowing or using a brush hog if necessary). Use lawn flags to mark the spots where trees should be planted according to the planting plan. Flags should be color-coded or otherwise labeled to indicate tree species.
- If the maintenance plan calls for mowing and herbicide to keep the vegetation around the base of trees, it is best to mow and conduct the first herbicide application before the trees are planted. Spray a spot roughly 4 to 6 feet in diameter around the space where the tree will be planted.

- The use of herbicide should always be done by a trained professional and strictly according to label instructions. If heavy equipment is used for digging holes, have the equipment dig the pits before the planting.
- Likewise, if the volunteer or labor pool for hand planting is too small for the project size, digging and planting should be broken into two different days.

Budgeting

Planning for a tree-planting program or applying for an urban greening grant will require a budget assessment. To estimate the cost of your project, consider the following expenses:

- Contractors for Construction and Site Preparation
  - Asphalt removal or related hardscaping where plantings involve the establishment of a new permanent planting site.
  - Hardscape cuts
  - Expansion of existing planting sites.
  - Up to 50% of soil testing costs to determine the needs for the site.
  - Other related construction costs.
- Trees and planting materials
  - Cost of trees
  - Stakes, ties, and root collars are proportional to the number of trees planted.
  - Wood chip surface mulch, soil amendments in areas of hard clay soil or sandy soil.
  - The soil was needed for backfill
  - Structural pruning stake adjustment and removal for newly planted trees.
  - Water-wise or hydro-zone irrigation and supplies.
  - Replacement costs for trees planted in the first two years of the project.
- Equipment
  - Purchased or rented materials and tools required for project purposes.
  - Pruning and gardening supplies.
  - Personal protective equipment.
  - Other related expenses.
- Acknowledgment signage
  - Construction and material costs
- Education/Outreach Component
  - Development of educational materials.
  - Outreach relevant to the scope of the proposed project.
- Administrative costs directly related to the implementation of the project
  - Mileage to and from the project site.
  - Liability insurance for project implementation.
  - Materials for personnel hired solely for this project.
- Indirect costs

Appendix I: Grants

Grant Eligibility

Grants significantly reduce the cost of urban greening projects. Urban greening grants typically have standards for eligible and ineligible projects. These standards must be followed when planning an urban greening project that requires financial support. Decide whether project objectives align with grant eligibility requirements. Eligibility may vary depending on the grant. Below are some examples of projects eligible for urban greening grants.

- Establishment, enhancement, and expansion of neighborhood parks and community spaces.
- Greening of public lands and structures, including schoolyards, may include incorporating riparian habitat for water capture and providing for other public and wildlife benefits.
- Green streets and alleyways.
- Non-motorized urban trails that provide safe routes for travel between residences, workplaces, commercial centers, and schools
- Urban heat island mitigation and energy conservation efforts. All eligible projects must result in GHG reductions by including at least one of the following activities:
  - Sequester and store carbon by planting trees
  - Reduce building energy use by strategically planting trees to shade buildings
  - Reduce commute vehicle miles traveled by constructing bicycle paths, bicycle lanes, or pedestrian facilities that provide safe routes for travel between residences, workplaces, commercial centers, and schools

Grant Resources

This is a list of some of the grant programs that focus on urban greening, tree planting, and urban forest resilience. It is not a comprehensive list and some grant programs may be pending future funding. It is anticipated that additional funding opportunities for urban greening programs will arise in the future as efforts to address climate change and urban community resilience increase.

Urban Greening Program. California Natural Resources Agency.

- Funds local green infrastructure projects to reduce emissions, expand green space, and create more sustainable communities. The program is part of "California Climate Investments," funded by the state's cap and trade auction revenues.
- Check the program website for funding availability and future updates. To find out more: https://resources.ca.gov/grants/urban-greening
- Some examples of local projects funded by this program:
  - Riverside County Transportation Dept. Mecca Neighborhood Park and Greening Project, $1,093,708. 2021. The project will create two green street

corridors in the community of Mecca, including planting trees and developing a pocket park within a park-poor and tree-poor community. http://rivcocob.org/proceeds/2021/p2021_02_09_files/03.29001.pdf

- ❖ City of Coachella. Grapefruit Boulevard Urban Greening and Connectivity Project. Project to plant 288 trees along Grapefruit Blvd, provide pedestrian facilities and bicycle lanes. $3,189,153. 2018. Project broke ground in February 2021.
  - http://www.caclimateinvestments.ca.gov/2020-profiles/urban-greening;
  - https://www.desertsun.com/story/news/2018/11/02/coachella-receives-3-19-m-state-grant-urban-greening/1860673002/
  - https://nbcpalmsprings.com/2021/02/05/officials-in-coachella-break-ground-for-grapefruit-blvd-urban-greening-and-connectivity-project/

California ReLeaf

- California ReLeaf is a non-profit organization that works statewide with community-based groups, individuals, industry, and government agencies, to contribute to the livability of our cities and the protection of our environment by planting and caring for trees. They also increase access to urban forestry funding by providing sub-grants to community groups. They maintain a list of other public grant programs for urban forest or urban greening projects.
- To find out more: https://californiareleaf.org/programs/grants/

Urban and Community Forestry Challenge Cost Share Grant Program. USDA Forest Service

- Funds innovative proposals for programs to address urban and community forest resilience and planning disaster mitigation strategies for urban forests.
- The 2021 funding cycle closed on April 21, 2021.
- To find out more: https://www.fs.usda.gov/managing-land/urban-forests/ucf

Urban Flood Protection Grant Program. California Natural Resources Agency

- Funds stormwater capture and reuse, restoration of urban watersheds, and increasing permeable surfaces to help reduce flooding. Urban forestry example projects “retrofit/naturalize a stormwater detention basin by introducing trees, vegetation, and soils to slow, spread and filter runoff, increase infiltration, and create wildlife habitat.”
- Awards for current cycle anticipated in August 2021.
- To find out more: https://resources.ca.gov/grants/ufp



Appendix II: Resources

Appendix II: Resources

Tree Selection and Care

The following list of resources cover a diversity of topics related to tree selection and care. Many of these resources were recommended by the experts consulted in preparing this guide. This is not an exhaustive list but focuses on resources that are particularly relevant for desert landscapes.

University of California Resources

Master Gardener Helpline (specifically for addressing home horticulture issues in the Coachella Valley) - email: anrmgindio@ucanr.edu

Sustainable Landscaping in California: https://anrcatalog.ucanr.edu/Details.aspx?itemNo=8504

Keeping Plants Alive Under Drought and Water Restrictions: https://anrcatalog.ucanr.edu/Details.aspx?itemNo=8553

Lawn Watering Guide for California: https://anrcatalog.ucanr.edu/Details.aspx?itemNo=8044

Use of Graywater in CA Landscapes: https://anrcatalog.ucanr.edu/Details.aspx?itemNo=8536

Univ. of CA ANR Landscape Publication: https://anrcatalog.ucanr.edu/Items.aspx?hierId=250000

Univ. of CA ANR Pest Management Publication: http://ipm.ucanr.edu/

Univ. of CA IPM Diagnostic Tool for Identifying Diseases and Insect Pests: https://www2.ipm.ucanr.edu/diagnostics/

Plant a Tree. Leave a Legacy! Janet Hartin's Blog: https://ucanr.edu/b/~T4C

Trees Come First Under the Drought, Janet Hartin's Blog: https://ucanr.edu/b/~D6C

Other Tree Maintenance Resources

Lush & Efficient: Desert-Friendly Landscaping in the Coachella Valley, Coachella Valley Water District: https://www.cvwd.org/DocumentCenter/View/4916/2016-Lush--Efficient-New-Revised-Edition-PDF?bidId=

Free and credible information from the International Society of Arboriculture: https://www.treesaregood.org

Find a certified arborist: https://www.treesaregood.org/findanarborist

Educational fact sheets' on trees (proper planting, pruning, staking, benefits of trees, etc.): https://www.treesaregood.org/education

SEARCHABLE TREE / PLANT FINDERS

Searchable Tree / Plant Finders

A great way to identify trees for your urban greening project or planting at home is to consult tree and plant finder websites. The following list includes some useful resources to help you with trees selection.

Be sure to look for trees that will grow in your climate zone.

Sunset magazine climate zones:
https://www.sunset.com/garden/climate-zones/sunset-climate-zone-california-desert

U.S. Department of Agriculture Plant Hardiness zones: https://planthardiness.ars.usda.gov/

Tree/Plant Finders

SelecTree: A Tree Selection Guide. Urban Forest Ecosystems Institute (UFEI), California State Polytechnic University: https://selectree.calpoly.edu

- Select a tree by name or desirable characteristics. Includes tree photos, characteristics, planting considerations. Urban Tree Key helps you identify a tree.

Calscape: Restore Nature one Garden at a Time. California Native Plant Society (CNPS):
http://www.calscape.org/

- Find out which plants are really native to your area, figure out which plants you want to plant, where to buy them and how to grow them. Type in your address to get list of trees and other native plants that do well in your area.

Water Use Classification of Landscape Species (WUCOLS): http://ucanr.edu/sites/WUCOLS

- The University of California Agriculture and Natural Resources (UCANR) tool provides guidance in the selection and care of landscape plants relative to their water needs. WUCOLS helps estimate the amount of water and type of irrigation for a tree project.

i-Tree: Tools for Assessing and Managing Forest and Community Trees.
https://www.itreetools.org/

- i-Tree provides data that you can use to demonstrate value of trees, the environmental benefits that trees provide, and set priorities for more effective decision-making in your community. The i-Tree Planting tool can be used to estimate tree carbon storage, energy savings, and pollution reduction for trees to be planted.

The Sustainable Urban Forest: A Step-by-Step Guide.
https://www.itreetools.org/documents/485/Sustainable_Urban_Forest_Guide_14Nov2016_pw6WcW0.pdf

- Alliance for Community Trees. Arbor Day Foundation.

Other Resources

- Greening without Gentrification Guide

https://www.ioes.ucla.edu/wp-content/uploads/Parks-Related-Anti-Displacement-Strategies-report-with-appendix.pdf.

Allergy-Free Gardening
http://www.allergyfree-gardening.com/

- Allergy free Gardening Considerations for Asthmatic and Sensitive Residents

Urban Greening and Related Plans

The City of Indio's Transformative Climate Communities Plan. January 2021. https://indiotccplan.com/wp-content/uploads/2021/01/IndioTCC-FINAL_150dpi.pdf.

City of Palm Springs Sustainability Plan. May 2016. Urban Forests and Natural Systems (pages 47-51). https://www.palmspringsca.gov/home/showdocument?id=44449

City of Palm Springs Inventory of Public Trees and Urban Forest Management Report. June 2015. City of Palm Springs Inventory of Public Trees. City of Palm Springs GIS Based Tree Inventory and Urban Forest Management System powerpoint: https://www.palmspringsca.gov/home/showdocument?id=37335

City of Palm Springs website: Sustainability & Recycling, Tree Programs. https://www.palmspringsca.gov/services/sustainability-and-recycling/urban-sustainability-mobility/urban-forestry-initiatives

Imperial County Community Emissions Reduction Program: Project Plan Urban Greening Program for The El Centro-Heber-Calexico Corridor. Prepared for the El Centro-Hebe-Calexico AB 617 Community Steering Committee, by Ramboll US Consulting, Inc. Los Angeles, CA. February 2021. https://apcd.imperialcounty.org/wp-content/uploads/2021/03/Urban-Greening-Project-Plan.pdf.

City of Phoenix Tree and Shade Master Plan. 2010. https://www.phoenix.gov/parkssite/Documents/PKS_Forestry/PKS_Forestry_Tree_and_Shade_Master_Plan.pdf

Cathedral City council plants tree at Cathedral City Elementary School for Clean Air Day https://www.desertsun.com/story/news/local/neighbors/2019/10/17/cathedral-city-council-plants-tree-elementary-school-clean-air-day/4015447002/

Section 4: Advanced Planning Sample Outline

Year One -- Summer through early Fall	Year Two -- Late Winter through early spring	Year Two and Beyond
Determine your objectives for planting trees	Receive nursery invoice, confirmation of the order	Inspect your trees regularly.
Inspect your planting site	Arrange for equipment, volunteer help, or contract tree planters	Control vegetation and insect or disease problems promptly.
Prepare a planting plan	Receive your seedlings. Transport and handle with care!	
Prepare your site for planting	Store your trees properly on-site and plant your trees within two days	
Control competing vegetation	Monitor your seedlings and control vegetation if required	
Improve drainage if necessary		
Order your trees from MNR or a private nursery		



Appendix III: References

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1 https://www.epa.gov/climate-indicators/southwest

2 Western Regional Climate Center. Desert Research Institute. NOAA Cooperative Climatological Data Summaries. Indio Fire Station, Indio, CA. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca4259.

3 Sorensen, Mark, et al. 1997. "Good practices for urban greening." *Inter-American Development Bank*. https://publications.iadb.org/publications/english/document/Good-Practices-for-Urban-Greening.pdf.

4 (Kuchelmeister 1991)

5 Nowak, David J; Greenfield, Eric J. 2018. US Urban Forest Statistics, Values, and Projections. Journal of Forestry. 116(2): 164-177. https://doi.org/10.1093/jofore/fvx004.

6 Akbari, Hashem. 2005. "Energy Saving Potentials and Air Quality Benefits of Urban Heat Island Mitigation". Lawrence Berkeley National Lab. U.S. Department of Energy. https://www.osti.gov/servlets/purl/860475.

7 Trees are Good. International Society of Arboriculture. Tree Owner Information/Benefits of Trees. https://www.treesaregood.org/treeowner/benefitsoftrees.

8 Wua, Chunxia; Xiaoa,Qingfu; McPherson, Gregory E. 2008. A method for locating potential tree-planting sites in urban areas: a case study of Los Angeles, USA. Urban Forestry & Urban Greening 7 (2008) 65–76. https://www.fs.fed.us/psw/publications/mcpherson/psw_2008_mcpherson001.pdf.

9 (Beninde et al., 2015; Daniels et al., 2018; Threlfall et al., 2017; Ksiazek-Mikenas et al., 2018).

10 Nowak, David J; Greenfield, Eric J. 2018. US Urban Forest Statistics, Values, and Projections. Journal of Forestry. 116(2): 164-177. https://doi.org/10.1093/jofore/fvx004.

11 Ibid.

12 Ibid.

13 Trees are Good. International Society of Arboriculture. Tree Owner Information/Planting a Tree. https://www.treesaregood.org/treeowner/plantingatree.

14 The Right Tree in the Right Place. Arbor Day Foundation. https://www.arborday.org/trees/righttreeandplace/.

15 Berthon, Katherine, Freya Thomas, and Sarah Bekessy. "The role of 'nativeness' in urban greening to support animal biodiversity." *Landscape and Urban Planning* 205 (2021): 103959.

16 Bassuk and Trowbridge, 2004. Trees in the Urban Landscape: Site Assessment, Design and Installation. Wiley. Cited in: https://www.fs.fed.us/psw/publications/mcpherson/psw_2008_mcpherson001.pdf.

17 Trees are Good. International Society of Arboriculture. Tree Owner Information/Planting a Tree. https://www.treesaregood.org/treeowner/plantingatree

18 Trees are Good. International Society of Arboriculture. https://www.treesaregood.org

19 Style and Energy Savings: Strategic Shade Tree Planting. https://www.mitsubishicomfort.com/articles/style-energy-savings-strategic-shade-tree-planting

20 "How to Plant Trees to Conserve Energy for Summer Shade." Arbor Day Foundation. Trees Help Fight Climate Change/How to Plant Trees to Conserve Energy for Summer Shade. https://www.arborday.org/trees/climatechange/summershade.cfm