Information Item

Date: October 6, 2015

To: Mayor and City Council

From: Martin Pastucha, Director of Public Works

Subject: City's Tree Care Guide, "How to Help Urban Trees Survive a Drought"

Introduction

The Public Landscape Division of the Public Works Department, which maintains the City's parks, urban forest, downtown and Santa Monica State Beach, created an instructional tree care guide "How to Help Urban Trees Survive a Drought" to educate the community on tree care best practices during a drought. This information item provides a brief overview of the guide.

Discussion

On April 30, 2015, staff provided an update to Council on the City's drought response efforts. The tree care guide supplements the outreach efforts mentioned in this update to inform the community on how to help trees survive a drought while taking into consideration mandated water conservation, and presents information in four steps:

1. Identify drought symptoms – illustrates signs of drought stress in trees.
2. Improve drought tolerance – describes a step by step approach to increase a tree's drought tolerance.
3. Water if needed – outlines watering tools and methods to conserve water, and how to determine appropriate water amounts and frequencies across seasons for young trees and mature trees.
4. Monitor and adjust to save water – provides further insight into watering and how to identify proper soil moisture levels.

An appendix provides water frequency recommendations by common tree species in Santa Monica. The guide can be found at www.santamonicatrees.com, and was

referenced on the drought response door hangers distributed to residents by the Office of Sustainability and the Environment in August. To ensure its effectiveness and relevancy, staff will regularly update the guide based on feedback and emerging best practices.

Prepared By: Carlos Collard, Senior Administrative Analyst

Attachment: 1 - How to Help Urban Trees Survive a Drought

HOW TO HELP URBAN TREES SURVIVE A DROUGHT

URBAN TREE CARE

City of
Santa Monica®

City of Santa Monica
Public Works Department
Public Landscape Division
Urban Forest
(310) 458-8974
trees@smgov.net
www.santamonicatrees.com

INTRODUCTION

The City of Santa Monica has over 33,000 street and park trees. A 2015 research study by the U.S. Forest Service calculated these trees annually deliver $5.1 million dollars worth of benefits to the community by cleaning the air, increasing property value, and reducing energy use among others.

Trees are an essential element of the City and need assistance during a drought. The two most important influences on an urban tree are the availability of adequate water and nutrients. A lack of water can cause high levels of stress and increased susceptibility to disease and is one of the primary causes of death.

It is always important to conserve water, but even more so during a drought. However, when we reduce watering our landscapes to save water, it is very important to ensure that associated trees continue to receive water as it:

- Cools the tree through transpiration and transports nutrients from the soil throughout the tree
- Supports healthy growth
- Helps defend the tree from pests and disease

Yet, too much water can be wasteful and harm trees. This guide shares recommendations based on science, research and industry best practices to help you determine the right amount of water for trees and provides information on how you can help trees survive a drought. By using this information, arranged in the four steps below, you will help Santa Monica conserve water and have healthy trees long into the future.

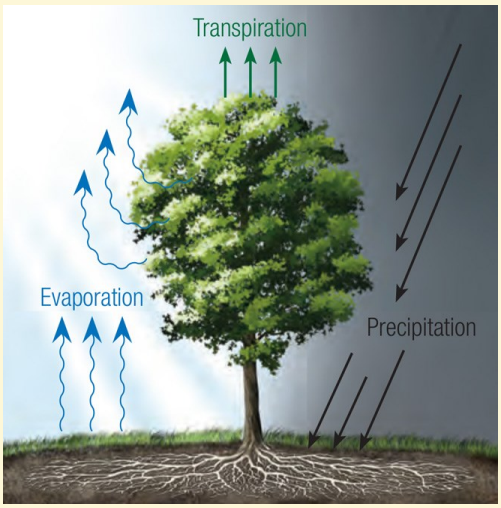
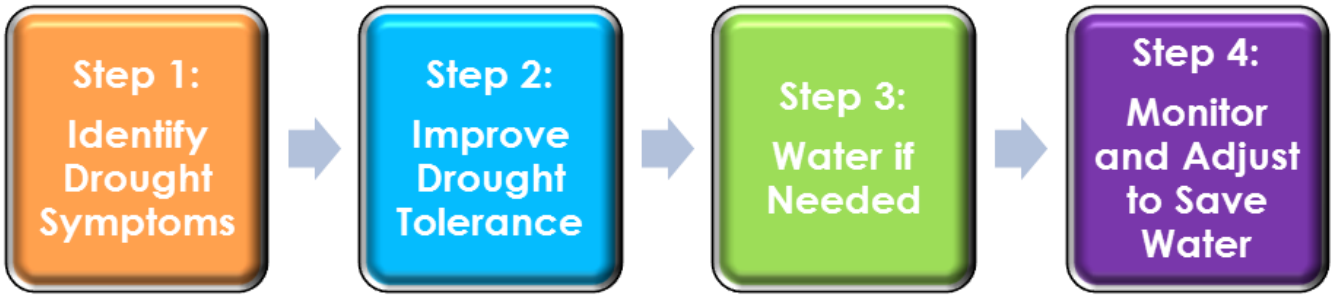


Photo credit: Arbor Day Foundation

Four Steps To Help Urban Trees Survive A Drought



Step 1: Identify Drought Symptoms

Signs of Drought Stress

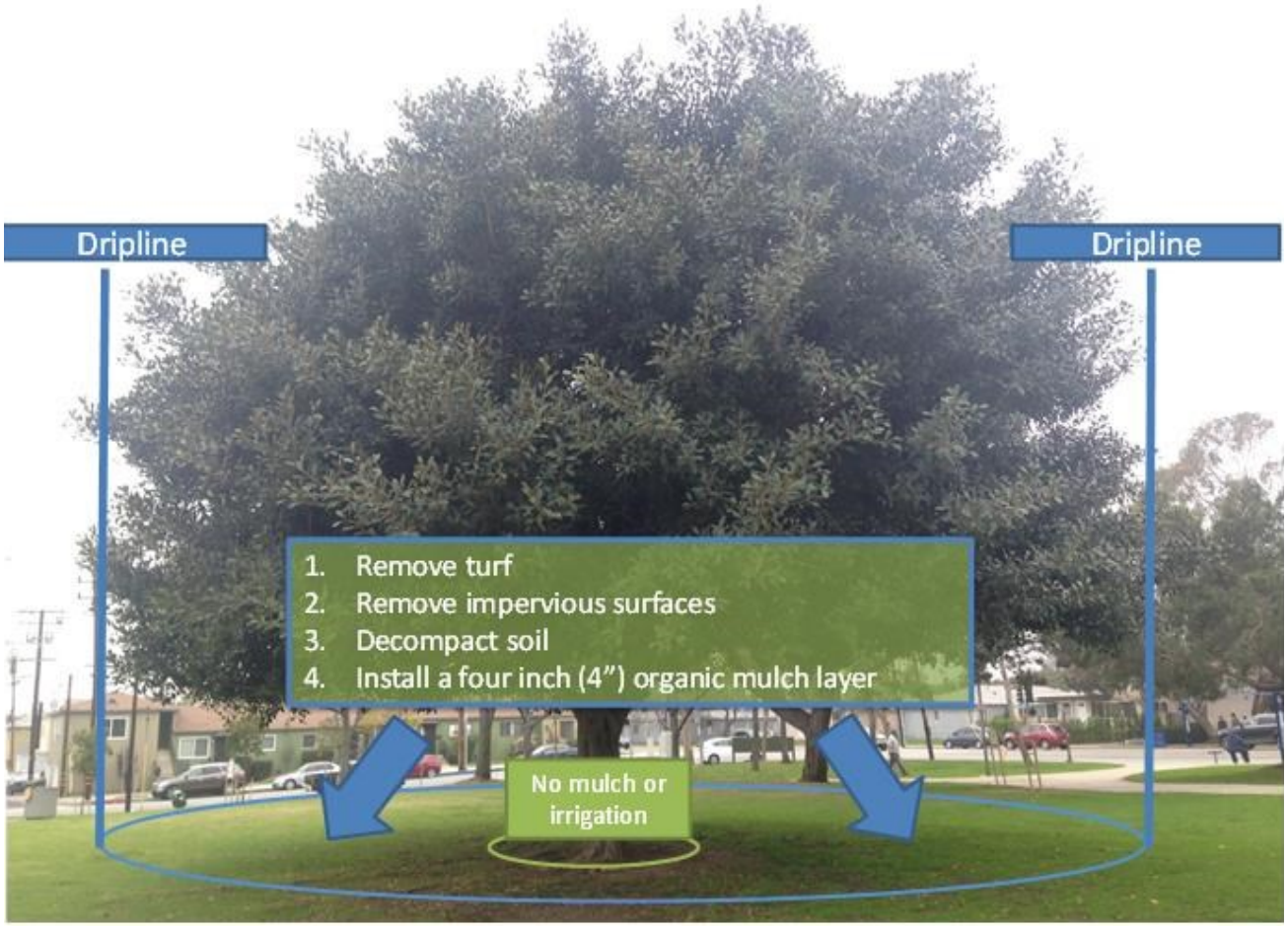
- Wilting of leaves and shoots (photo 1)
- Fewer deep green leaves (photos 2 & 3)
- Smaller than normal leaves (photos 2 & 3)
- Early leaf drop and thinning canopy (photos 2 & 3)
- Browning of leaf edges (all photos)

Photo 1: The young Catalina Ironwood tree above shows drought stress with wilting and browning foliage.

Photo 2: The Magnolia tree above has a thin canopy with smaller than usual and browning leaves.

Photo 3: Shown above is the same tree in June 2011 (left) and again in August 2014 (right). The apparent removal of irrigation has had a negative impact on this tree over a three year period.

Step 2: Improve Drought Tolerance



Steps to Improve a Tree's Drought Tolerance

1. Remove turf (lawn/grass) under the dripline, the area below a tree canopy extending to the outer edge. Turf competes for soil moisture. For tips on turf removal, you can refer to page 86 of the Santa Monica Urban Forest Master Plan (www.santamonicatrees.com).
2. If possible, remove impervious surfaces (not allowing fluid to pass through), such as concrete or artificial turf, under the dripline because they impair the movement of water, nutrients, and air into the soil.
3. Decompact the soil within the dripline using a garden fork (left photo). This adds holes that create air circulation within the soil. Tree care professionals can also do this with an air tool or auger.
4. Install four inches of organic mulch, such as wood chips, grass clippings or straw, under the dripline. Organic mulch improves root growth and soil condition, reduces weeds, and reduces the need for water by conserving moisture. Organic mulch can be obtained for free or for a low cost through local resources (do an internet search for your area) or purchased from tree care companies or retailers.

DO NOT….

- **Cut or damage tree roots.**
- **Install an impervious surface, such as concrete or artificial turf, directly under the tree's canopy.**
- **Remove or turn off turf irrigation that is also watering a tree. Slowly reduce the amount of irrigation, or replace it with other watering methods (see next page).**

Step 3: Water if Needed - Watering Tools

Recommended Watering Tools to Conserve Water

This guide categorizes watering by young trees (five years old and younger) and mature trees (older than five years), which you will find on the next pages. The tools below can be used to water both types of trees in ways that use water smartly. However, we recommend that a raised mound, also know as a swale, or water bags be used to water young trees. The next page illustrates this further.

Frequent but short watering will only provide moisture to the top few inches of soil. Therefore, **longer and less frequent watering is more beneficial to trees because the moisture can penetrate to the depth of 18 to 24 inches,** which is often described as deep watering, beneath as much of the dripline as possible. How to measure soil moisture depth is described on page 8.

- **A soaker hose (right photo)**, available at home improvement stores, coiled several times in a spiral within the tree's dripline. The hose or tubing can be covered using mulch.
- **Tree water bags (photos below)**, also available at home improvement stores or internet retailers, generally hold 20 gallons of water and slowly water a tree over a period of hours.

Example: How to water a tree's dripline with a soaker hose. Similar to the dripline illustration on page 4, the soaker hose is coiled in the dripline area of this young tree. Water is delivered to the tree's roots by the coil and not applied directly to the tree trunk base. It is normal for the water to spread and cover the entire area as it percolates deep into the soil.

- **A drip irrigation system** installed in compliance with the City's **"**Water-Efficient Landscape and Irrigation Standards**."**
- **Water by hand using a garden hose with a shower head attachment**. A shower head attachment for a hose helps conserve water by reducing surface runoff. With this method, you would preferably spread water equally throughout the area under the dripline. To calculate the time needed to water a tree sufficiently with a hose and shower head attachment, measure the time it takes to fill a bucket with water in this manner. For example, if it takes two minutes to fill a five gallon bucket, it will take four minutes to provide 10 gallons of water, and eight minutes to deliver 20 gallons of water.

Photo 1: Young trees being watered using a soil swale. The swale is approximately equal to the dripline of the tree.

Photo 2: Young trees being watered using a mulch swale. The swale is approximately equal to the dripline of the tree.

Photo 3: A 20 gallon tree water bag.

Step 3: Water if Needed-Young Trees

Helping Young Trees During a Drought

Young trees are those that have been planted within the last five years. They are particularly dependent on water for a couple of reasons. First, they often have compromised root systems that need to develop. And prior to planting, they live in a tree nursery and receive regular and highly monitored irrigation. They must become slowly accustomed to not receiving this type of watering as they grow and adapt to an urban environment.

How Much Water & How Often?

The amount of water and watering frequency needed for young trees is outlined in the table below.

Recommended Watering Frequencies and Amounts for Young Trees	
April to October (Warmer Months)	**November to March (Cooler Months)**
Weekly	**Twice a Month**
10-20 Gallons	**10-20 Gallons**

How to Water a Young Tree

The key to watering a young tree is to let the water slowly soak into the soil around the tree. There are two recommended methods to do this if irrigation is not already installed. One is to create a raised mound, or swale, around the tree by creating a berm.

- The berm could be of soil (photo 1) or organic mulch (photo 2). The swale's berm should be about three inches high and be as wide as the dripline.
- Fill the swale with water. After it has all drained into the soil, fill the swale again and allow it to drain once more.

The second recommended way to water a young tree is to install a tree water bag as shown in photo 3.

Step 3: Water if Needed-Mature Trees

Helping Mature Trees During a Drought

Mature trees need more water than young trees as they have a higher leaf surface area and a larger root system. They are often able to find the water they require, but during a drought, supplemental watering may be required. Use the signs of drought stress to determine this. Urban Forest staff can help with public trees (those in parks and parkways/along streets) by submitting a request through the City's Government Outreach (GO) Customer Service Center.

How Much Water Does a Mature Tree Need?

A general rule is to provide 10 gallons of water, preferably spread equally throughout the area under the dripline, per inch of trunk diameter. The trunk diameter should be measured at four and a half feet from ground level as shown in the photographs to the right. This tree has a trunk diameter of nine inches and therefore needs about 90 gallons at each watering. **It is recommended that 160 gallons is the maximum amount of water provided to a tree, even if its trunk diameter exceeds 16 inches, to avoid wasting water**. Palm trees would be excluded from this rule because their trunk diameter is not related to their size. If a palm tree shows drought stress, it is recommended that those less than 20 feet high are provided 20 gallons of water and those taller are provided 50 gallons per the watering frequencies below.

To water larger trees, you can refill the same water bag until the desired amount of water is reached or connect multiple water bags. If the trees are too large for water bags, try attaching them to multiple stakes under the dripline. Watering under the dripline allows for good water absorption.

Watering Frequency for Mature Trees

Different tree species require different watering frequencies defined as **minimal**, **moderate**, and **high**. Watering frequency recommendations per common species in Santa Monica can be found in the Appendix of this document (page 9). A number of mobile apps and websites exist to help identify tree species. An internet search for "how to identify trees" is one way to assist you in identification. Urban Forest staff can help identify public trees by submitting a request through the City's Government Outreach (GO) Customer Service Center. **If the tree species is unknown, the "minimal" watering frequency is recommended.**

Recommended Watering Frequency Based on Species	April to October (Warmer Months)	November to March (Cooler Months)
Minimal	Twice a Month	None, Once Established*
Moderate	Three Times a Month	Once a Month
High	Weekly	Twice a Month

**once established means trees over five years old*

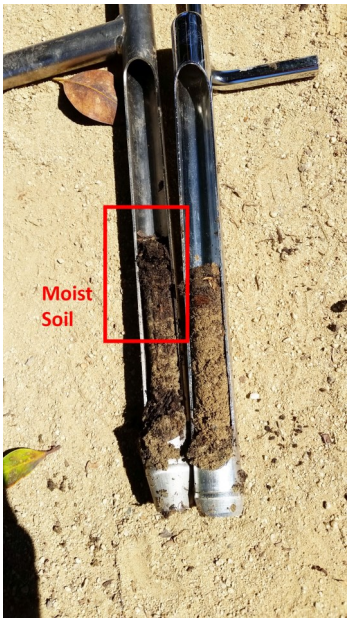
Step 4: Monitor and Adjust to Save Water

After water is provided consistently and in the proper amounts, a tree's appearance should improve. The aim of watering is to provide soil moisture to a depth of 18 to 24 inches beneath as much of the tree canopy, or dripline, as possible (refer to page 4). You can monitor and adjust water use by measuring soil moisture. Soil moisture can be measured by driving a screwdriver six to 12 inches into the soil. If the soil is dry and breaks easily, then it needs water. You can also measure soil moisture using a soil probe (see photos below) available at home improvement stores. A soil probe provides additional information on soil moisture and soil compaction.

A soil probe is used throughout the dripline one to two hours after watering. The soil probe should penetrate into the soil to a depth of 12 inches fairly easily. The soil should feel slightly damp and be darker in color. If the soil is resistant, additional soil decompaction might be necessary. For more information on soil probes see: https://extension.usu.edu/files/publications/publication/HG-518.pdf.

Continued monitoring of a tree's health is essential. If the tree continues to exhibit drought stress signs, consider the frequency and/or watering volume by using the tools described earlier in this guide. Another consideration is the level of nutrients being provided to the tree.

Standard soil probe found at home improvement stores.



Two soil probes. The probe on the left shows moist soil penetration to about 2" inches depth, while the one of the right shows dry soil.

How to use a soil probe.

Appendix: Watering Frequencies for Mature Trees

Recommended Watering Frequency Based on Species	April to October (Warmer Months)	November to March (Cooler Months)
Minimal	Twice a Month	None, Once Established
Moderate	Three Times a Month	Once a Month
High	Weekly	Twice a Month

Common Name	Botanical Name	Irrigation Requirements
ACACIA	Acacia spp.	None, once established
ALEPPO PINE	Pinus halepensis	Minimal
ALEXANDRA PALM	Archontophoenix alexandrae	Minimal
ALMOND	Prunus amygdalus	Moderate
AMERICAN PERSIMMON	Diospyros virginiana	Moderate
AMERICAN SWEETGUM	Liquidambar styraciflua	Moderate
AMERICAN SYCAMORE	Platanus occidentalis	Moderate
APRICOT	Prunus armeniaca	Moderate
ARIZONA ASH	Fraxinus velutina	Minimal
ASH ARIZONA	Fraxinus velutina 'Dr Pironne'	Minimal
ASH GUM	Eucalyptus cinerea	Minimal
ATLAS CEDAR	Cedrus atlantica	Minimal
AUSTRALIAN TEA TREE	Leptospermum laevigatum	Minimal
AUSTRALIAN WILLOW	Geijera parviflora	Minimal
AVOCADO	Persea americana	Moderate
BAILEY ACACIA	Acacia baileyana	None, once established
BANANA	Musa spp.	High
BIDWILLS CORAL TREE	Erythrina bidwillii	Moderate
BIRCH	Betula spp.	Moderate
BLACK ACACIA	Acacia melanoxylon	None, once established
BLUE GUM	Eucalyptus globulus	Minimal
BOTTLE TREE	Brachychiton populneus	Minimal
BRAZILIAN PEPPER	Schinus terebinthifolius	Minimal
BRISBANE BOX	Lophostemon confertus	Minimal
BRONZE LOQUAT	Eriobotrya deflexa	Moderate
BRUSH CHERRY	Syzygium paniculatum	Moderate
BUNYA-BUNYA	Araucaria bidwillii	Moderate
CAJEPUT TREE	Melaleuca quinquenervia	Minimal
CALABRIAN PINE	Pinus brutia	Minimal
CALIFORNIA BAY	Umbellularia californica	None, once established
CALIFORNIA BLACK WALNUT	Juglans hindsii	None, once established
CALIFORNIA FAN PALM	Washingtonia filifera	None, once established
CALIFORNIA PEPPER	Schinus molle	Minimal
CALIFORNIA SYCAMORE	Platanus racemosa	Moderate
CAMPHOR TREE	Cinnamomum camphora	Minimal
CANARY ISLAND DATE PALM	Phoenix canariensis	Minimal
CANARY ISLAND PINE	Pinus canariensis	Minimal
CAPE CHESTNUT	Calodendrum capense	Moderate
CAPE PITTOSPORUM	Pittosporum viridiflorum	Moderate
CARIBBEAN COPPER TREE	Euphorbia cotinifolia	Minimal
CAROB	Ceratonia siliqua	Minimal
CAROLINA LAUREL CHERRY	Prunus caroliniana	Moderate
CARROTWOOD	Cupaniopsis anacardioides	Minimal
CATALINA CHERRY	Prunus lyonii	Moderate
CEDAR	Cedrus spp.	Minimal
CEDAR WEEPING	Cedrus atlantica 'Pendula'	Minimal
CHERRY MT FUJI	Prunus 'Mt Fuji'	Moderate
CHESTNUT	Castanea spp.	Minimal
CHINA DOLL	Radermachera sinica	Moderate

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Recommended Watering Frequency Based on Species	April to October (Warmer Months)	November to March (Cooler Months)
Minimal	Twice a Month	None, Once Established
Moderate	Three Times a Month	Once a Month
High	Weekly	Twice a Month

Common Name	Botanical Name	Irrigation Requirements
CHINESE ELM	Ulmus parvifolia	Moderate
CHINESE FLAME TREE	Koelreuteria bipinnata	Moderate
CHINESE FRINGE TREE	Chionanthus retusus	Moderate
CHINESE JUNIPER	Juniperus chinensis	Minimal
CHINESE PISTACHE	Pistacia chinensis	None, once established
CLUSTER PINE	Pinus pinaster	Minimal
COAST LIVE OAK	Quercus agrifolia	Minimal
COAST REDWOOD	Sequoia sempervirens	High
COCKSPUR CORAL TREE	Erythrina crista-galli	Moderate
CORAL GUM	Eucalyptus torquata	Minimal
CORAL TREE	Erythrina spp.	Moderate
CORK OAK	Quercus suber	Minimal
CORKSCREW WILLOW	Salix matsudana 'Tortuosa'	Moderate
CRAPE MYRTLE	Lagerstroemia indica	Minimal
CRAPE MYRTLE	Lagerstroemia indica 'Muskogee'	Minimal
CRAPE MYRTLE TUSCARORA	Lagerstroemia indica 'Tuscarora'	Minimal
CROWN OF GOLD TREE	Cassia excelsa	Minimal
CUBAN ROYAL PALM	Roystonea regia	Moderate
CYPRESS	Cupressus spp.	Minimal
DATE PALM	Phoenix dactylifera	Moderate
DATE PALM	Phoenix loureri	Moderate
DEODAR CEDAR	Cedrus deodara	Minimal
DESERT GUM	Eucalyptus rudis	Minimal
DRACAENA	Cordyline australis	Moderate
DRAGON TREE	Dracaena draco	Moderate
DRAKE ELM	Ulmus parvifolia 'Drake'	Moderate
DROOPING MELALEUCA	Melaleuca armillaris	Minimal
DROOPING SHE-OAK	Casuarina stricta	Minimal
EASTERN REDBUD	Cercis canadensis	Minimal
EDIBLE APPLE	Malus sylvestris	Moderate
EDIBLE FIG	Ficus carica	Moderate
EDIBLE LOQUAT	Eriobotrya japonica	Moderate
EUCALYPTUS	Eucalyptus spp.	Minimal
EUROPEAN WHITE BIRCH	Betula pendula	Moderate
EVERGREEN PEAR	Pyrus kawakamii	Moderate
FERN PINE	Podocarpus gracilior	Moderate
FERN-LEAF CATALINA IRONWOOD	Lyonothamnus floribundus	Minimal
FICUS ALII	Ficus 'Alii'	Moderate
FIG	Ficus spp.	Moderate
FIREWHEEL TREE	Stenocarpus sinuatus	Moderate
FLOODED GUM	Eucalyptus grandis	Minimal
FLOWERING PLUM	Prunus blireiana	Moderate
FOXTAIL PALM	Wodyetia bifurcata	Moderate
FRUITING PEAR	Pyrus communis	Moderate
GIANT BIRD OF PARADISE	Strelitzia nicolai	Moderate
GIANT SEQUOIA	Sequoiadendron giganteum	High
GIANT YUCCA	Yucca elephantipes	None, once established
GINKGO AUTUMN GOLD	Ginkgo biloba 'Autumn Gold'	Minimal
GOLD MEDALLION TREE	Cassia leptophylla	Minimal

Appendix: Watering Frequencies for Mature Trees

Recommended Watering Frequency Based on Species	April to October (Warmer Months)	November to March (Cooler Months)
Minimal	Twice a Month	None, Once Established
Moderate	Three Times a Month	Once a Month
High	Weekly	Twice a Month

Common Name	Botanical Name	Irrigation Requirements
GOLDEN TRUMPET TREE	Tabebuia chrysotricha	Moderate
GOLDENRAIN TREE	Koelreuteria paniculata	Moderate
GREEN GEM INDIAN LAUREL FIG	Ficus microcarpa 'Green Gem'	Moderate
GREEN WATTLE	Acacia decurrens	None, once established
GUADALUPE PALM	Brahea edulis	Minimal
HACKBERRY	Celtis spp.	Minimal
HEATH MELALEUCA	Melaleuca ericifolia	Minimal
HOLLY OAK	Quercus ilex	Minimal
HOLLYWOOD JUNIPER	Juniperus chinensis 'Torulosa'	Minimal
HONG KONG ORCHID TREE	Bauhinia blakeana	Minimal
HOPSEED	Dodonaea viscosa	Minimal
INCENSE CEDAR	Calocedrus decurrens	None, once established
INDIAN LAUREL FIG	Ficus microcarpa 'Nitida'	Moderate
ITALIAN ALDER	Alnus cordata	Moderate
ITALIAN CYPRESS	Cupressus sempervirens	Minimal
ITALIAN STONE PINE	Pinus pinea	Minimal
JACARANDA	Jacaranda mimosifolia	Minimal
JAPANESE BLACK PINE	Pinus thunbergiana	Minimal
JAPANESE CEDAR	Cryptomeria japonica	Moderate
JAPANESE FLOWERING CHERRY	Prunus serrulata	Moderate
JAPANESE MAPLE	Acer palmatum	Moderate
JAPANESE RED PINE	Pinus densiflora	Minimal
JUNIPER	Juniperus spp.	Minimal
KAFFIR PLUM	Harpephyllum caffrum	Minimal
KAFFIRBOOM CORAL TREE	Erythrina caffra	Moderate
KARO	Pittosporum crassifolium	Moderate
KING PALM	Archontophoenix cunninghamiana	Minimal
LAURUSTINUS	Viburnum tinus	Moderate
LEMON	Citrus limon	Moderate
LEMON BOTTLEBRUSH	Callistemon citrinus	Minimal
LEMON-SCENTED GUM	Eucalyptus citriodora	Minimal
LEYLAND CYPRESS	Cupressocyparis leylandii	Moderate
LOMBARDY POPLAR	Populus nigra 'Italica'	Moderate
LONDON PLANE	Platanus acerifolia	Moderate
LONDON PLANE BLOODGOOD	Platanus acerifolia 'Bloodgood'	Moderate
LONG-LEAFED YELLOWWOOD	Podocarpus henkelii	Moderate
MAGNOLIA SAMUEL SOMMER	Magnolia grandiflora 'Samuel Sommer'	Moderate
MAIDENHAIR TREE	Ginkgo biloba	Minimal
MAJESTY PALM	Ravenea rivularis	Moderate
MANNA GUM	Eucalyptus viminalis	Minimal
MAYTEN TREE	Maytenus boaria	Moderate
MEDITERRANEAN FAN PALM	Chamaerops humilis	Moderate
MEXICAN BLUE PALM	Brahea armata	Minimal
MEXICAN FAN PALM	Washingtonia robusta	None, once established
MOCK ORANGE	Pittosporum tobira	Moderate
MODESTO ASH	Fraxinus velutina 'Modesto'	Minimal
MONTEREY CYPRESS	Cupressus macrocarpa	Minimal
MONTEREY PINE	Pinus radiata	Minimal
MONTEZUMA CYPRESS	Taxodium mucronatum	None, once established

Appendix: Watering Frequencies for Mature Trees

Recommended Watering Frequency Based on Species	April to October (Warmer Months)	November to March (Cooler Months)
Minimal	Twice a Month	None, Once Established
Moderate	Three Times a Month	Once a Month
High	Weekly	Twice a Month

Common Name	Botanical Name	Irrigation Requirements
MORETON BAY FIG	Ficus macrophylla	Moderate
MYOPORUM	Myoporum laetum	None, once established
NAKED CORAL TREE	Erythrina coralloides	Moderate
NEW ZEALAND CHRISTMAS TREE	Metrosideros excelsus	Minimal
NICHOL'S WILLOW LEAFED PEPPERMINT	Eucalyptus nicholii	Minimal
NORFOLK ISLAND PINE	Araucaria heterophylla	Moderate
OLEANDER	Nerium oleander	Minimal
OLIVE	Olea europaea	Minimal
ORANGE	Citrus sinensis	Moderate
ORIENTAL ARBORVITAE	Platycladus orientalis	Moderate
ORIENTAL SWEETGUM	Liquidambar orientalis	Moderate
ORNAMENTAL PEAR	Pyrus calleryana	Moderate
PAPER MULBERRY	Broussonetia papyrifera	Minimal
PEACH	Prunus persica	Moderate
PEPPERMINT TREE	Agonis flexuosa	Minimal
PINCUSHION TREE	Hakea laurina	None, once established
PINDO PALM	Butia capitata	Moderate
PINEAPPLE GUAVA	Feijoa sellowiana	Moderate
PINK BOTTLEBRUSH	Callistemon citrinus 'Violaceus'	Moderate
PINK MELALEUCA	Melaleuca nesophila	Minimal
PINON PINE	Pinus edulis	Minimal
PITTOSPORUM	Pittosporum spp.	Moderate
PLUM	Prunus domestica	Moderate
PLUME ALBIZIA	Albizia distachya	None, once established
PODOCARPUS NAGI	Podocarpus nagi	Moderate
PRIMROSE TREE	Lagunaria patersonii	Minimal
PURPLE ORCHID TREE	Bauhinia variegata	Minimal
PURPLE-LEAF PLUM	Prunus cerasifera	Moderate
PYGMY DATE PALM	Phoenix roebelenii	Moderate
QUEEN PALM	Syagrus romanzoffianum	Moderate
QUEENSLAND PITTOSPORUM	Pittosporum rhombifolium	Moderate
QUEENSLAND UMBRELLA TREE	Schefflera actinophylla	Moderate
RED BAY	Persea borbonia	Moderate
RED CLUSTERBERRY	Cotoneaster lacteus	Minimal
RED FLOWERING GUM	Eucalyptus ficifolia	Minimal
RED GUM	Eucalyptus camaldulensis	Minimal
RED IRONBARK	Eucalyptus sideroxylon	Minimal
RIVER SHE-OAK	Casuarina cunninghamiana	Minimal
ROUGH-SHELL MACADAMIA	Macadamia tetraphylla	Moderate
ROUND-LEAFED SWEETGUM	Liquidambar styraciflua 'Rotundiloba'	Moderate
RUBBER TREE	Ficus elastica	Moderate
RUSTY LEAF FIG	Ficus rubiginosa	Moderate
SENEGAL PALM	Phoenix reclinata	Moderate
SHAMEL ASH	Fraxinus uhdei	Minimal
SIBERIAN ELM	Ulmus pumila	Moderate
SILK OAK	Grevillea robusta	Minimal
SILK TREE	Albizia julibrissin	Minimal
SILK-FLOSS TREE	Chorisia speciosa	Minimal
SILVER DOLLAR GUM	Eucalyptus polyanthemos	Minimal

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Minimal	Twice a Month	None, Once Established
Moderate	Three Times a Month	Once a Month
High	Weekly	Twice a Month

Common Name	Botanical Name	Irrigation Requirements
SILVER MAPLE	Acer saccharinum	Moderate
SKY FLOWER	Duranta repens	Moderate
SOUTH AMERICAN ROYAL PALM	Roystonea oleracea	Moderate
SOUTHERN LIVE OAK	Quercus virginiana	Minimal
SOUTHERN MAGNOLIA	Magnolia grandiflora	Moderate
SPANISH DAGGER	Yucca gloriosa	None, once established
SPOTTED GUM	Eucalyptus maculata	Minimal
STAR PINE	Araucaria columnaris	Moderate
STRAWBERRY GUAVA	Psidium cattleianum	Moderate
STRAWBERRY TREE	Arbutus unedo	Minimal
SUGAR GUM	Eucalyptus cladocalyx	Minimal
SWEET BAY	Laurus nobilis	Minimal
SWEETGUM	Liquidambar styraciflua	Moderate
SWEETSHADE	Hymenosporum flavum	Moderate
TEA TREE	Leptospermum spp.	Minimal
TIPU	Tipuana tipu	Moderate
TOMLINSON ASH	Fraxinus uhdei 'Tomlinson'	Minimal
TORREY PINE	Pinus torreyana	Minimal
TRIANGLE PALM	Neodypsis decaryi	Moderate
TRINIDAD FLAME BUSH	Calliandra tweedii	None, once established
TRUE MYRTLE	Myrtus communis	Minimal
TULIP TREE	Liriodendron tulipifera	Moderate
TUPIDANTHUS	Tupidanthus calyptratus	Moderate
VICTORIAN BOX	Pittosporum undulatum	Moderate
WATER GUM	Tristaniopsis laurina	None, once established
WATKINS FIG	Ficus watkinsiana	Moderate
WEEPING BOTTLEBRUSH	Callistemon viminalis	Moderate
WEEPING FIG	Ficus benjamina	Moderate
WEEPING INDIAN LAUREL FIG	Ficus microcarpa	Moderate
WESTERN REDBUD	Cercis occidentalis	Minimal
WHITE ALDER	Alnus rhombifolia	Moderate
WHITE IRONBARK	Eucalyptus leucoxylon	Minimal
WHITE MULBERRY	Morus alba	Moderate
WHITE POPINAC	Leucaena glauca	Minimal
WHITE POPLAR	Populus alba	Moderate
WHITE SAPOTE	Casimiroa edulis	Moderate
WILLOW PITTOSPORUM	Pittosporum phillyreoides	Moderate
WINDMILL PALM	Trachycarpus fortunei	Moderate
XYLOSMA	Xylosma congestum	Moderate
YATE	Eucalyptus cornuta	Minimal
YELLOW OLEANDER	Thevetia peruviana	Minimal
YEW PINE	Podocarpus macrophyllus	Minimal
YUCCA	Yucca spp.	None, once established