SAN DIEGO ASLA
AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS

WORKSHOP AGENDA

TREE ReLEAF IN URBAN SETTINGS – an in depth look at urban forestry and its challenges

2:00 - 2:15
WELCOME & INTRODUCTION:
JACKIE HIGGINS

2:15 - 4:30
URBAN TREES ENVIRONMENTAL PERSPECTIVE:
ROBERT PERRY, FASLA

CAL FIRE URBAN FORESTRY:
ABIGAIL SRADER

SUSTAINABLE TREE SELECTIONS:
ROBIN RIVET

DROUGHT MANAGEMENT FOR TREE S:
BILL HOMYAK

4:30-5:00
QUESTIONS AND COMMENTS
PANELISTS AND AUDIENCE PARTICIPATION

5:00-6:30
SOCIAL NETWORKING HOUR

GAIL MATERIALS

TRI C NATURAL SOILUTIONS™

San Diego County Water Authority

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QUESTION AND ANSWER PERIOD

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NASA VIDEO

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Overview of Urban Tree Benefits and Costs; an Environmental Perspective

Bob Perry, FASLA

October 9, 2015

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Primary Benefits:

Carbon Sequestration
Embodied Energy
Oxygen Release

Secondary Benefits:

Climate Mitigation
Pollution and Erosion Mitigation
Psychological and Health Benefits
Recreation, Habitat and Urban Fabric Benefits

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Primary Benefits of Plants per Pound of Biomass:

Carbon Sequestration

.4-.5 lb. Carbon/Lb. Biomass

Embodied Energy

1,755 Btu's Heat Energy

2,000 kCals Food Energy

2.25 kWh Electrical Energy

Oxygen Release

.9 - 1 Lb. Oxygen/Lb. Biomass

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Secondary Benefits:

Climate Mitigation

- Sun/Heat Load Reduction
- Temperature Reduction

Pollution and Erosion Mitigation

- Air, Water and Soil
- Slope and Soil Stabilization

Psychological and Health Benefits

- Stress Reduction

Recreation, Habitat, Urban Fabric

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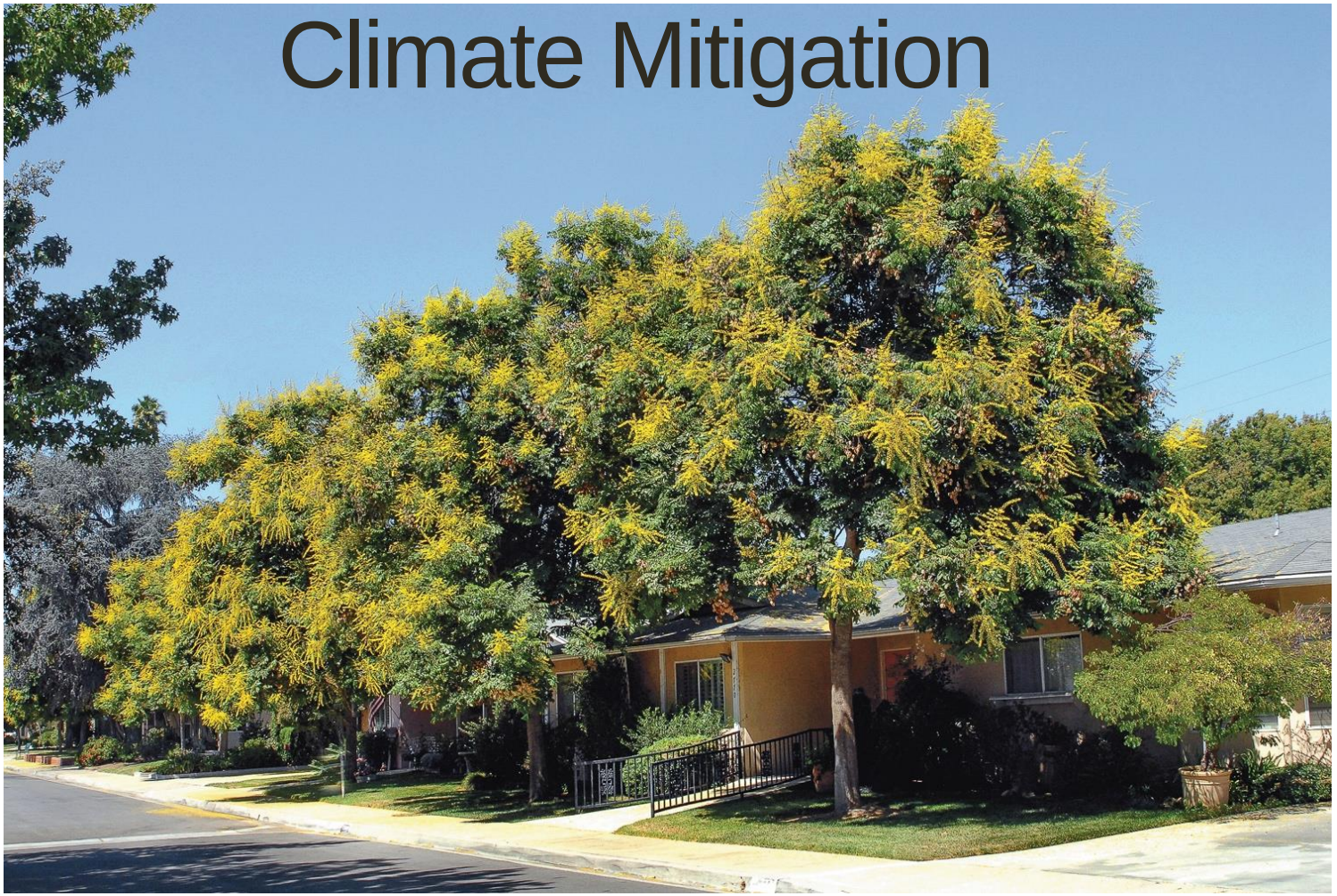
Greg McPherson
Urban Forestry

Climate Mitigation



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Hillside Housing
Diamond Bar

Soil & Slope Stabilization

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Grand Park
Rios Clementi Hale Studios

Stress Reduction, Urban Fabric

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Vista Hermosa Park
Mia Lehrer & Associates

Recreation, Urban Habitat

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USC Sports Field
Tall Fescue Turf Grass

Primary Benefits:

Tall Fescue Turf Grass

0.50 Lb. per Sq. Ft. =

21,780 Lb. per Acre

Carbon Sequestration

10,890 Lb. Carbon

Embodied Energy

9,680 kWh Electrical Energy

Oxygen Release

21,780 Lb. Oxygen Released

Primary Benefits:

10” DBH Quercus agrifolia

980 - 1,000 lb. Dry Weight Biomass

Carbon Sequestration

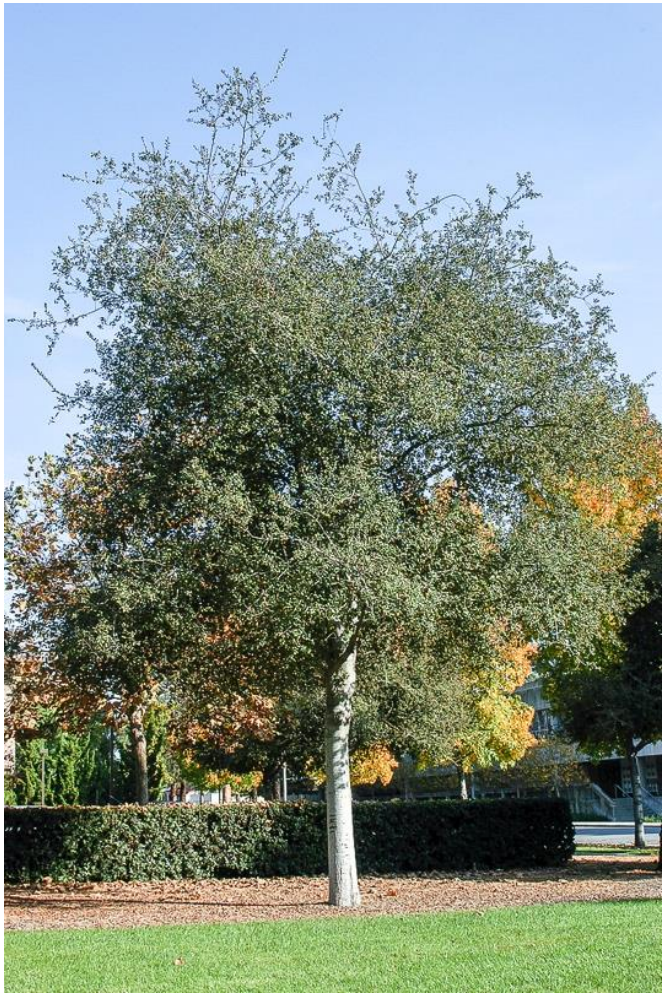
= +/- 490 – 500 lb. Carbon

Embodied Energy

+/- 1,100 kWh Electrical Energy

Oxygen Release

+/- 980-1,000 lb. Oxygen Release



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i-Trees
Carbon Calculator

Primary Benefits:

48” DBH Quercus agrifolia

34,000lb. Dry Weight Biomass

Carbon Sequestration

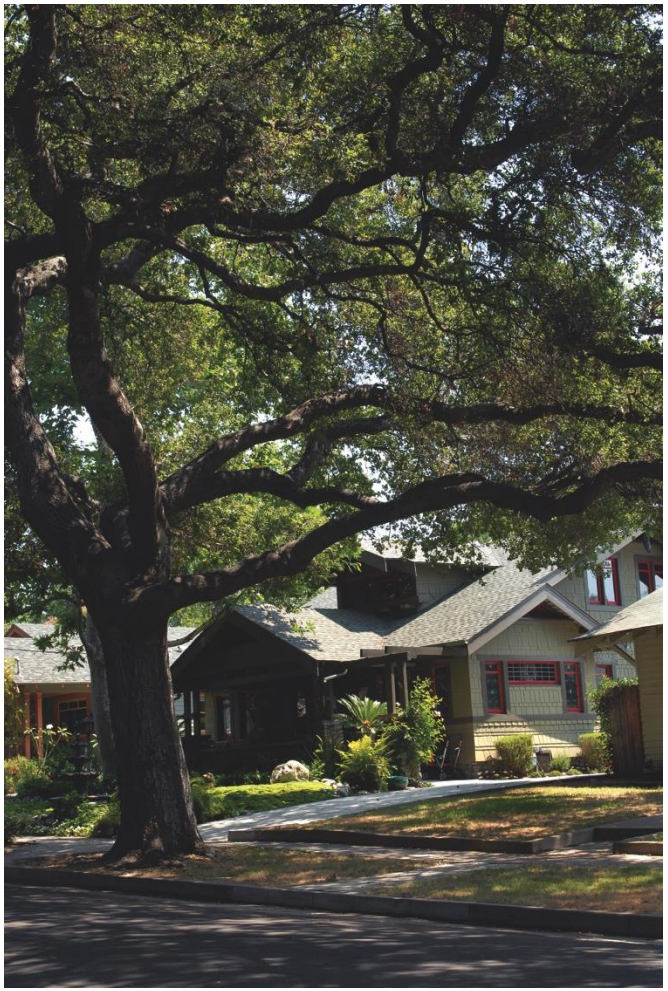
= +/- 17,000 Lb. Carbon

Embodied Energy

= +/- 7,550 kWh Electrical Energy

Oxygen Release

= +/- 34,000 Lb. Oxygen Release



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Tree and Turf Grass
Assessing Costs

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Energy Down The Drain: Natural Resources Defense Council

Carbon Footprint of One Acre Foot of Water to Southern California per Year

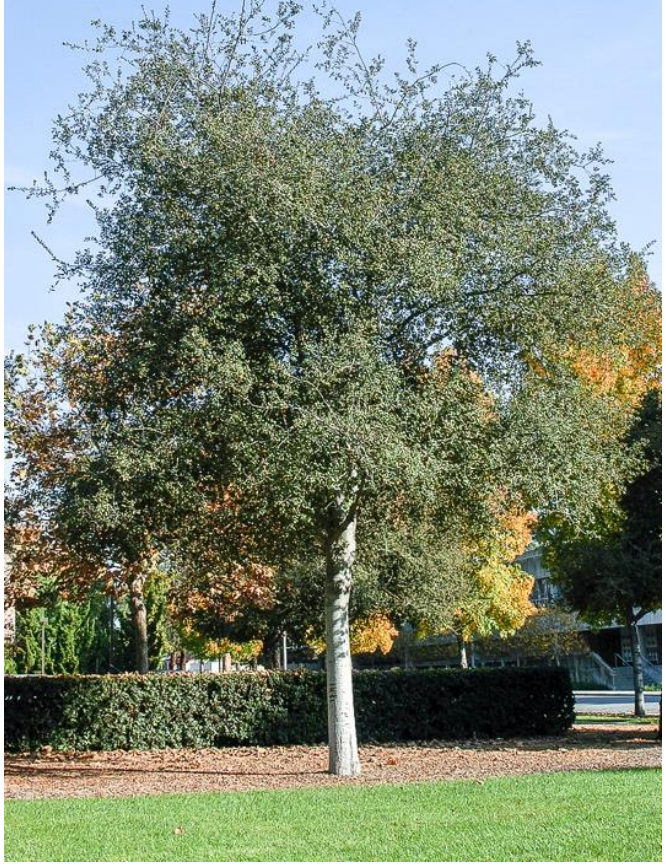
State Water Project = 3,000 kWh
(Releases 670 pounds of carbon = 1.3 Trees)
(2,680 s.f. Turf)

Reclaimed Water = 1,500 kWh
(Releases 335 pounds of carbon = .67 Trees)
(1,340 s.f. Turf)

Ground Water = 580 kWh/ 1,980,000 Btu's
(Releases 130 pounds of carbon = .25 Trees)
(520 s.f. Turf)

Desalinization = 4,400 kWh
(Releases 980 pounds of carbon = 2 Trees)
(3,920 s.f. Turf)

980-1,000 lb. Coast Live Oak
= +/- 490 – 500 lb. Carbon



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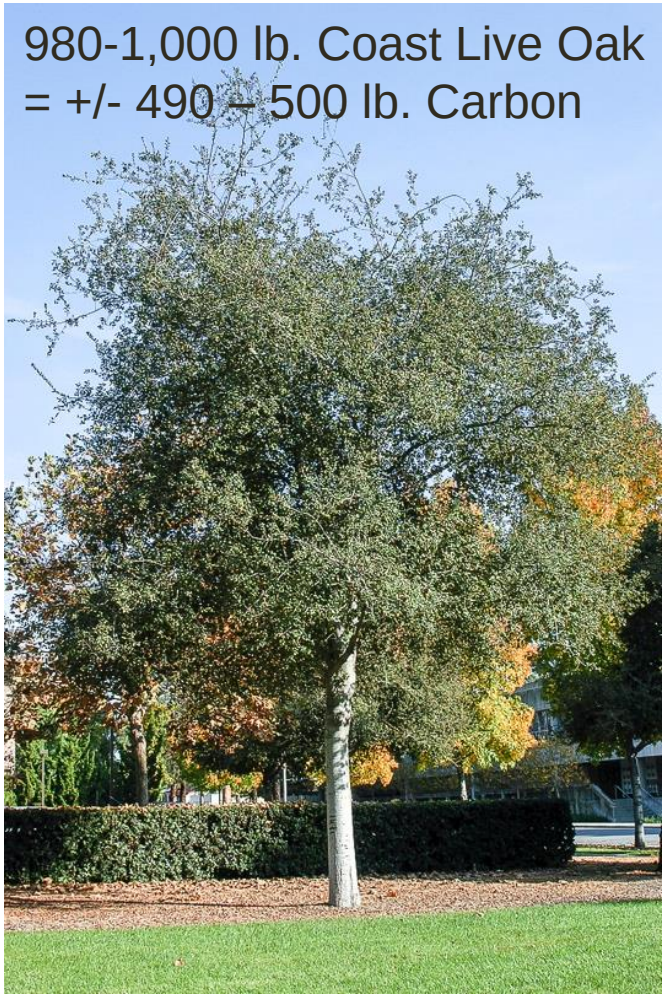
Energy Down The Drain: Natural Resources Defense Council

Carbon Footprint of Chemical Fertilizers

The UC Guide to Healthy Lawns

In general, lawns should be fertilized about 4 times a year with 1 lb. of nitrogen at each application. Both cool season and warm-season grasses require 4 - 6 lbs. of actual nitrogen per year (43.5 lb. of actual nitrogen per acre per application).

1 pound of Nitrogen = 4.5 Lbs. of carbon
x 43.5 lbs. per Acre = 195 Lbs. of carbon
(Equals 390 lbs. of Biomass = .8 Trees/year
780 s.f. Turf



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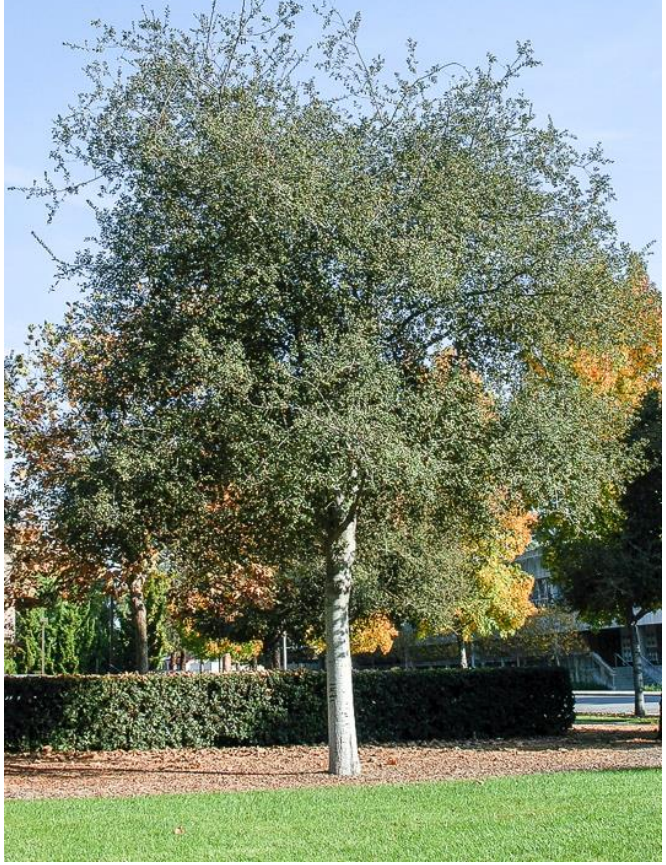
Energy Down The Drain: Natural Resources Defense Council

Carbon Footprint of PVC/HDPE Irrigation Pipe

1 pound of PVC Pipe = 2.2 lbs. of carbon
x 400 lbs. per Acre = 1,800 lbs. of carbon
(Equals 3,600 lbs. of Biomass = 7+ Trees
7,200 s.f. Turf Grass

1 pound of HDPE Pipe = 3.0 lbs. of carbon
x 675 lbs. per Acre = 2,000 lbs. of carbon
(Equals 4,000 lbs. of Biomass = 8 Trees
8,000 s.f. Turf Grass

980-1,000 lb. Coast Live Oak
= +/- 490 – 500 lb. Carbon



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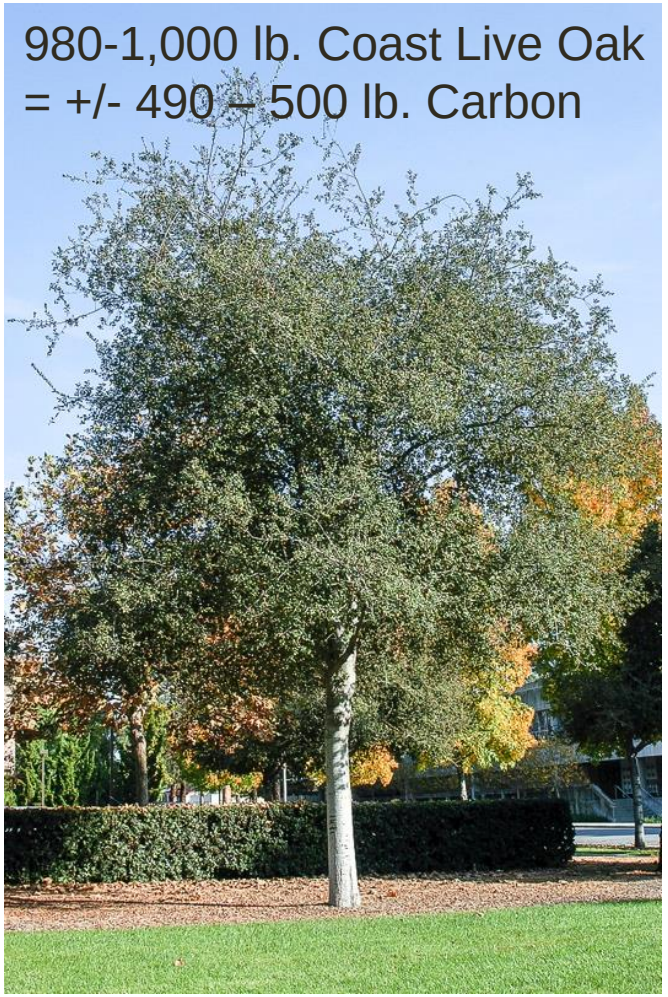
Energy Down The Drain: Natural Resources Defense Council

Carbon Footprint of Gasoline & Diesel

1 Gallon of Gasoline = 6.5 lbs of carbon
x 100 Gallons = 650 lbs. of carbon
(Equals 1,300 lbs. of Biomass = 2.75 Trees
5,200 s.f. Turf

1 Gallon of Diesel = 7.0 Lbs. of carbon
x 100 Gallons = 700 Lbs. of carbon
(Equals 1,400 lbs. of Biomass = 3 Trees
6,000 s.f. Turf



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Nason Street Median
1 Acre – Moreno Valley

Moreno Valley MAWA

(Eto) x (0.62) x (0.45) x (L.A.) =
(64 In.) x (0.62) x (0.45) x (43,560 s.f.) =

777,800 Gallons/Acre/Year
= 2.4 A.F. per year

Lifetime Landscape Benefits

Projected Biomass Accrual = 60,000 Lb.
= 30,000 Lb. Sequestered Carbon
= 26,650 kWh. Electrical Energy
= 60,000 Lb. Released Oxygen

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Nason Street Median
1 Acre – Moreno Valley

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Nason Street Median
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Nason Street Median
1 Acre – Moreno Valley

Moreno Valley MAWA

777,800 Gallons/Acre/Year
= 2.4 A.F. per year

Carbon Release:

State Water Project Water

@ 3,000 kWh/A.F. = 7,200 kWh per Year

=

3,200 Lb. Carbon release per year

Projected Biomass Accrual = 60,000 Lb.

= 30,000 Lb. Sequestered Carbon

= 9.25 years until cost exceeds benefits

(1 pound of HDPE Pipe = 3.0 lbs. of carbon
x 675 lbs. per Acre = 2,000 lbs. of carbon)

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Overplanting + Wrong Species
Moorpark

Aquabella Mitigation Channel - Grading

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Tree Trimming Maintenance

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Miraloma Park, Anaheim
Tree Removal

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Miraloma Park, Anaheim Tree Removal

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Primary Benefits:

Carbon Sequestration
Embodied Energy
Oxygen Release

Secondary Benefits:

Climate Mitigation
Pollution and Erosion Mitigation
Psychological and Health Benefits
Recreation, Habitat and Urban Fabric Benefits

Checklist:

Abundant and Diverse Landscape Plantings
Regional and Micro-climate Adapted Species
Right Plant – Right Place
Carbon Footprint Assessment Framework
Water Budget Based Irrigation w/ Meters
Manage Fossil Fuel Consumption
Plant for Climate Mitigation
Pollution and Erosion Mitigation
Psychological and Health Benefits
Recreation, Habitat and Urban Fabric Benefits

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Tongva Park
Santa Monica

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CAL FIRE

California Department of Forestry & Fire Protection

Urban & Community Forestry Program

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Urban Forestry Act of 1978

Purpose –

- **Arrest the decline of Urban Forest.**
  - **Facilitate Tree Planting.**
  - **Improve Management of Urban Forest.**
  - **Improve Quality of Life.**
- **Facilitate Tree Maintenance Job Opportunities.**
- **Maximize Tree & Vegetation Cover to Conserve Energy, Produce Fuels, and other Products.**
- **Encourage Coordination Between State & Local Government.**
  - **Encourage Coordination Between Related Programs.**
  - **Encourage Citizen Participation**

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Mission & Vision

California's Urban and Community Forests will be healthy and well-managed, providing optimal benefits to all Californians.

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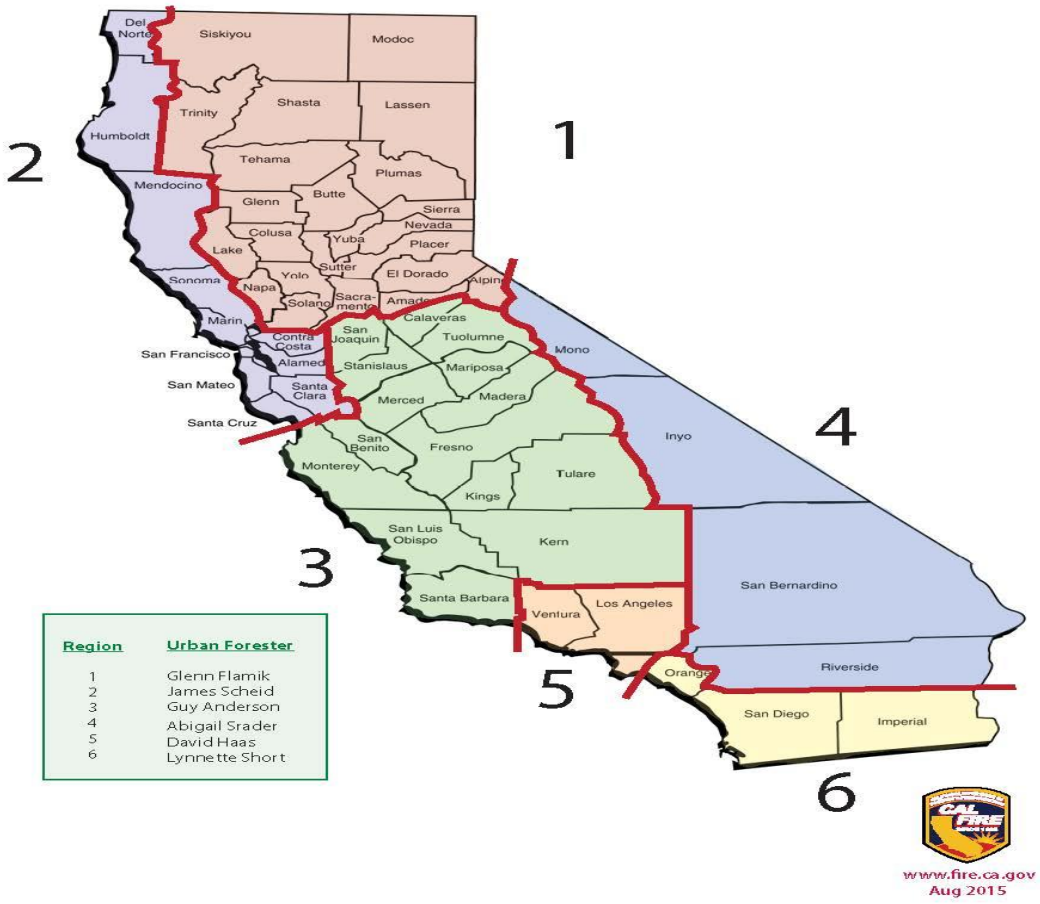
CAL FIRE
Regional Urban Foresters



Region	Urban Forester
1	Glenn Flamik
2	James Scheid
3	Guy Anderson
4	Abigail Srader
5	David Haas
6	Lynnette Short

www.fire.ca.gov
Aug 2015

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What We Do

- **Grant Programs**
- **CaUFC / Regional Councils**
- **Tree City USA program**
- **Coordination between governments and Urban Forestry organizations**

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Urban Forestry Program Goals

1. **Optimize the benefits that people receive from urban & community forestry.**

2. **Improve management and health of the urban and community forest**

3. **Promote industry growth and job creation**

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Desired Outcome

- **Increased investment in urban forestry efforts from State, Regional and Local governments.**

- **Increased resolutions, policies or management plans for urban forestry**

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Funding Sources

- **Past**
  - **Proposition 12**
  - **Proposition 40**
  - **Proposition 84**
  - **Federal Funds**
- **Current**
  - **Greenhouse Gas Emissions Reduction fund**

    2014/2015 $17,000,000 statewide

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2014/2015 Grant Awards

http://www.fire.ca.gov/grants/downloads/GHG_Grants.pdf

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Grant Programs

- **GTGS – Tree Planting grant. $150,000-$750,000**
- **Urban Forestry Management for GHG Reduction. $150,000-$750,000**
- **Green Innovations Projects. $150,000-$750,000**
- **Urban Wood Biomass Utilization – $150,000-$750,000**
- **Woods in the Neighborhood (Reclamation of blighted urban lands) $200,000-$150,000**

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California's Urban Forests

- **Environmental Benefits:**
  - Reduces runoff of Polluted storm water
  - Filters air pollutants including ozone and particulates
  - Reduces CO2 by sequestration and lowered cooling/heating needs
  - Provides habitat for birds, animals and insects
  - Mitigates heat island effects by providing shade
  - Helps reduce noise, and acts as a windbreak

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California's Urban Forests

- **Economic Impacts (2009)**
  - Supported 59,205 jobs resulting in $3.2 billion individual income
  - Resulted in $812 million of Local, State, & Federal taxes
  - Added $3.5 billion in value to the state's economy
  - Enhances aesthetic value of urban landscapes and quality of life – adds property value

INCREASE THE VALUE OF YOUR BUSINESS AND YOUR REVENUE STREAM

Businesses on tree-lined streets show twenty percent higher income streams.[1]

20%

More profitable businesses produce more jobs and leave fewer storefronts vacant, which helps the entire community thrive.[2]

TREES MEAN BUSINESS

TREES ATTRACT MORE VALUABLE AND LOYAL CUSTOMERS

CUSTOMERS STAY LONGER, PAY MORE

The presence of trees encourages consumers to shop more often, stay in stores longer and pay more for goods.[3]

Stores in shopping districts with trees can charge, on average, nine percent higher prices, than those districts without trees.[3]

9%

SHOPPING IN TREE-SCAPED AREAS, LEAVES CUSTOMERS MORE SATISFIED WITH THE QUALITY OF YOUR GOODS AND SERVICES

Customers are 30% more satisfied with products that they purchase in shopping districts with trees.[3]

Customers are also 15% more satisfied with the customer service experience in those stores located in shopping districts with trees.[3]

FIRST IMPRESSIONS ABOUT A BUSINESS START AT THE CURB AND SIDEWALK.

Sources:
1. *Dan Burden, Walkable and Livable Communities Institute*
2. *Kelly Caffarelli, Home Depot Foundation*
3. *Dr. Kathleen Wolf, University of Washington*

INCREASE THE VALUE OF YOUR HOME AND IMPROVE YOUR COMMUNITY

$8,870

Simply having trees on your street can increase property values by an average of $8,870.[1]

Landscaping on your property, especially if it includes trees, can increase its value by up to twenty percent.[2]

20%

GREAT NEIGHBORHOODS ARE MADE UP OF MORE THAN NICE HOUSES AND GOOD SCHOOLS.

TREES MAKE THE PLACES WE LIVE FEEL LIKE HOME

SAVE MONEY ON YOUR ENERGY BILLS

Correctly planted trees can save 20–50% in energy used.[1]

For summer savings: The net cooling effect of a young, healthy tree is equivalent to 10 room-size air conditioners operating 20 hours a day.[3]

For winter savings: Trees planted as windbreaks can reduce heating costs by 10–25%.[1]

IMPROVE YOUR MENTAL AND PHYSICAL HEALTH.

Access to nature can improve mental health and reduce symptoms of conditions like ADHD. Conversely, lack of access can worsen mental health, resulting in depression and anxiety.[4]

TREES REDUCE POLLUTION IN THE AIR AND WATER.

Sources:
1. USDA Forest Service
2. Management Information Services/ICMA
3. U.S. Department of Agriculture
4. Journal of Epidemiology and Community Health

California urban forests | invest from the ground up

GROWING TREES MAKE GREAT NEIGHBORHOODS

FOLLOW US:
InvestInTrees

VISIT:
http://calfire.ca.gov/resource_mgt/resource_mgt_urbanforestry.php

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Urban Forest Data for California

- Percent total state population 94.4%
- Percent urban land of state land area 5.1%
- Percent urban tree canopy cover 11.4%
- Tree canopy cover per capita (sq meters/person) 43.1

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Urban Forestry Data for California

• Storage(metric tons)	12,500,000
• Storage value	$285,000,000
• Sequestration (metric tons/year)	414,000
• Sequestration ($ / year)	$9,439,000
• Air pollution removal (metric tons/year)	16,840
• Air pollution removal ($value @ 4/year)	$136,800,000

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Questions??

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http://www.fire.ca.gov/resource_mgt/resource_mgt_urbanforestry.php

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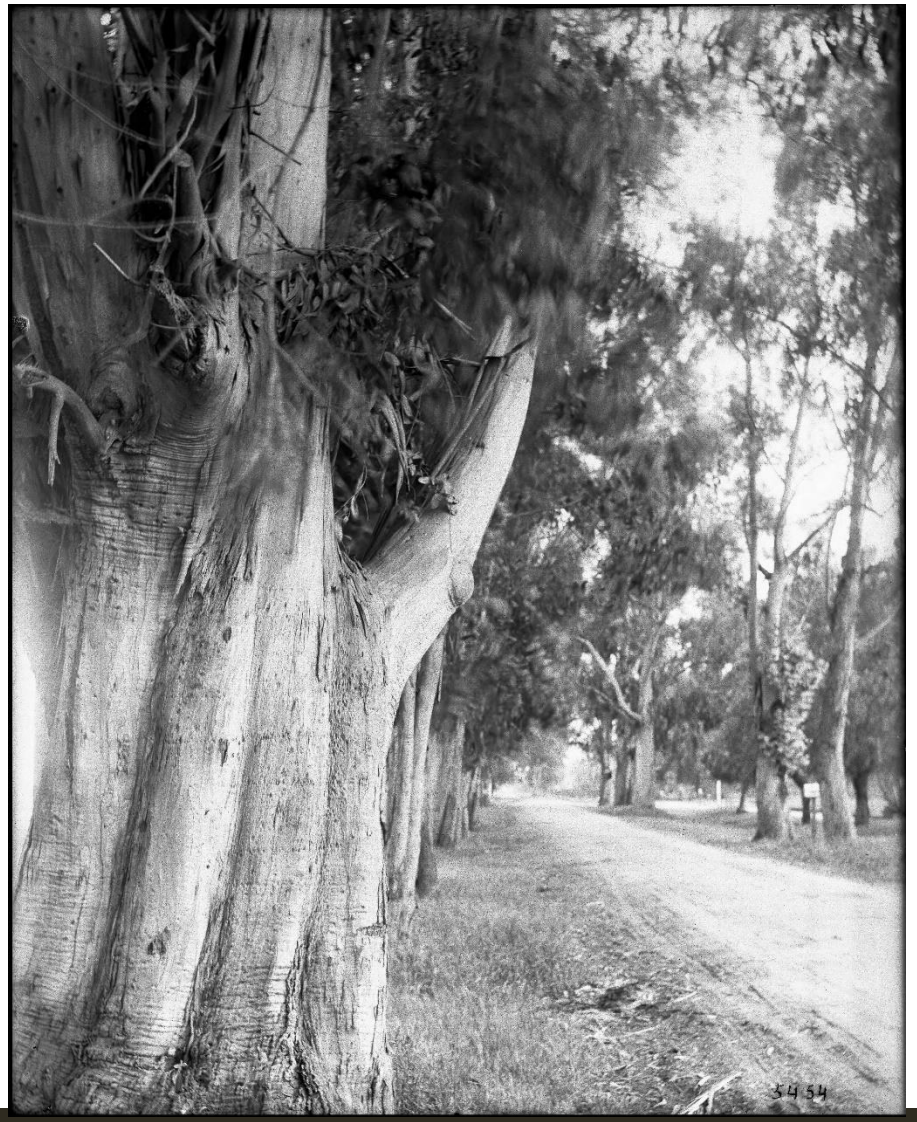
WORKSHOP AGENDA

Sustainable Urban Tree Selection

Re-Thinking current planning and practice

Robin Y Rivet – ISA Certified Arborist & Tree Risk Assessor

- Damage
- Design
- Disease
- Diversity
- Domains
- Dependability
- Digestion



For climate stability there are paths we need to revisit.

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Damage

How Can We Do Better?

Can YOU see the difference?

We need to demand improved nursery quality, and enforced code compliance.

Images used with permission - Dr. Ed Gilman: University of Florida

Lack of early oversight at the municipal level typically results in increased maintenance costs and short-lived trees.

People and poor public policy causes some very dumb results…

Are “Big Bad” roots really the problem?

A tale of two Liquidambars

but why are they growing so differently?

What makes one tree valuable, and another one a nuisance?

Pssst….
There's lots of secrets,
but probably not what you're thinking.


The amazing thing
is they’re growing right next door
to each other…

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Design

The **LARGE** tree

Argument

Mature tree size
The approximate tree size 40 years after planting.

Relative Size at Maturity:

Small-stature
Less than 25 feet tall and wide with trunk diameters less than 20 inches.

Medium-stature
25 - 40 feet tall and wide with trunk diameters 20 - 30 inches.

Large-stature
Greater than 40 feet tall and wide with trunk diameters commonly over 30 inches.

Large Tree
- Total benefits/year = $55
- Total costs/year = $18
- Net benefits/year = $37
- Life expectancy = 120 years
- Lifetime benefits = $6,600
- Lifetime costs = $2,160
- Value to community = $4,440

Medium Tree
- Total benefits/year = $33
- Total costs/year = $17
- Net benefits/year = $16
- Life expectancy = 60 years
- Lifetime benefits = $1,980
- Lifetime costs = $1,020
- Value to community = $960

Small Tree
- Total benefits/year = $23
- Total costs/year = $14
- Net benefits/year = $9
- Life expectancy = 30 years
- Lifetime benefits = $690
- Lifetime costs = $420
- Value to community = $270

—hypothetical case using data for trees at year 30, projected to life expectancy from McPherson, E.G.; et. al. 2003. Northern mountain and prairie community tree guide: benefits, costs and strategic planting. Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service. 92p.

Cities Need More Large Trees

Table 1: Large trees vs small trees

The city of Greentree chose planting scenario X. By year 20 it was already a $60,000 annual mistake (see discussion above).

		CHOICE X		CHOICE Y	
	Avg. Ann. Benefit Avg. Ann. Cost	# Trees	Total Benefit Total Cost	# Trees	Total Benefit Total Cost
Large Trees	$65.18 $13.72	259	$16,882.00 $3,553.00	1,693	$110,350.00 $23,228.00
Medium Trees	$36.04 $6.87	753	$27,138.00 $5,173.00	753	$27,138.00 $5,173.00
Small Trees	$17.96 $6.23	1,693	$30,406.00 $10,547.00	259	$4,652.00 $1,614.00
Total Trees		2,705		2,705	
Total Benefits			$74,426.00		$142,140.00
Total Costs			$19,273		$30,015.00
Annual Net Value to Community			$55,153.00		$112,125.00

Note: Each "tree" represents 259 trees planted.

You can query for attributes like USDA zone, height, fall color, etc.

http://www.ufei.org/

urban tree foundation

Skip to Content

CAL POLY
SAN LUIS OBISPO

Urban Forest
Ecosystems Institute

NAVIGATION

Explore UFEI:

- UFEI Home
  - Grant Information
  - News Listings
  - Resource Links
- SelecTree
- Urban Tree Key
- ForesTree
- CA Big Trees
- Urban Wood

UFEI > Home

Welcome to UFEI

Urban Forest Ecosystems Institute at Cal Poly

SelecTree
A Tree Selection Guide

Urban Tree Key
Identify Trees

ForesTree
Guide to Tree Health

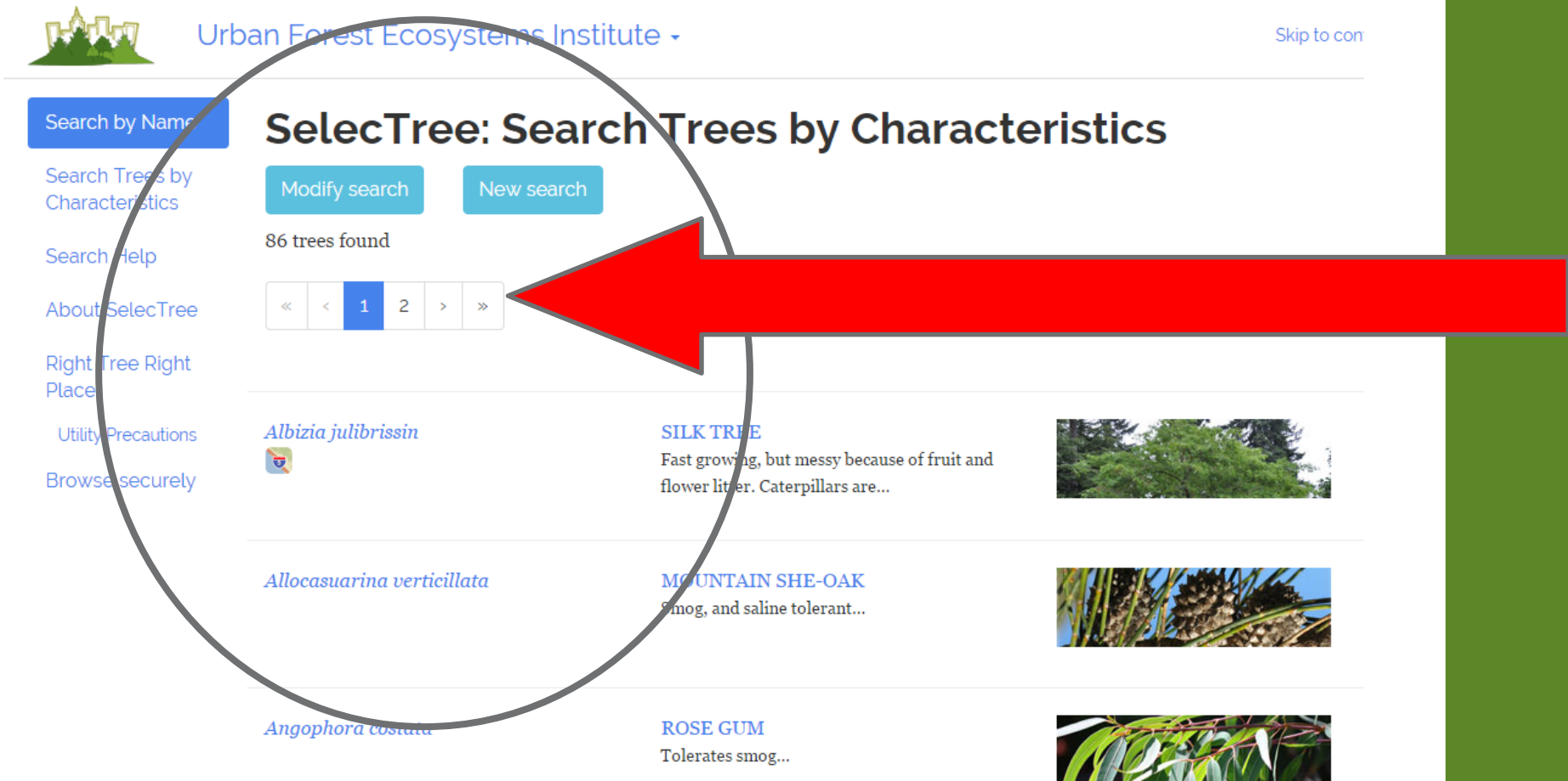
Big Trees
California Registry

Urban Wood
Online Directory

UFEI is an excellent California site for tree selection

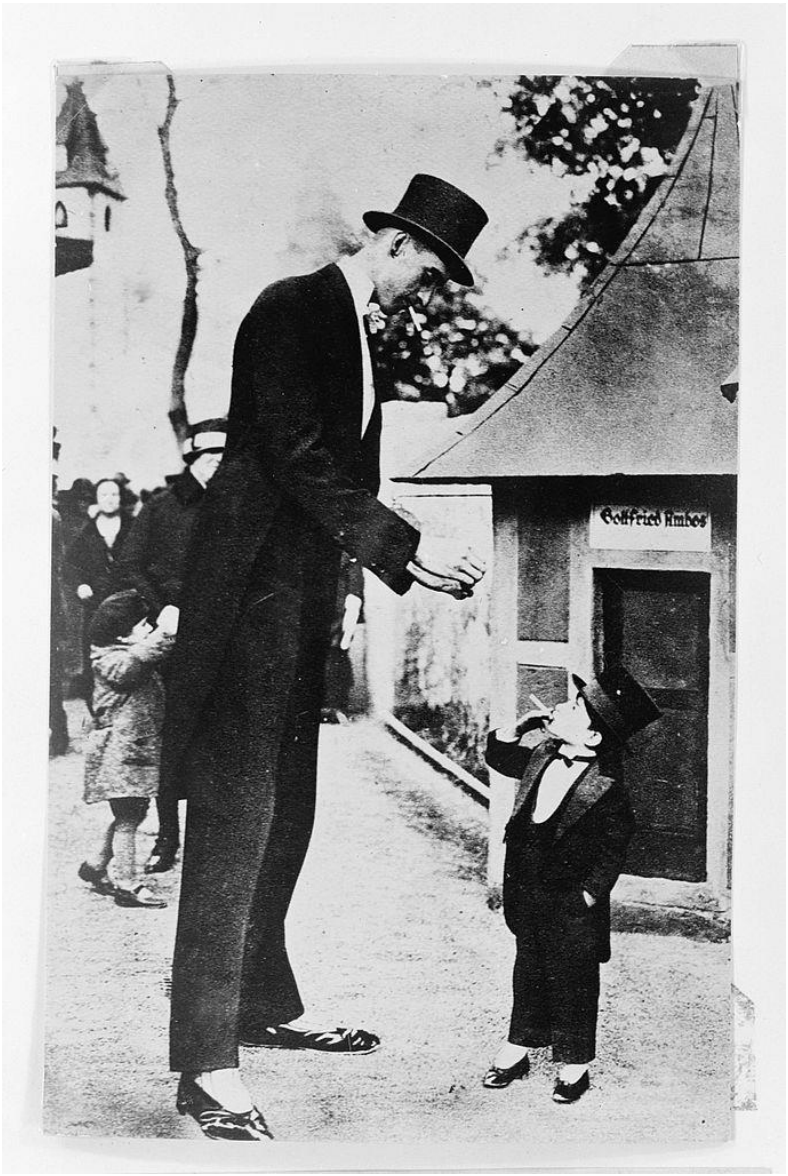
Sample Query

- Sunset Zone 23
- Height: > or = to 35 feet
- Drought tolerant (dry soil)
- Moderate branch strength
- Medium root damage potential



Bigger REALLY is Better…

Not too tall at all…



Too few large species are specified for inadequate reasons…

- Acacia (some)
- Araucaria (most)
- Camphor
- Cedars (deodar, Lebanon)
- Evergreen Elm
- Floss silk
- Eucalyptus (many)
- Ficus (some)
- Magnolia (many)
- Melaleuca (most)
- Quercus (many oaks)
- Pepper (California)
- Pines (some)

Atlas Cedar – Cedrus atlantica ‘glauca’

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Disease

North American Chestnut

1904 – R.I.P.
4 Billion Trees

PESTS

GSOB

GWSS

HLB

PSHB

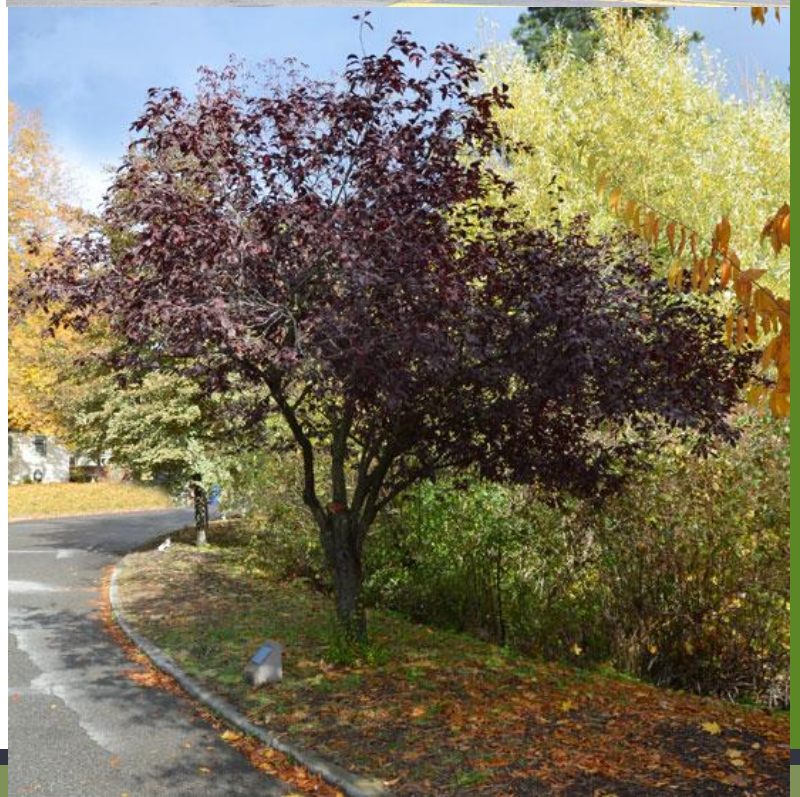
Are we making good choices in jeans?

water smart LANDSCAPE

A Better Way to Beautiful

Just checking if you were still paying attention?

I really meant GENES



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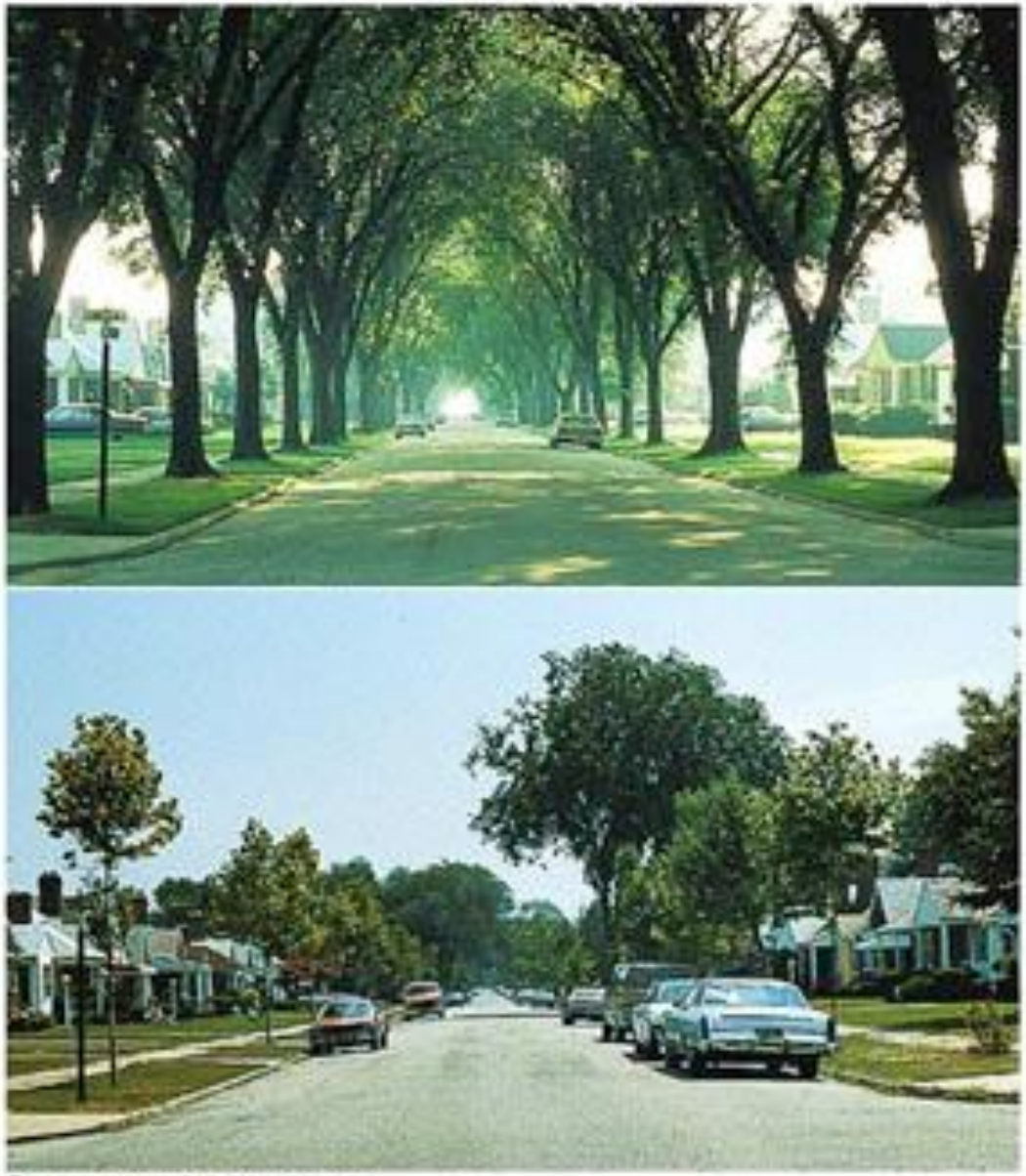
Diversity



©Jack H. Barger/U.S. Forest Service

An elm-lined street in Detroit in 1971 (top), and the same view in 1984 after a Dutch elm disease pandemic.

monoculture is misguided

The few remaining American Elm trees are typically solitary specimens…

http://www.amerinursery.com/american-nurseryman/the-5-percent-rule/

As we struggle to adjust the climate, we must also adjust to it changing.

Adhere to the “new” 5,10, 20 rule

- No more than 5% of any species
- No more than 10% of any genus
- No more than 20% of a family of plants
- This includes spatial & geographic distribution

Myrtaceae Family: Angiosperm Phylogeny Website

Acca, *Accara*, ***Acmena***, *Acmenosperma*, *Actinodium*, ***Agonis***, *Allosyncarpia*, *Amomyrtella*, *Amomyrtus*, *Angasomyrtus*, ***Angophora***, *Archirhodomyrtus*, *Arillastrum*, *Astartea*, *Asteromyrtus*, *Austromyrtus*, *Backhousia*, *Baeckea*, *Balaustion*, *Barongia*, *Basisperma*, *Beaufortia (Myrtaceae)*, *Blepharocalyx*, ***Callistemon***, *Calothamnus*, *Calycolpus*, *Calycorectes*, *Calyptranthes*, *Calyptrogenia*, *Calythropsis*, *Calytrix*, *Campomanesia*, *Carpolepis*, *Chamelaucium*, *Chamguava*, *Choricarpia*, *Cleistocalyx*, *Cloezia*, *Conothamnus*, *Corynanthera*, *Cupheanthus*, ***Darwinia***, *Decaspermum*, *Eremaea*, *Eucalyptopsis*, ***Eucalyptus***, ***Eugenia***, *Gomidesia*, *Heteropyxis*, *Hexachlamys*, *Homalocalyx*, *Homalospermum*, *Homoranthus*, *Hottea*, *Hypocalymma*, *Kania*, *Kjellbergiodendron*, *Kunzea*, *Lamarchea*, *Legrandia*, *Lenwebbia*, ***Leptospermum***, *Lindsayomyrtus*, *Lophomyrtus*, ***Lophostemon***, ***Luma***, *Lysicarpus*, *Malleostemon*, *Marlierea*, ***Melaleuca***, *Meteoromyrtus*, ***Metrosideros***, *Micromyrtus*, *Mitranthes*, *Mitrantia*, *Monimiastrum*, *Mosiera*, *Myrceugenia*, *Myrcia*, *Myrcianthes*, *Myrciaria*, *Myrrhinium*, *Myrtastrum*, *Myrtella*, *Myrteola*, ***Myrtus***, *Neofabricia*, *Neomitranthes*, *Neomyrtus*, *Ochrosperma*, *Octamyrtus*, *Osbornia*, *Paramyrciaria*, *Pericalymma*, *Phymatocarpus*, *Pileanthus*, *Pilidiostigma*, *Piliocalyx*, ***Pimenta***, *Pleurocalyptus*, *Plinia*, *Pseudanamomis*, ***Psidium***, *Purpureostemon*, *Regelia*, *Rhodamnia*, *Rhodomyrtus*, *Rinzia*, *Ristantia*, ***Scholtzia***, *Siphoneugena*, *Sphaerantia*, *Stereocaryum*, *Syncarpia*, ***Syzygium***, *Tepualia*, *Thryptomene*, ***Tristania***, ***Tristaniopsis***, ***Ugni***, *Uromyrtus*, *Verticordia*, *Waterhousea*, *Welchiodendron*, *Whiteodendron*, *Xanthomyrtus*,

Are all these street strips repeating similar species?

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Domains

Native or Not?

(many are not drought tolerant nor street-friendly choices)

Riparian species

(Native streamside and moist habitat)

California Sycamore (*Platanus racemosa*)
White Alder (*Alnus rhombifolia*)
Fremont Cottonwood (*Populus fremontii*)
Arroyo Willow *(Salix lasiolepis)*
California Box-Elder *(Acer negundo*)
California Fan Palm *(Washingtonia filifera)*

Some California native trees are well adapted,
but the definition of a San Diego “native tree” is fuzzy.

Desert Willow

Coast Live Oak

Is a Torrey Pine native to El Cajon, or is a Redbud native to Coronado?

Non-native trees are often better adapted to our urban environment, than so called “native trees”

This is partly a result of our changing climate, and our lack of indigenous trees.
Our higher elevation native trees are not adapted to coastal regions.

Monarchs increasingly flock to Eucalyptus Groves

In some ecosystems, large old trees provide nesting or sheltering cavities for up to 30% of the nearby bird, mammal, and insect species.

Good places to get habitat gardening information, native plant information & plants

- Certified Earth Friendly Gardens – UCCE Master Gardeners
  http://www.mastergardenerssandiego.org/sustain/
- San Diego Natural History Museum – Nature Bytes videos:
  http://natureswayproductions.com/videoindex.html
- National Wildlife Federation – certified habitat
  http://www.nwf.org/how-to-help/garden-for-wildlife/create-a-habitat.aspx?
- Moosa Creek native plant nursery
  http://www.moosacreeknursery.com/
- Las Pilitas Native Plants Nursery – plants for songbirds & hummingbirds
  http://www.laspilitas.com/bird.htm
  http://www.laspilitas.com/garden/hummingbird.html
- Tree of Life native plant nursery:
  http://www.californianativeplants.com/index.php/resources/sage-advice

Native palms are happiest in washes – NOT on Pavement



Palms are NOT trees, but monocots; more similar to the "grass" family


Palms are particularly hazardous for spreading wildfire

Photo courtesy of KTLA - Wildfire burning in San Marcos

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Dependability

Do you look forward to new nursery releases each year?

What is Phenotype Plasticity?

Simply stated it is the relative ability of a species or genotype to acclimate to changes in their environment.

OAK RIDGE National Laboratory

- Clones
- Cultivars
- Grafts
- Hybrids

?

Are these beneficial for sustainable ecology?

U.S. DEPARTMENT OF ENERGY
Office of Science

Climate Change Science Institute: http://climatechangescience.ornl.gov/content/using-forest-see-trees

CLIMATE CHANGE SCIENCE INSTITUTE
OAK RIDGE NATIONAL LABORATORY

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Using the Forest to See the Trees

ORNL researcher uses global climate model to explore regional events

Climate modelers work to untangle complex webs of cause and effect

Every few years, unusual weather brings torrential rainfall and warm, nutrient-poor water to the coasts of Peru and Ecuador, devastating the fishing economies. Although this might seem like a local storm, the system—known as the El Niño–Southern Oscillation—has global effects. Typically, the next winter is much warmer in western North America, wetter in the southeastern United States, and drier in the Pacific Northwest. Rain and temperature changes throughout Africa and Australia and tropical cyclones off the coast of Japan also can be tied to El Niño occurrences.

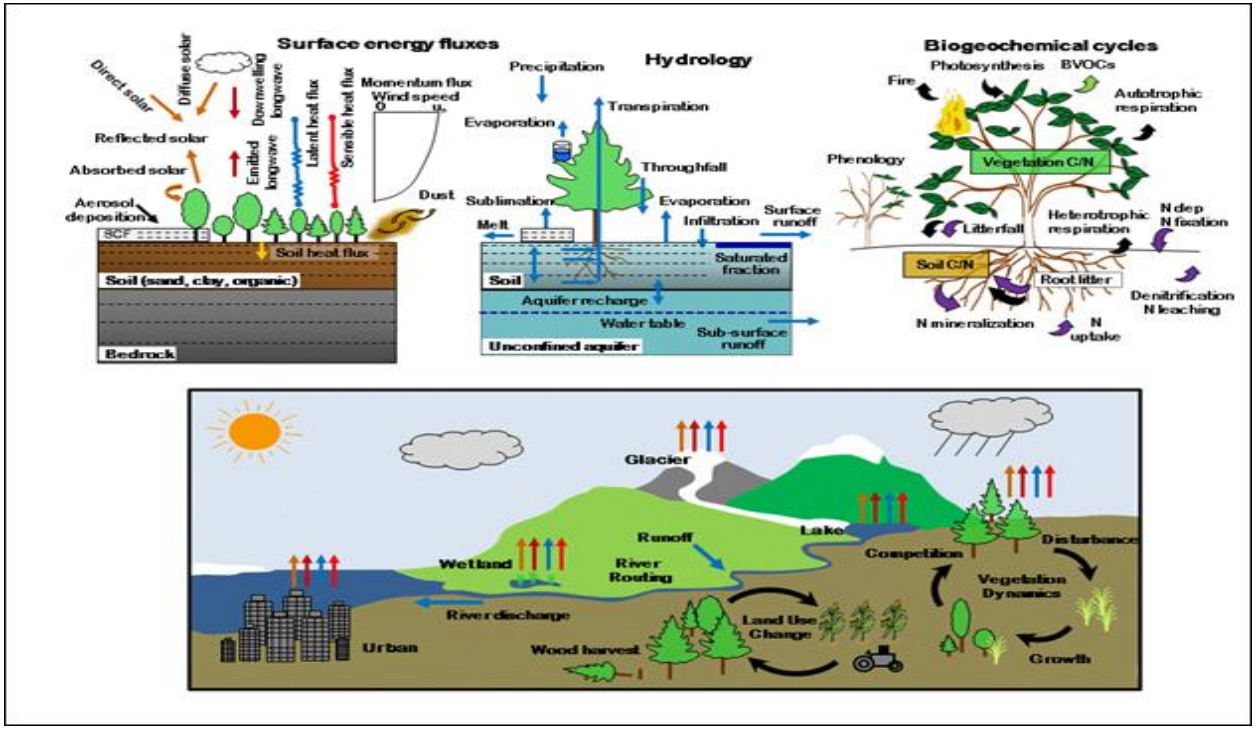
CLM
COMMUNITY LAND MODEL

NCAR Earth System Laboratory (NESL)
a collaborative project between TSS and the CESM community

Welcome to the Community Land Model

The Community Land Model is the land model for the Community Earth System Model (CESM) and the Community Atmosphere Model (CAM).

It is a collaborative project between scientists in the Terrestrial Sciences Section (TSS) and the Climate and Global Dynamics Division (CGD) at the National Center for Atmospheric Research (NCAR) and the CESM Land Model Working Group. Other principal working groups that also contribute to the CLM are Biogeochemistry, Paleoclimate, and Climate Change and Assessment.



Solar Shade Control Act - 1978

Under this law, property owners are prohibited from allowing their trees or shrubs to shade more than 10% of a neighbor's solar energy system between the hours of 10am and 2pm.

Any tree or shrub planted before the installation of the solar collector is exempt.

If a pre-existing tree dies, its replacement is also exempt, even if the replacement is planted after the solar collector's installation. The law also exempts trees and shrubs planted on timberland or commercial agricultural land.

CA PUBLIC RESOURCES CODE SECTION 25980-25986

Trees are so effective at using solar radiation for energy,
the science of bio-mimicry has copied trees to design collectors

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Digestion

10.4.15 | Take a self-guided tour through Seattle's beautiful and historic orchards.

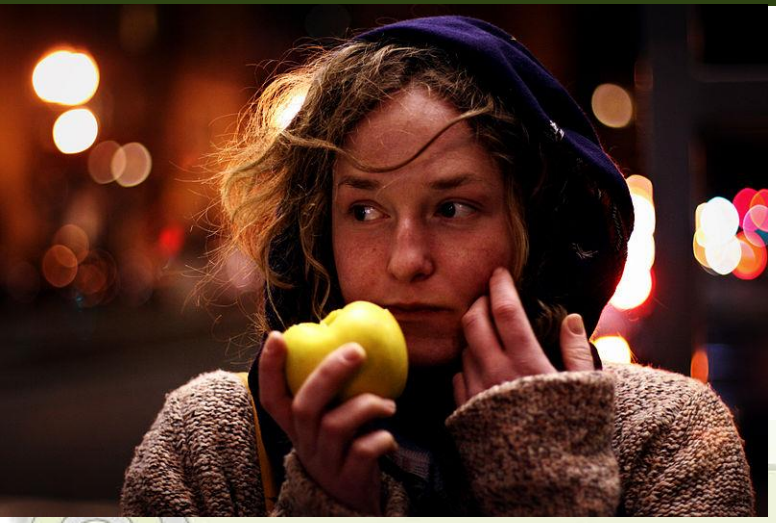
Urban Fruits and other Nutty Ideas

Seattle is planning to build a new city park filled with hundreds of edible plants - such as fruit trees, vegetables plants, herbs, etc… Free to "anyone and everyone." If successful, it will be the first "food forest" of the nation.

San Diego has more small farms, than any other county in the nation.
We can grow almost anything.

Why not plant more edible nut trees?

Seattle's Food Forest is Open for Foraging!



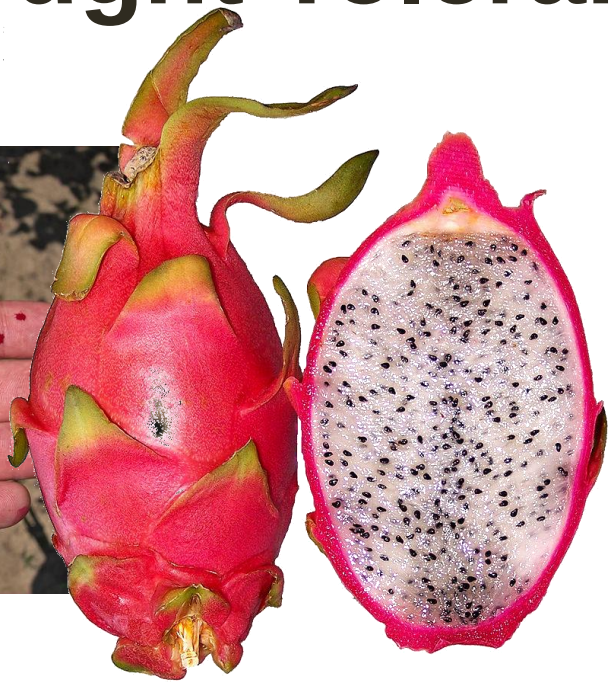
https://vimeo.com/43583846

Province of Seville, Spain - fruit trees grow on streets

What is the most common argument against this?

People might actually eat the fruit…

Drought Tolerant Fruits



- Loquat
- Fig
- Date
- Persimmon
- Pitahaya
- Pomegranate

- Macadamia
- Jujube
- Pineapple guava
- Kei Apple
- Olive

- Mulberry
- Che
- Grapes
- Jelly palm
- Strawberry guava

FOOD for THOUGHT

- Chill hours – *many fruit trees need some cold weather to set fruit*
- Frost sensitivity: *every degree matters*
- Disease resistance: *know your cultivars*
- Rootstocks: *not all dwarfs are the same*

Fruit & Nut Extension Service:
http://fruitsandnuts.ucdavis.edu/
UC Master Gardeners Garden Web:
http://cagardenweb.ucanr.edu/
California Rare Fruit Growers: cultural data
http://www.crfg.org/list.ht
Dave Wilson Nursery
http://www.davewilson.com/

Urban Forestry is Essential to our Futures

And That Future will be Amazing

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Drought Management for Trees

Speaker: Bill Homyak

Southwestern College Landscape Nursery and Technology Department

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San Diego County Water Authority

WaterSmart Landscape

EDUCATION SERIES

Drought Management for Trees

BILL HOMYAK

10/9/2015

impact

OF DROUGHT ON TREES

1

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IMPACT
OF DROUGHT ON TREES

1

A. Increased Stress
B. Increase in the likelihood of damage by pests
    - Beetle borers
C. Increase in diseases
    - *Armillaria mellea*- Oak Root Fungus from improper water application

assessment

OF DROUGHT STRESSED TREES

2

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ASSESSMENT
OF DROUGHT STRESSED TREES

2

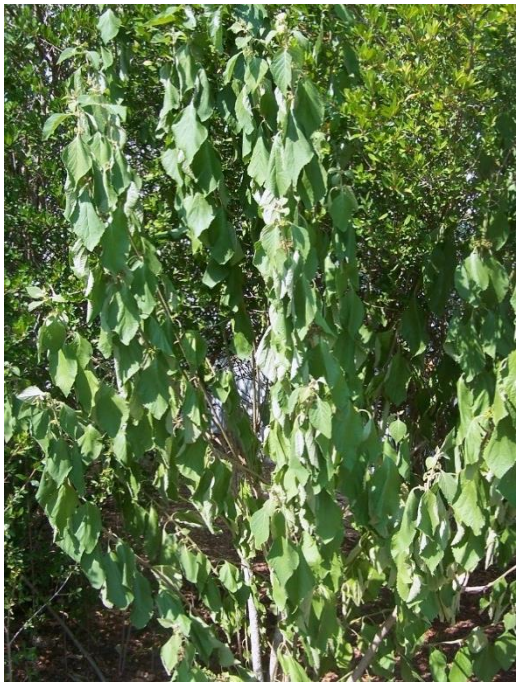
A. Leaf Symptoms
B. Trunk Symptoms
C. Tree Health Symptoms

TREE ASSESSMENT

A. Leaf stress symptoms

1. Wilting leaves
   - Incipient- wilting not readily noticeable
   - Temporary- visible drooping of leaves during the day, recovery at night
   - Permanent- wilting does not recover overnight and may or may not recover when water is added to the soil

2. Other leaf symptoms
   - Curling, wrapping, becoming crinkly, scorching, turning brown, or falling from tree



TREE ASSESSMENT

B. Reduced radial growth

- Broadleaf, evergreen and conifers will develop reduced spring and summer wood which will be reflected in the diameter of the trunk
- Palms will develop a narrowed trunk

TREE ASSESSMENT

c. Reduced production of sap
   - Can cause crown die back
   - Trees become susceptible to pests like borers

water

AND HOW IT IS USED BY TREES

3

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WATER USE BY TREES

3

There are many misconceptions about tree root depth and where to apply water

A. Location of roots
B. Water use by trees

TREE ROOT ZONES

A. Roots will grow where conditions are best
   - Usually this is near the surface
B. Trees and turf grasses compete
   - This can reduce the ability of the tree to absorb moisture and nutrients
C. Urban situations also restrict root spread
D. Poor aeration and drainage prevents deeper root development

TREE ROOT ZONES

Most absorbing roots are in the upper few inches of soil and extend well beyond the tree drip line.

(http://www.extension.umn.edu/)

TREE WATER USE

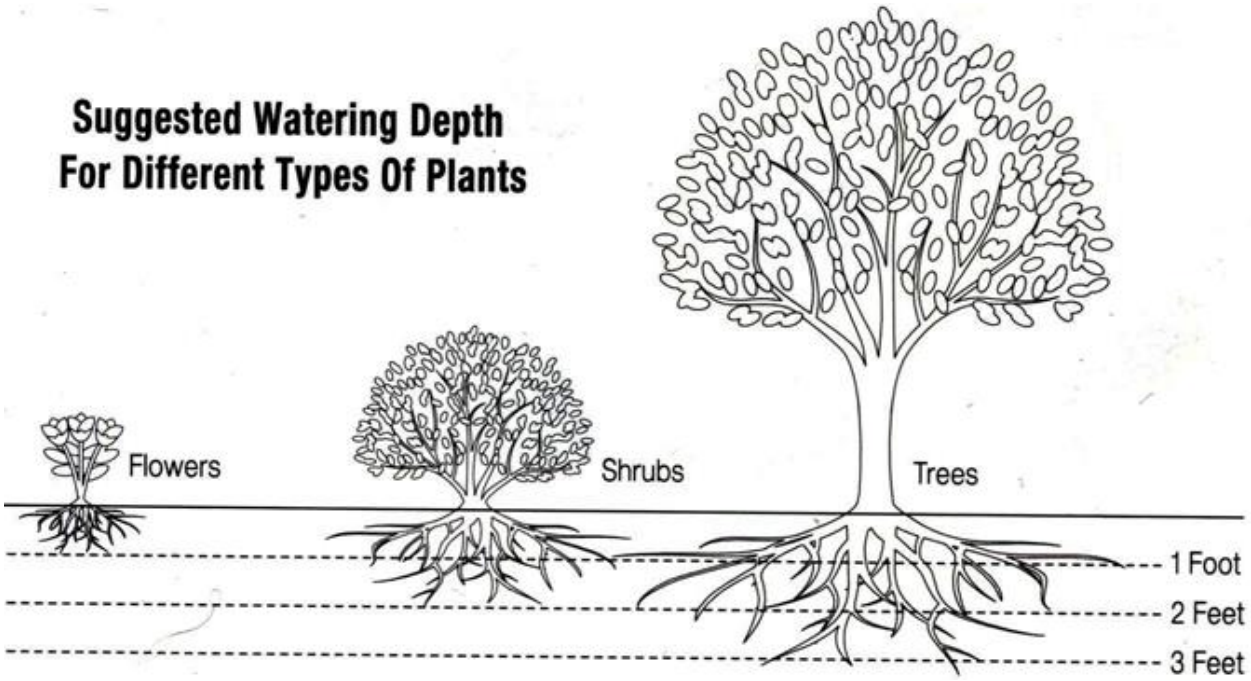
A. How deep to water a tree varies based on
   - Soil type
   - Type of root system
   - Ability of water to penetrate the soil

B. Sandy soil should allow for deep watering
   - Sometimes its cemented, or contains layers that inhibit water penetration

C. Clay soil may suggest poor water infiltration
   - Amended or organic clay can have good structure and allow deep water penetration

TREE WATER USE

However, determining how deep your trees are rooted and how deep to water can be tricky…



(http://www.extension.umn.edu/)

TREE WATER USE

For example this is a mature oak tree growing in sandy soil that was blown over by Hurricane Ivan

TREE WATER USE

…And a few more trees also blown over

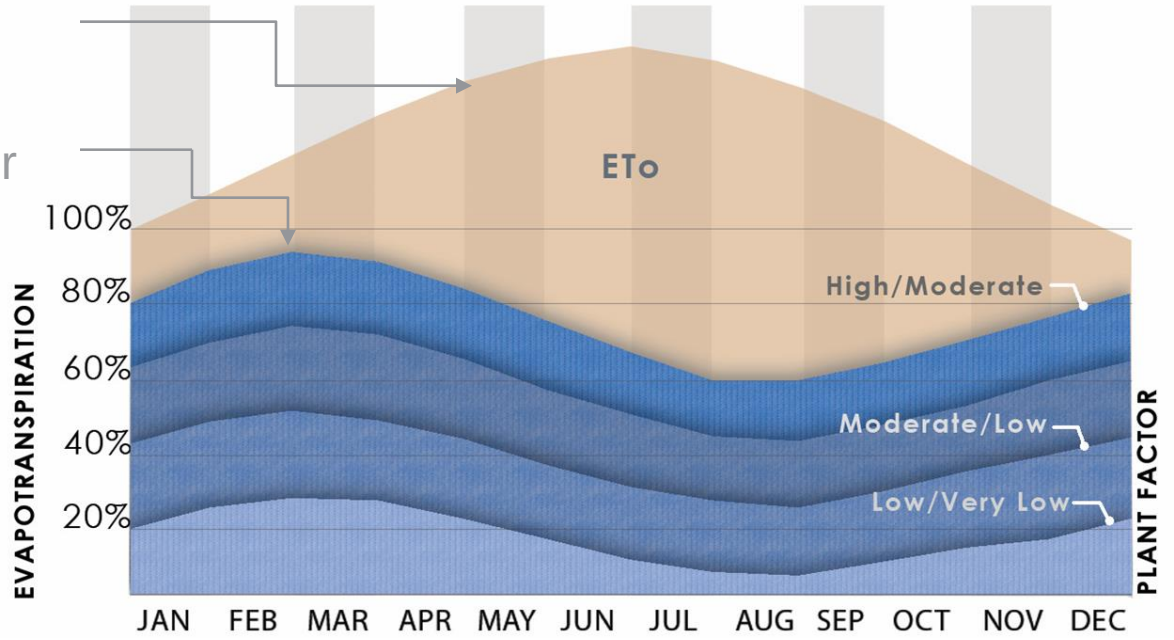
TYPE OF TREE AND WATER REQUIEMENTS

When to water trees

- Non-native trees
- Native trees (which ecosystem does it originate from?)

Non-Native Plant Water Use Cycle

Native Plant Water Use Cycle



REMEMBER

Most trees have their roots in the upper 6” of soil

A. Don’t change the existing grade of the soil around trees, especially in the drip line
B. Never mound soil around the trunk
C. Minimize adding new planting, irrigation and lighting around existing trees

lawn conversions

AND HOW TO PROTECT TREES

4

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CONVERT AND PROTECT

4

Protect existing trees, they provide value through cooling, carbon sequestration, habitat, and enjoyment

A. Remove sod
B. Protect tree
C. Design new irrigation

REMOVING SOD

Most trees have their roots in the upper 6” of soil

- Avoid using a sod cutter near the trunk or in the drip line of the tree
- Avoid rototilling where roots are
- Use caution with chemicals like Round-Up, damaged roots or suckers can absorb the chemical and harm the tree

Carmel Mountain Ranch golf course turf removal project.

REMOVING SOD

One option is to keep sod in place and mulch over it

- Kill grass and sod cut the edges only to reduce the grade.
- Add irrigation that either does not interfere with established tree roots or hand trench around existing tree roots.
- Plant new containers and mulch.

4S Ranch turf transition project,
photos courtesy of TVRI Landscaping

CONVERSION

Be sure to replace the water source for the tree that has been watered by the lawn irrigation for years

- For basic survival, make sure the tree is watered deeply 2 to 4 times per month
- Make sure the entire root zone is watered
- Include long term irrigation provisions for the existing tree(s) in the new landscape design

PROTECTION

Many existing trees are very old and add benefits to the area

- Include a separate irrigation zone for the existing trees
- Minimize adding new planting in the root zone, mulch instead
- Don’t combine existing tree irrigation with new planting

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irrigation practices

TO STABILIZE TREES UNDER SEVERE DROUGHT CONDITIONS

5

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IRRIGATION PRACTICES

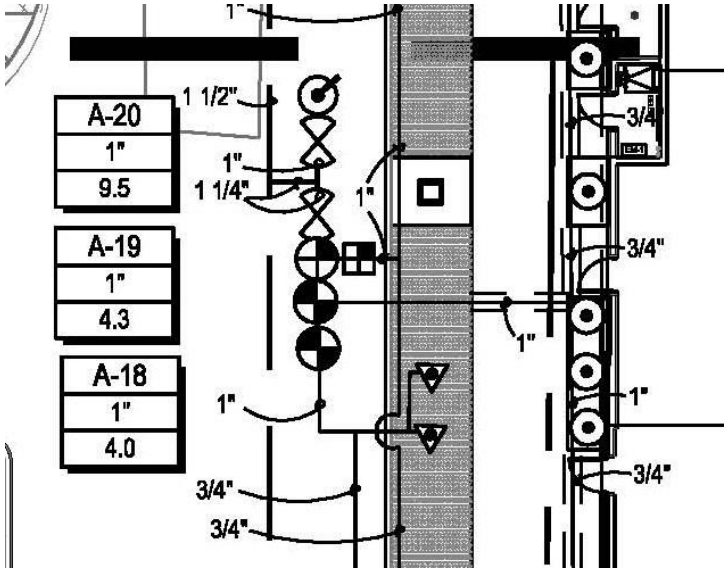
5

Irrigation techniques for stabilizing trees under severe drought conditions

A. New trees
B. Existing trees

NEW TREES

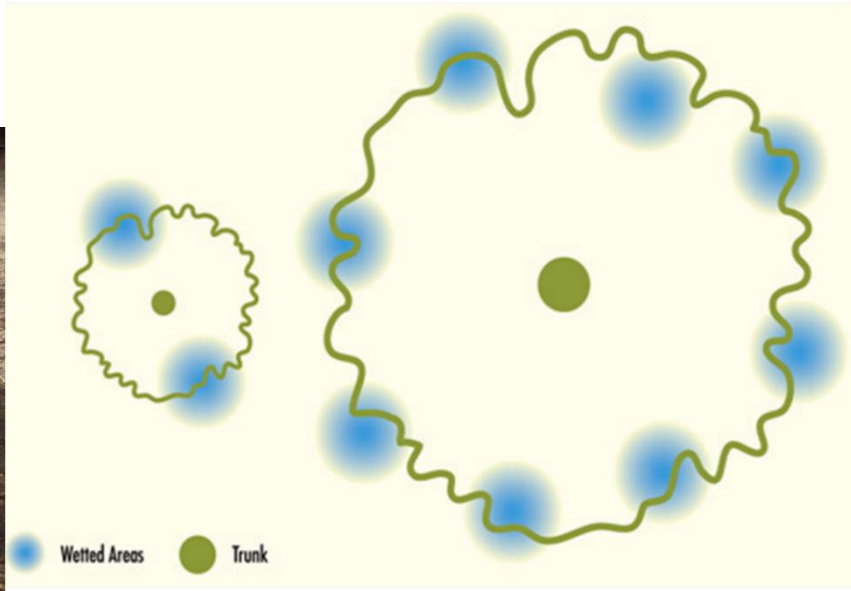
Install bubblers on a separate valve zone



NEW TREES

In-line drip irrigation Rings

- Provide adequate water at the root ball and at the mature canopy size



EXISTING TREES

Install bubblers on a separate zone

- Avoid trenching through existing roots!
- Use an air spade and hand excavation to trench new irrigation lines

EXISTING TREES

In-line drip irrigation rings

- Install away from the tree trunk!
- Ensure the entire drip line area is irrigated at a minimum

EXISTING TREES

Watering bags, buckets or soaker hoses

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Questions?

BILL HOMYAK

10/9/2015

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