

Design Resources for Public Landscapes

Ellen Mackey (LASGRWC and MWD of So. Cal.)



Outline

- Ecological concepts
- Garden/Garden project
- *Landscaping Guidelines*
- *Care & Maintenance of Southern California Native Plant Gardens*
- *Maintenance Manual*
- Resources

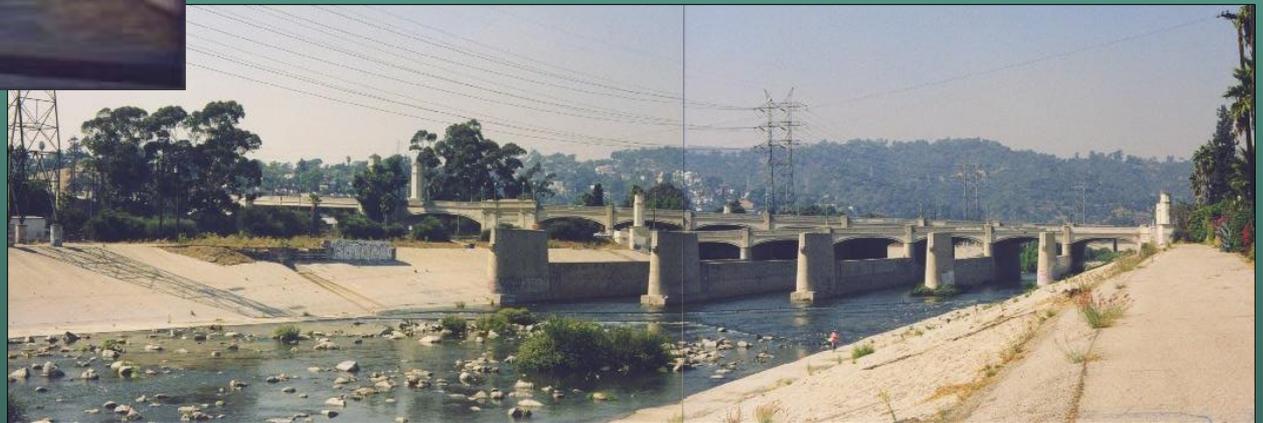


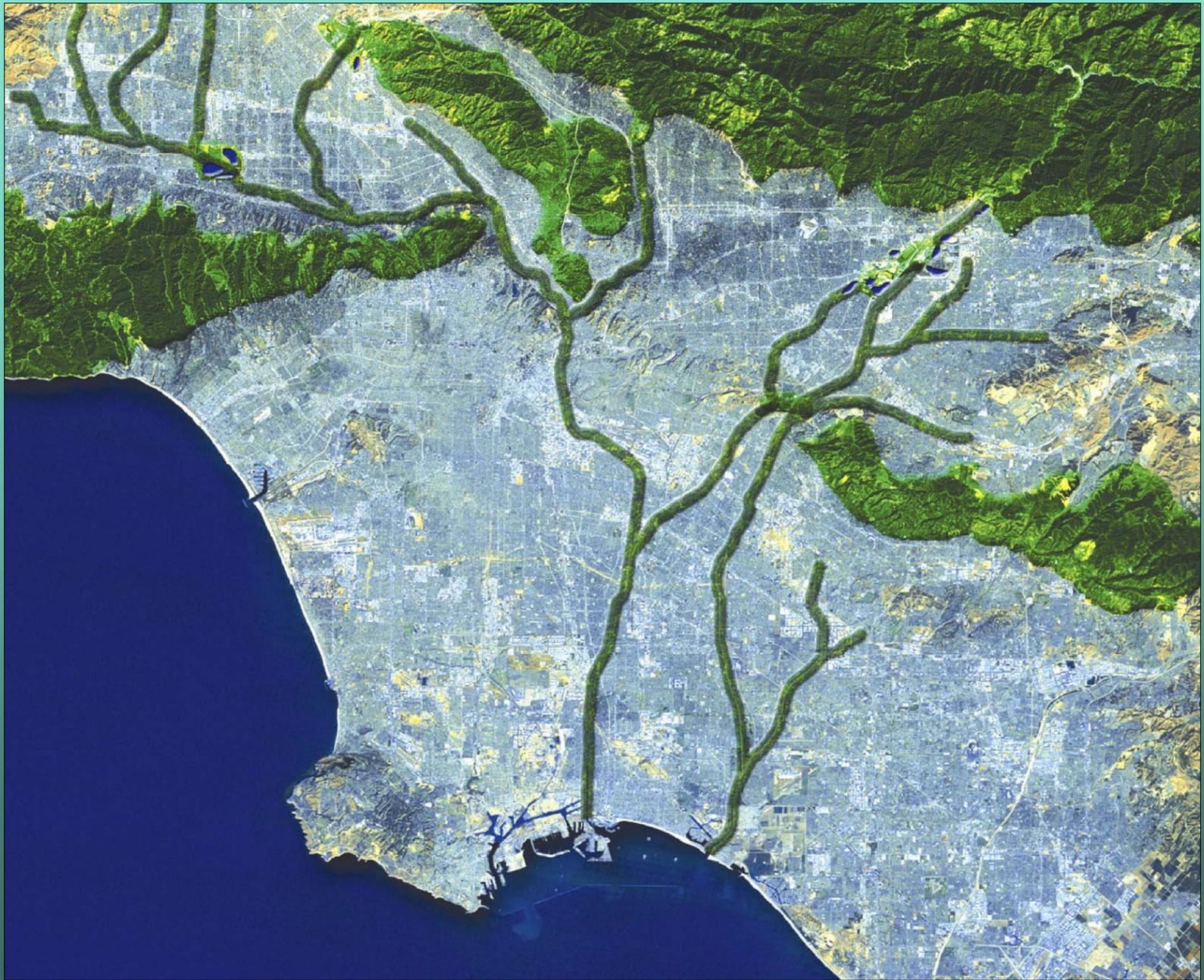
WHY?

“Perfect Storm” brewing



- Water is a rapidly diminishing resource everywhere
- Prop 84 funds (\$5.4 billion over 30 years) will become available in the next 2 years
- Public interest in river parks and better water quality
- Losing our local biodiversity





Why *Natives* for Public Landscape Projects?

- Adapted to local conditions (water, soil, weather)
- Resistant to natural pests and diseases
- Supports local wildlife
- Drought-tolerant
- Economical
- Not weeds. Less likely to become invasive
- Beautiful and fragrant
- Results in LOWER MAINTENANCE



golden currant (*Ribes aureum*)



Mediterranean biome



- Western tip of Australia
- Cape Town , South Africa
- Coastal areas of Mediterranean
- West coast of So. America
- West Coast U.S.

Cool, wet winters and hot, dry summers



We have seasons – 4 of them !



- Winter - growing season
- Spring - massive flowering season
- Summer - slowing down
- Fall - hibernating, resting

Native plants can look good in all seasons

Myths about Native Plants



showy penstemon



- Hard to grow/persnickety
 - Adapted to local conditions (water, soil, weather)
- Look ugly/Not colorful
- Expensive
- Hard to find care info
- Don't know how to design with them
- They're weeds



Why *Natives* for Public Landscape Projects?

- Adapted to local conditions (water, soil, weather)
- Resistant to natural pests and diseases
- Drought-tolerant
- **Economical**
- Not weeds . Less likely to become invasive
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- Results in LOWER MAINTENANCE



wooly blue curls





2006 Highlights

The comparison garden idea

A demonstration project composed of two adjacent urban front yards contrasting the benefits of climate-appropriate plantings and water-efficient irrigation compared to the style of garden that has traditionally been planted in Santa Monica in modern times.

Native Garden

Traditional Garden



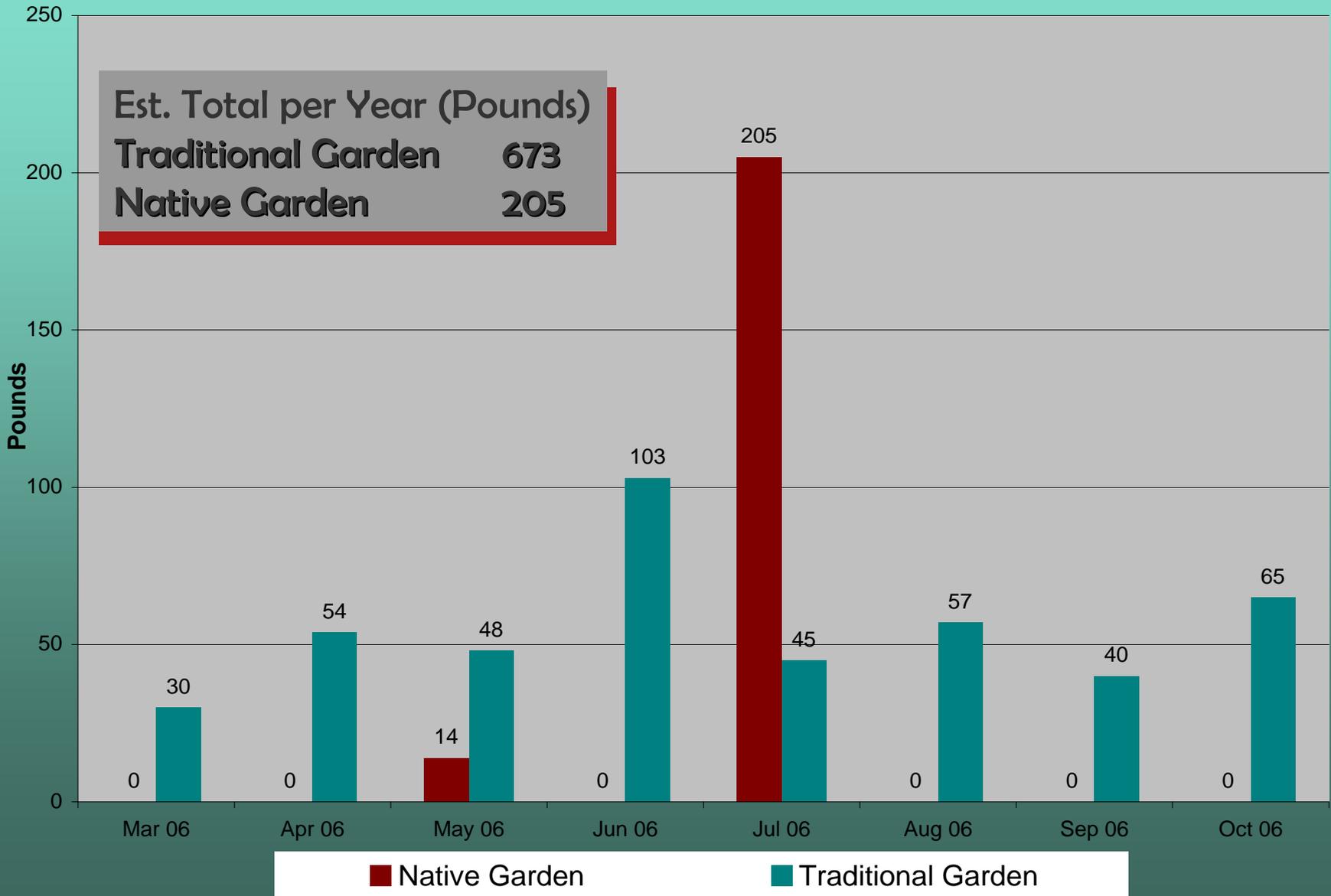
Cost

Item	Native Garden	Traditional Garden
Design	\$1,500	\$1,500
Demolition	\$4,100	\$2,900
Soil Prep, Plants, Mulch	\$5,100	\$3,500
Irrigation System	\$2,400	\$3,400
Boulders, Bender Board, Signage	\$3,100	\$2,800
Urban Runoff Features		
Rain Catchment, Infiltration Pit	\$3,900	None
Permeable Paving	\$2,000	None
Total	\$22,100	\$14,100
Landscaped Area	1998 sqft	1879 sqft
Cost per square foot	\$11.06	\$7.50
Cost per square foot inc Urban Runoff	\$8.11	\$7.50

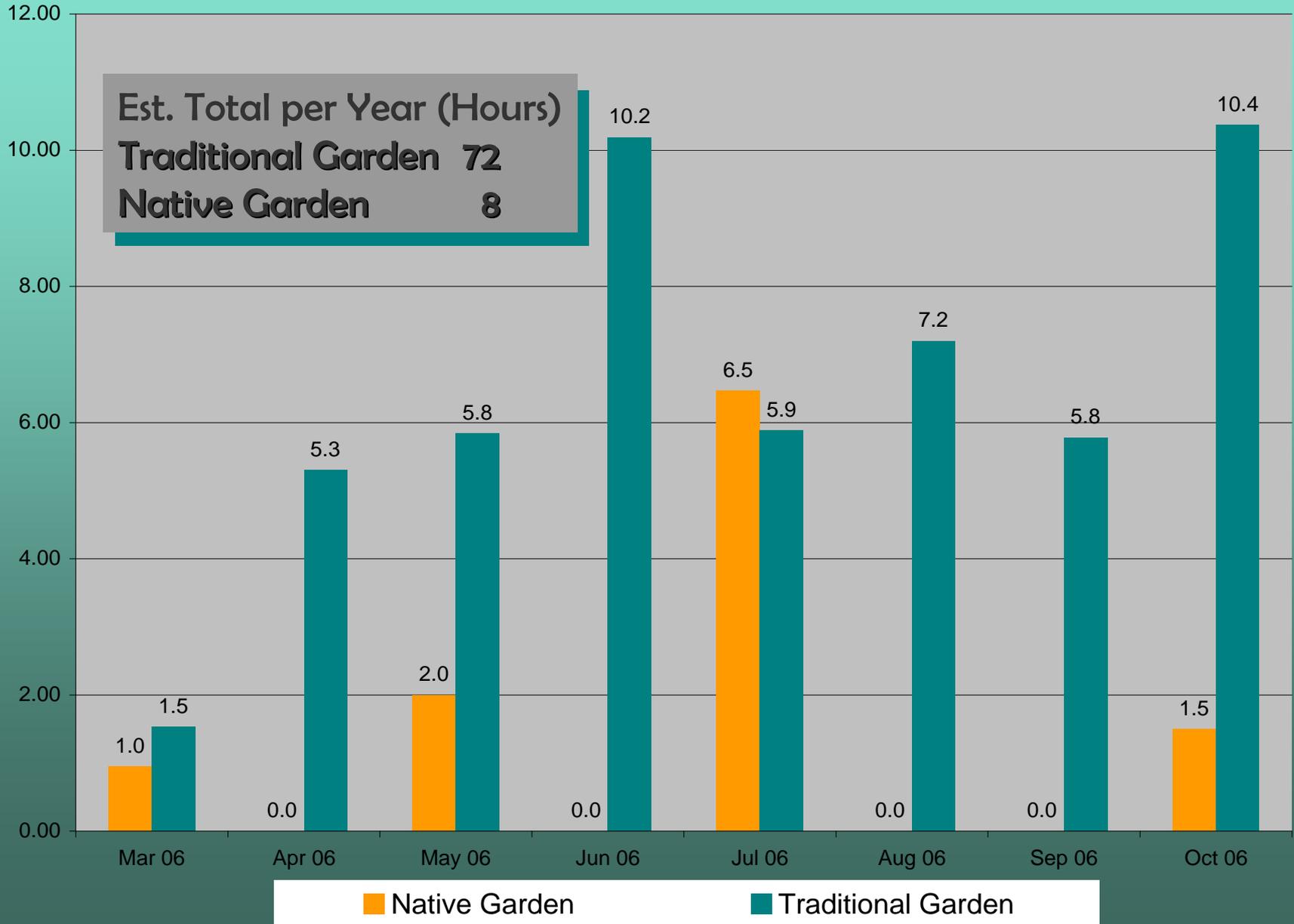
Information Tracked

- **Water Consumption**
- **Greenwaste Production**
- **Labor Hours**
- **Carbon Production (Soon)**

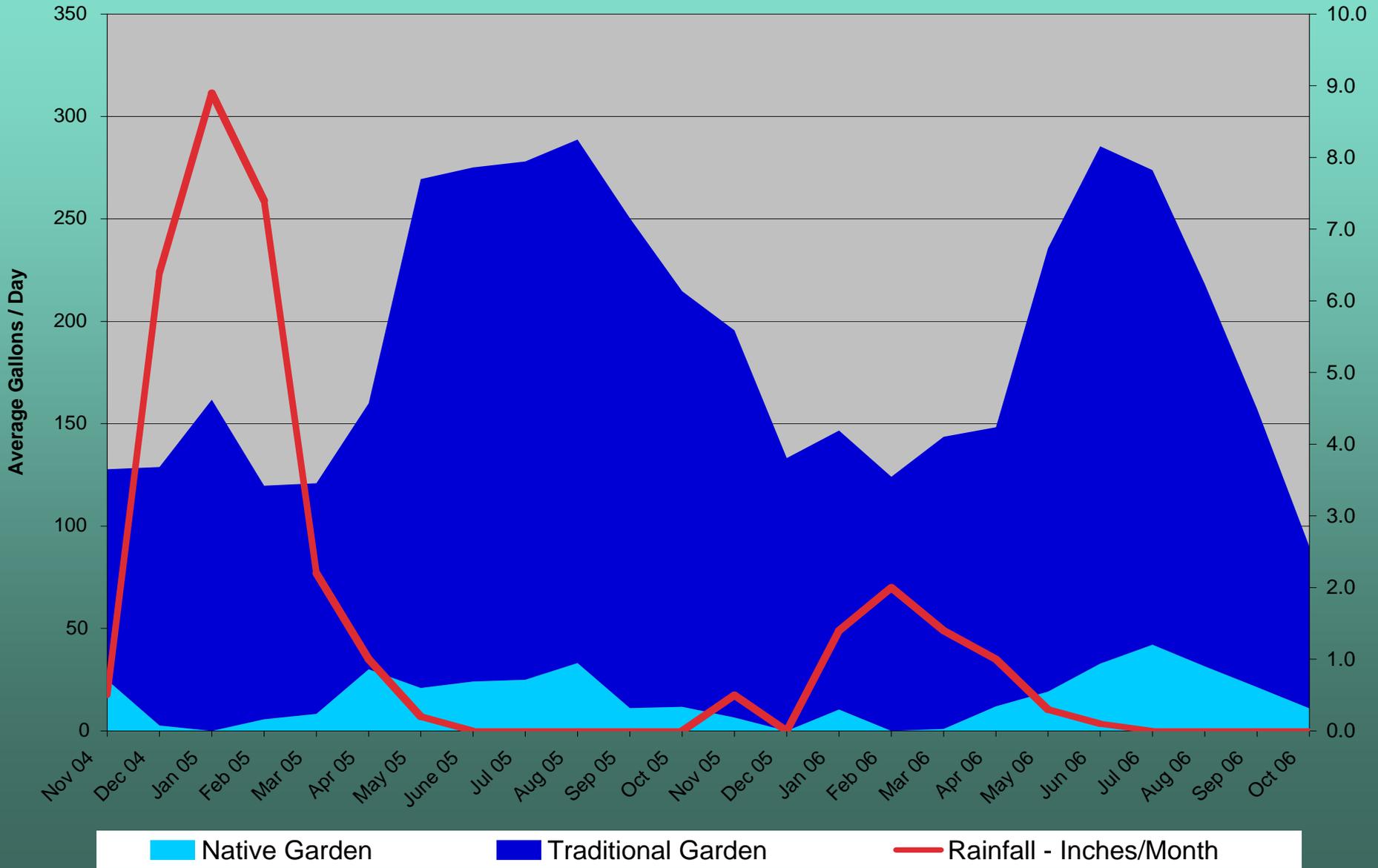
Comparative Greenwaste Generation



Comparative Labor Hours



24-Month Comparative Water Use



Economical

Bill Issued 01/28/02 Due Date 02/19/02
Amount Of Previous Bill \$ 136.11
Payments Since 11/27/01 \$ 136.11-

DWP ENERGY SERVICES- 1(800)342-5397
This Bill Covers 11/21/01 To 01/24/02.
Energy Used 769 KWH*
Meter 02-Electric Total \$ 80.38
\$ 1.26 is your daily average cost for energy.

DWP WATER SERVICES- 1(800)342-5397
This Bill Covers 11/21/01 To 01/24/02.
First Tier 8 HCF**
Total Water 8 HCF
Meter 01-Water Total \$ 16.41
*\$ 0.26 is your daily average cost for water.
Your cost per gallon is less than 1/2 cent.*

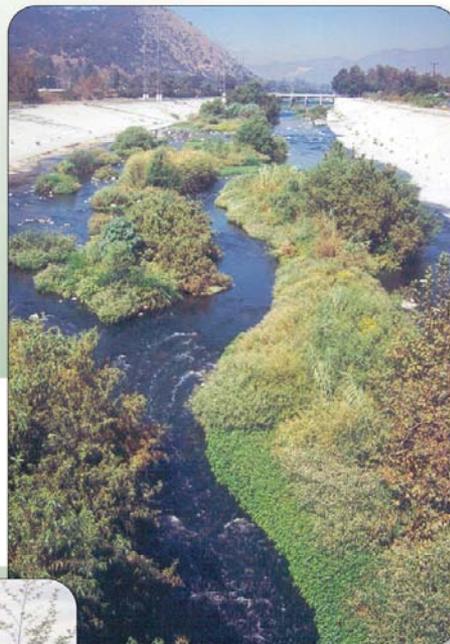
DWP SUBTOTAL \$ 96.79



LOS ANGELES RIVER MASTER PLAN

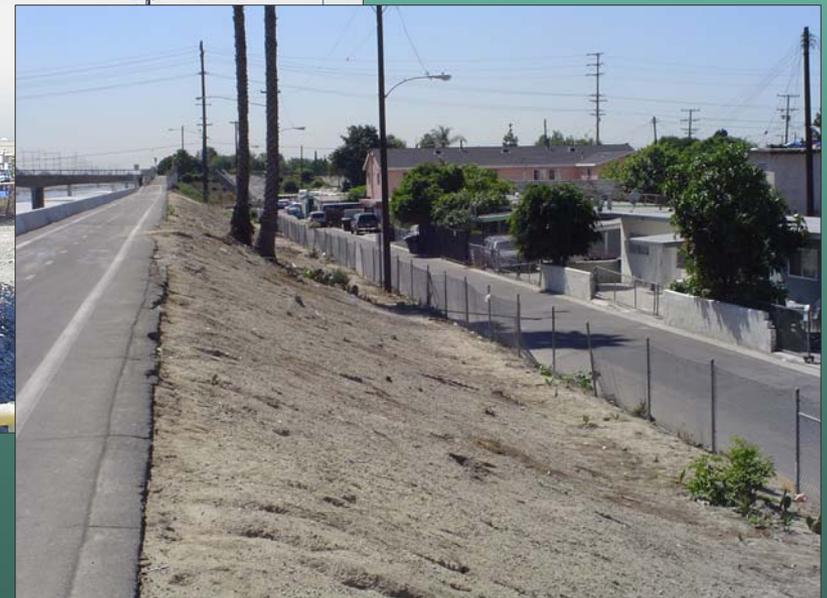
LANDSCAPING GUIDELINES AND PLANT PALETTES

January 2004

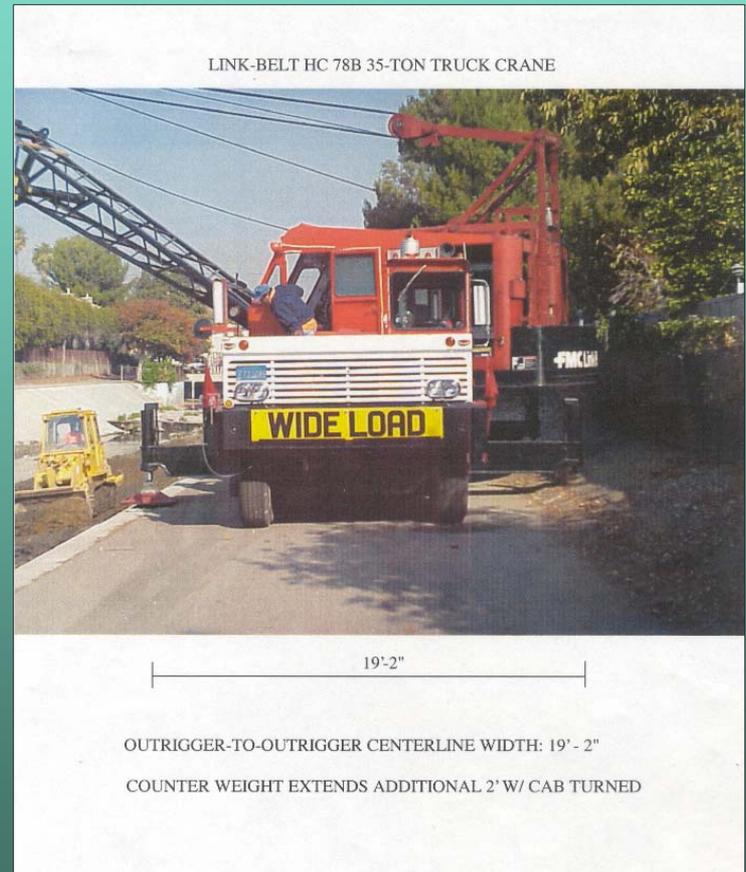




Existing Conditions – soil & utilities



LA Co. Flood Control Maintenance Equipment





Issues in the Field



Planted too close



Setback problems





Issues in the Field

Improperly pruned



Homeless encampments

Goals of Landscaping Guidelines

- Create a river identity
- **Create an indigenous native plant landscape**
- Provide a framework for public recreation and non-motorized transportation
- Implement watershed management Best Management Practices and utilize sustainable energy and materials



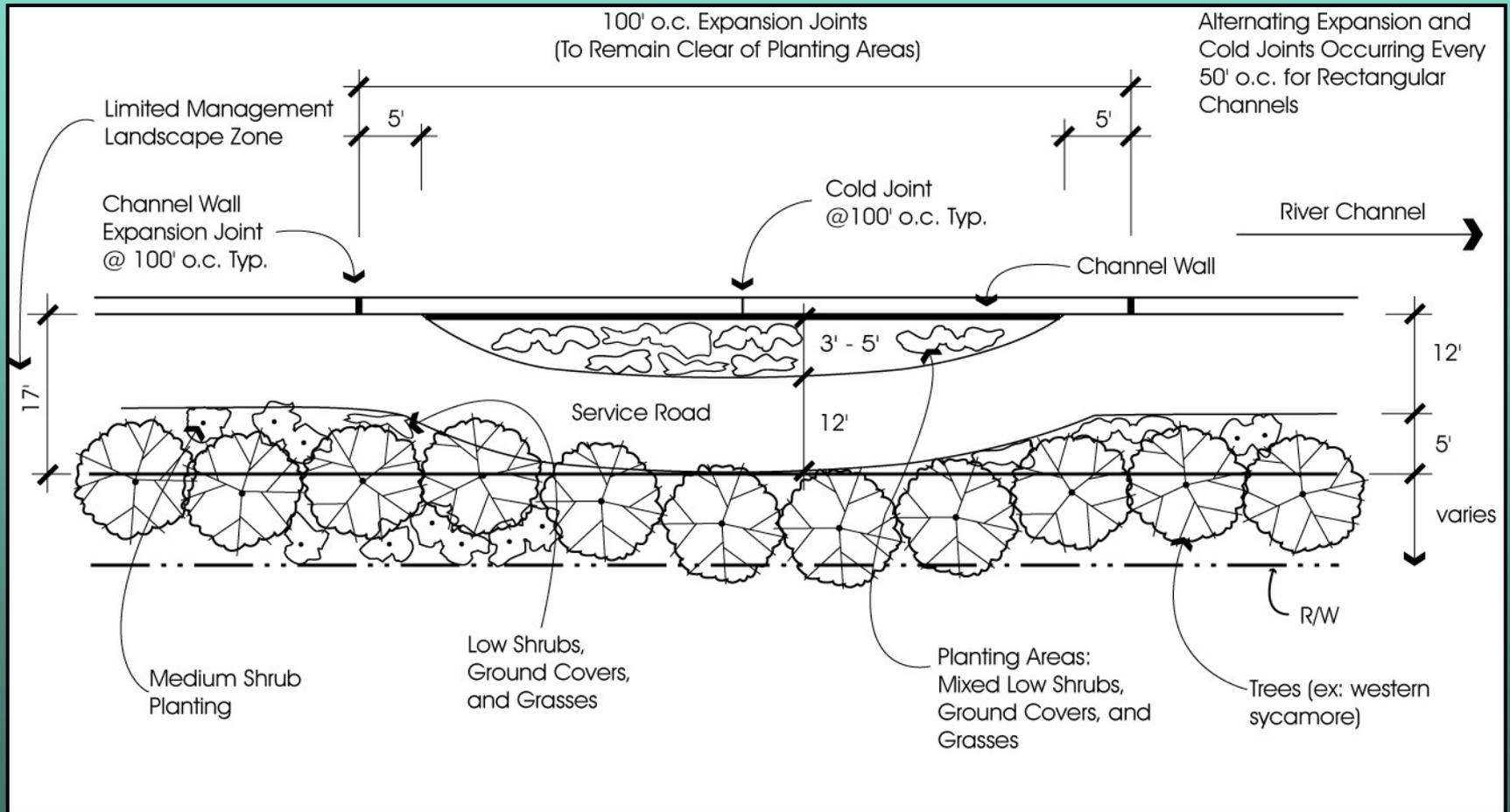
John Game

fuchsia-flowered gooseberry (*Ribes speciosum*)

Short List of Plants for the LA River

Botanical Name	Common Name	Plant Form	Min. setback (ft.)	Est. Water Needs	Sun/Pshade	Height (ft.)	Spread (ft.)
Trees							
<i>Alnus rhombifolia</i>	white alder	t-d	6	M/H	all	10-30	20
<i>Juglans californica</i> var. <i>californica</i>	California walnut	td	6	VL	su/ps	8-25	20+
<i>Platanus racemosa</i>	California sycamore	t-d	6	M	su	40+	30+
<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont cottonwood	td	8	M/H	su	30-50+	35+
<i>Quercus agrifolia</i> var. <i>agrifolia</i>	coast live oak	t	6	VL/L	su	20-40	35+
<i>Quercus engelmannii</i>	Engelmann or mesa oak	t	6	VL/L	su	20-40	25+
<i>Quercus lobata</i>	valley oak	td	6	L*	su	15-40	35+
<i>Sambucus mexicana</i>	Mexican elderberry	t-d	6	L/M	su/ps	6-20	15+
<i>Umbellularia californica</i>	California bay laurel	t	6	L/M	su/ps	30-80	25+
Shrubs							
<i>Artemisia californica</i>	California sagebrush	s	3	VL	su/ps	3	2-3
<i>Artemisia douglasiana</i>	Douglas mugwort	s	3	L	all	2-3	3
<i>Atriplex lentiformis</i> ssp. <i>lentiformis</i>	big saltbush	s	5	VL	su	6-8	5-10
<i>Baccharis pilularis</i>	coyote brush	s	3	L	su/ps	4-8	6-8
<i>Baccharis salicifolia</i>	mulefat	s	5	VL/L	all	4-10	8
<i>Berberis (Mahonia) nevinii</i>	Nevin's barberry	s	5	VL/L	su	4-12	12
<i>Cercocarpus betuloides</i> var. <i>betuloides</i>	mountain mahogany	s/t	6	L	su	6-20	12
<i>Encelia californica</i>	California encelia	s	3	VL/L	su/ps	3	4
<i>Epilobium canum</i> ssp. <i>latifolium</i> , (<i>Zauschneria californica</i>)	California fuchsia	p	1	VL/L	su/ps	1	4
<i>Epilobium canum</i> ssp. <i>canum</i> (<i>Zauschneria californica</i>)	hoary California fuchsia	p	2	VL/L	su/ps	1	4
<i>Eriodictyon trichocalyx</i> var. <i>trichocalyx</i>	hairy yerba santa	s	4	VL	n	2-6	6
<i>Eriogonum fasciculatum</i> var. <i>foliosum</i>	California buckwheat	s	4	VL/L	su/ps	3-5	5+
<i>Euthamia occidentalis</i>	western goldenrod	s			su/ps	2-4	3+
<i>Heteromeles arbutifolia</i>	toyon	s/t	6	VL/L	su/ps	8-15	15

Setbacks



Ecological Constraints in design



Barbara Eisenstein

- **Sun exposure** (aspect)- how much sun
- **Soil** - test; plant in the soil you have
- **Water** - *CSS/CHA natives want winter water*
- **Space** - width and depth of design area

Sustainable Landscapes

- **Choose locally native plants that can exist within present ecological constraints based on soils tests**
- Pay attention to ultimate size
- Select plant species that will minimize maintenance (water and pruning)
- Minimize use of pesticides
- Manage invasive exotics species (weeding, mulching)
- Use stormwater BMPs to maximize rainwater infiltration



California rose (*Rosa californica*)



Issues

- Los Angeles is one of the most park-poor cities in the US.
- An Angeleno's average bill reflects 50%-80% for outdoor irrigation; mostly imported water.
- So. Cal. has one of the highest clusters of endangered species in California
- Due to development pressure in LA, less than 10% of our native habitat remains
- We feel the remaining wild populations need protection and, if possible, expansion.



purple sage (*Salvia leucophylla*)

Issues

- The SGR watershed is ~ 680 square miles with ~ 550 acres of potential revegetation area along ROWs.
- The LAR is ~ 880 square miles with ~ 650 acres of potential revegetation area along ROWs.
- A number of river revitalization projects are already in the planning stages.
- There is a shortage of documented local seed and container stock.
- Commercial growers are willing to collect but it is a time-consuming, costly process that requires considerable lead time.



toyon (*Heteromeles arbutifolia*)

Solutions



hummingbird sage (*Salvia spathacea*)

- The use of local, native plant materials creates beautiful, functional public spaces that use substantially less (or no) water after establishment.
- We proposed to:
 - Create a short list of plants
 - Identify local plant populations for later seed collection
- Project proponents with public open space revegetation projects can plan with specific plant lists and access the plant locations (or seed bank) to begin their contract growing process.

Identification of populations for indigenous SGR plants



- Develop a short plant list for the SGR watershed
- Identify plant populations
- Collect plant vouchers, and GIS coordinates
- Develop a map from GIS data
- Store plant vouchers in RSAGB herbarium
- Develop and distribute a informational brochure

California fuchsia (*Zauschneria californica*)

Criteria for Short List Plants

- Native and appropriate for SGR watershed
- Growable in nursery conditions
- High probability for success
- Available within the SGR system
- Have aesthetic appeal
- Provide potential wildlife habitat
- Require minimum maintenance and water after establishment

Barbara Eisenstein

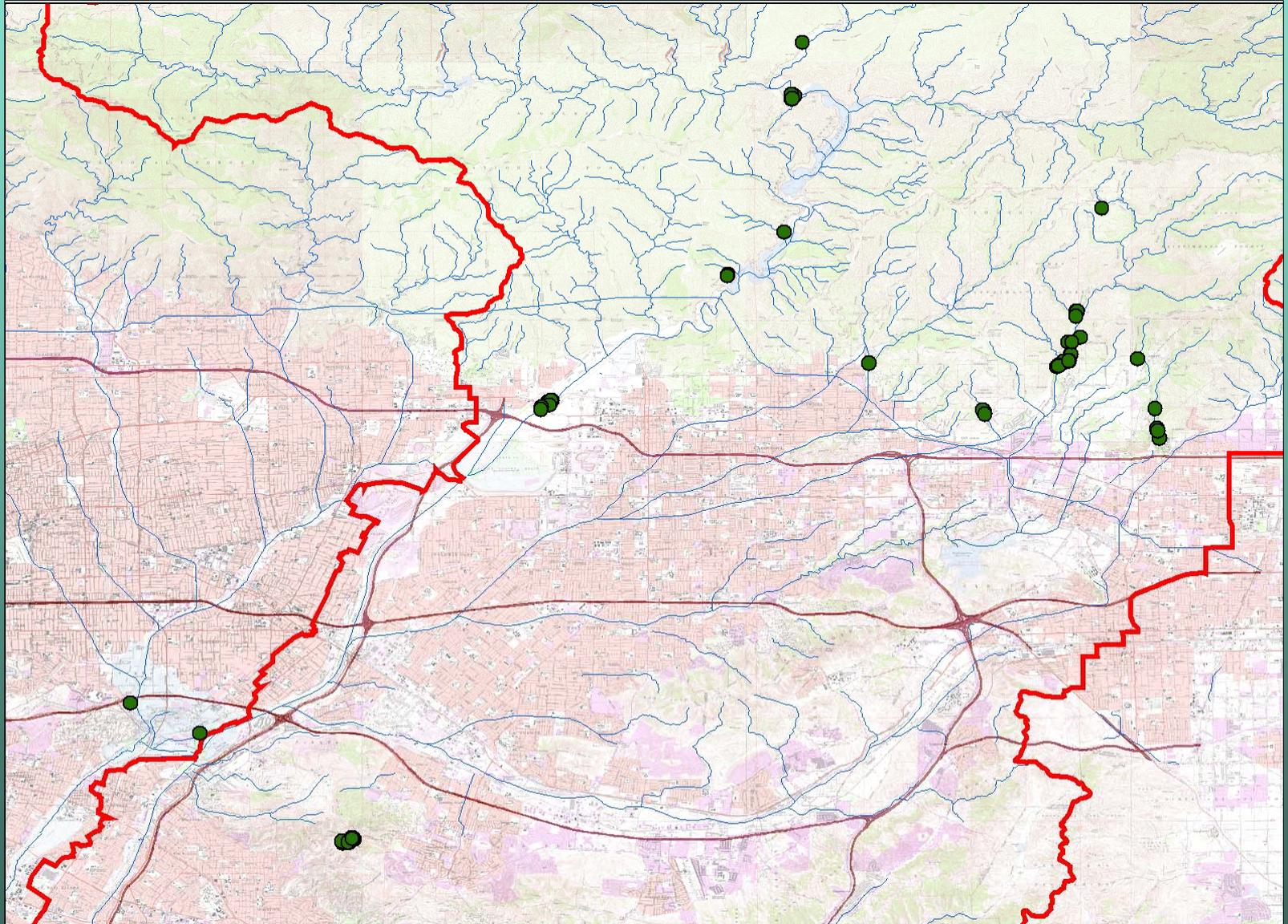


Encelia californica; **California sunflower bush**

Short List of Plants for the SGR Project

	Botanical Name	Common Name
Trees		
1	<i>Alnus rhombifolia</i>	white alder
2	<i>Juglans californica</i> var. <i>californica</i>	California walnut
3	<i>Platanus racemosa</i>	California sycamore
4	<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont cottonwood
5	<i>Quercus agrifolia</i> var. <i>agrifolia</i>	coast live oak
6	<i>Quercus engelmannii</i>	Engelmann or mesa oak
7	<i>Quercus lobata</i>	valley oak
8	<i>Salix exigua</i>	sandbar willow
9	<i>Salix gooddingii</i>	black willow
10	<i>Salix laevigata</i>	red willow
11	<i>Salix lasioloipsis</i>	arroyo willow
12	<i>Sambucus mexicana</i>	Mexican elderberry
13	<i>Umbellularia californica</i>	California bay laurel
Shrubs and Perennials		
14	<i>Artemisia californica</i>	California sagebrush
15	<i>Artemisia douglasiana</i>	mugwort
16	<i>Atriplex lentiformis</i> ssp. <i>lentiformis</i> (<i>A. lentiformis</i> ssp. <i>breweri</i>)	saltbush
17	<i>Baccharis pilularis</i> var. <i>consanguinea</i>	coyote brush
18	<i>Baccharis salicifolia</i>	mulefat
19	<i>Berberis</i> (<i>Mahonia</i>) <i>nevinii</i>	Nevin's barberry
20	<i>Cercocarpus betuloides</i> var. <i>betuloides</i>	mountain mahogany
21	<i>Encelia californica</i>	California encelia
22	<i>Epilobium canum</i> ssp. <i>latifolium</i> (<i>Zauschneria californica</i>)	California fuchsia
23	<i>Epilobium canum</i> ssp. <i>canum</i> (<i>Zauschneria californica</i>)	hoary California fuchsia
24	<i>Eriodictyon trichocalyx</i> var. <i>trichocalyx</i>	hairy yerba santa
25	<i>Eriogonum fasciculatum</i> var. <i>foliolosum</i>	California buckwheat

Native Plant Populations in the SGR (NFWF)

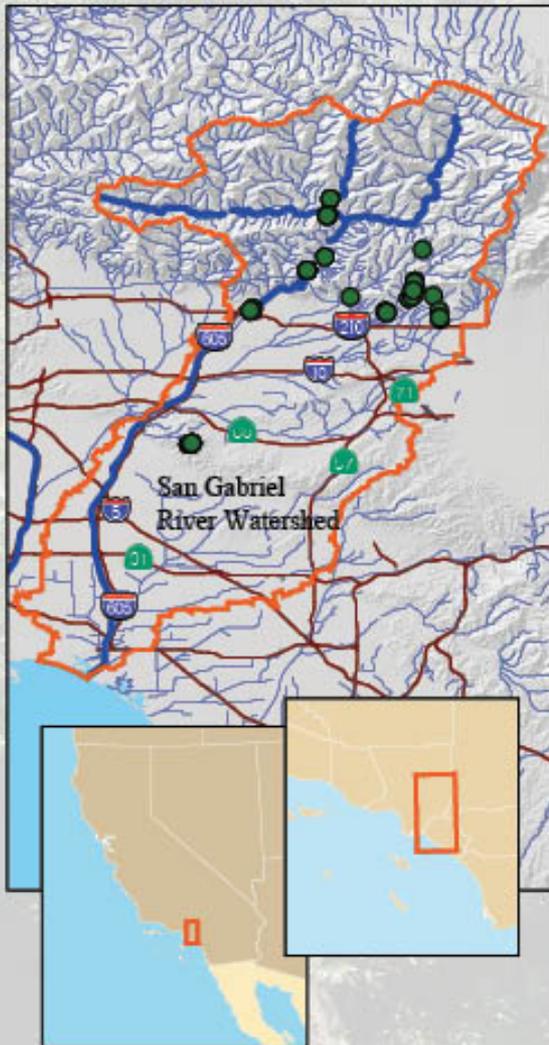


Native Seed Resources Program

- Seek funding for seed collection and banking
- Monitor seed collection activities
- Initiate a nursery network to grow seeds and propagules
- Distribute seed to project proponents



Fay's Wildflower Meadow at
Rancho Santa Ana Botanic Garden



● Selected "Short List" Plant Populations for Seed Collection

Pilot Project: Native Plant Seed Resources of the San Gabriel River Watershed

This project is a cornerstone for a larger, ongoing research effort focused on the collection of seed and propagules and the monitoring of plant populations and plant communities of the targeted species.

Find more information, seminars, and classes on the use of native plants check:

www.lasgrwc.org
www.rsabg.org
www.bewaterwise.com



Senecio flaccidus var. elongatus, Photo by Blake Whittington



Los Angeles and San Gabriel Rivers Watershed Council
www.lasgrwc.org



Rancho Santa Ana Botanic Garden
www.rsabg.org

With Funding From:



National Fish and Wildlife Foundation
<http://www.nfwf.org/>

Printed on recycled paper with soy based ink.
 Background: San Dimas River, Photo by Blake Whittington



Epilobium caryum spp. caryum, Photo by Blake Whittington

Creating Beautiful Public Landscapes

Restoring Local Habitat

Protecting Water Supplies

**LOS ANGELES AND
 SAN GABRIEL RIVERS
 WATERSHED COUNCIL**
 and
**RANCHO SANTA ANA
 BOTANIC GARDEN**

Native Seed Resources Program

The use of locally native plant materials allows for beautiful, functional public spaces that need only our local rainfall after plant establishment.

Lonicera albopurpurea var. abruscula
Photo by Devin Eady



We owe it to ourselves and our children to ensure we have clean abundant water. One way to do this is to landscape with California native plants that can thrive on little or no extra water after establishment. The use of locally native plants creates beautiful functional public spaces.

- Los Angeles imports 80% of its water.
- Less than 5% of river habitat and coastal wetlands remain in Los Angeles County.
- 50-80% of water use is for thirsty lawns and /or non-native plants and landscapes.
- California's local native plants are adapted to grow here using only our normal rainfall.

Why local native plants?

- Need little or no water following establishment.
- Require less maintenance.
- Support local wildlife.
- Provide beauty and a sense of place.
- Provide an educational experience.
- Conserve biological diversity.

Locally native plants are those that evolved in the local watershed and are adapted to its ecology, climate, and natural processes.

The Los Angeles County Board of Supervisors adopted the Los Angeles River Master Plan Landscaping Guidelines and Plant Palettes in 2004. The Guidelines require the use of locally native plants for revegetation projects. Planning efforts in the County are incorporating the ecological principles in the Guidelines into their watershed planning documents and landscaping plans. A number of river revitalization projects are already in the planning stages. These projects need locally native plants, yet there is a shortage of documented local seed and plant container stock.

Collecting seeds from local plants is time-consuming, costly, and requires advance planning in order to provide container plants when needed. The temptation is to obtain California native seeds from other places often far outside our region. Little useful information exists to assist both project proponents and nursery growers who wish to meet the demand for locally native plants in a cost effective way. These problems illustrate the need for a Native Seed Resources Program.

“These Guidelines incorporate concepts of sustainability, creative design, and sound ecological concepts”

Los Angeles River Master Plan Landscaping Guidelines and Plant Palettes

The Los Angeles & San Gabriel Rivers Watershed Council, together with Rancho Santa Ana Botanic Garden, have taken the first steps to address this problem by developing watershed-specific “short lists” of locally native plants appropriate for landscape use and identifying local plant populations suitable for later seed collection. Project proponents and native plant nurseries needing locally native plants for revitalization and enhancement projects will be able to access these plant lists and locations for seed collecting to begin their contract growing process. Contact the Watershed Council for more information.

The next steps for the Native Seed Resources Program are to expand from the San Gabriel River Watershed into other watersheds in Los Angeles County, to establish a program to collect and store seed, and to work with growers, seed collectors, and project proponents to ensure appropriate plant material is available when needed.

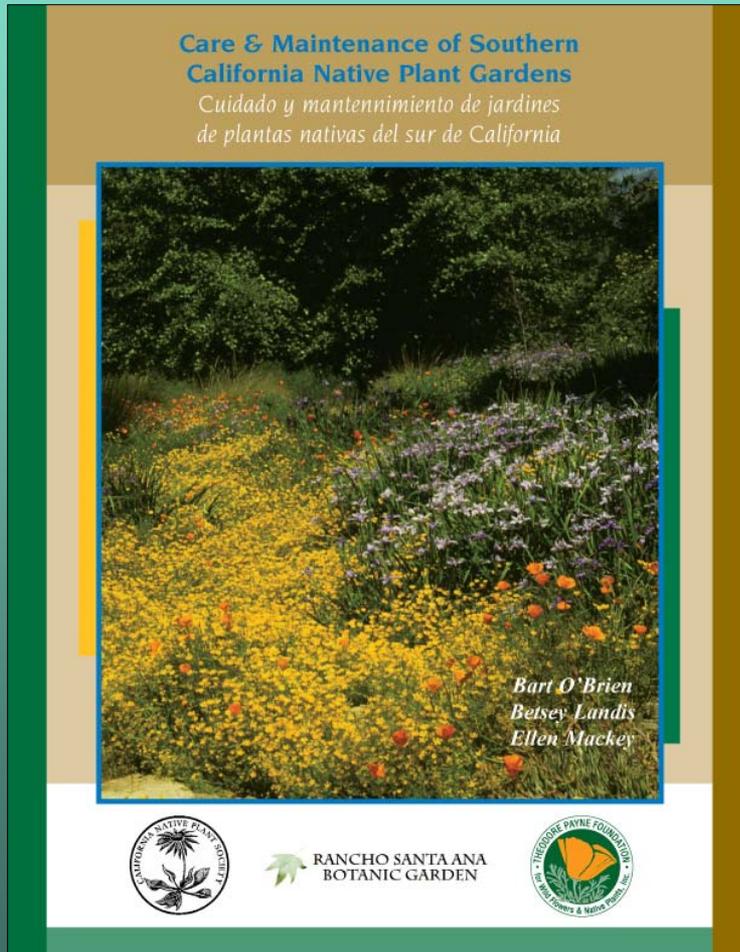
The *Native Seed Resources Program* has the following goals:

- To generate a verified, documented source of native seed available for use by growers to provide genetically appropriate plant materials for restoration/revitalization projects in the watersheds of the Los Angeles and San Gabriel Rivers.
- To promote local plant biodiversity in these restoration/revitalization projects while at the same time ensuring sustainability of native, intact plant populations through responsible seed collecting and monitoring.

Salix laevigata
Photo by Blake Whittington



Care & Maintenance manual



- Cooperative project between: TPF, RSABG, CNPS (volunteers)
- Published by MWD
- Bilingual Text
- Target audience - beginners
- Goal - reduce the intimidation factor
- Geographic extent
- Take it outside!

Care & Maintenance manual

CONTENTS:

- Climate
- Soil
- Watering
- Planting
- Plant Care
- Pests
- Weeds
- Appendices



Purple sage

CLIMATE

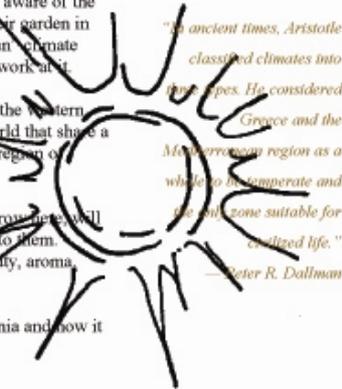
Southern California's Mediterranean Climate

All gardeners, from the newest to the most experienced, must be fully aware of the horticultural implications that climate and microclimates have on their garden in order to be successful. Luckily, southern California's "Mediterranean" climate enables gardeners to grow nearly anything they desire if they are willing to work at it.

Found roughly between 30° and 40° north and south latitude and located on the western coasts of continents, southern California is one of only five places in the world that share a mediterranean climate: Central Chile, Mediterranean Sea borderlands, cape region of South Africa, and portions of South and Western Australia.

Understanding how this distinct climate influences the types of plants that grow here, will help gardeners enjoy their landscapes and gardens rather than being a slave to them. Gardening with appropriate climate adapted native plants will bring the beauty, aroma, sense of place, and environmental harmony that so many Californians seek.

This chapter covers the characteristic climate conditions of southern California and how it affects native gardens.



*"In ancient times, Aristotle classified climates into three types. He considered Greece and the Mediterranean region as a whole to be temperate and the only zone suitable for civilized life."
—Peter R. Dallman*

CLIMA

Clima mediterráneo del Sur de California

"En la antigüedad, Aristóteles clasificó tres tipos de Clima. Consideraba que Grecia y la región del Mediterráneo era una sola región con clima templado y la única zona apropiada para la vida civilizada."

—Peter R. Dallman

Todos los jardineros, desde el novato hasta el más experimentado, debe estar consciente de las implicaciones que el clima y los microclimas tienen sobre su jardín para que su trabajo sea exitoso. Afortunadamente el clima Mediterráneo del sur de California le permite a los jardineros plantar casi cualquier planta que se desee si están dispuestos a trabajar un poco.

El sur de California se encuentra aproximadamente entre los 30° y 40° latitud norte y sur y se localiza en la costa oeste del continente, es uno de los 5 lugares en el mundo que comparte un clima de tipo mediterráneo, los otros lugares son: el centro de Chile, orillas frente al mar Mediterráneo, el área de la Ciudad del Cabo en Sudáfrica y porciones del sur y oeste de Australia.

Entendiendo la influencia del clima en los diferentes tipos de plantas que se mencionan en este libro, ayudaremos a los jardineros a disfrutar de sus jardines y paisajes más que convertirse en esclavos de ellos. Trabajar en el jardín con plantas nativas apropiadas adaptadas al clima dará como resultado belleza, aroma, sentido de placer y armonía del medio ambiente que al final es lo que muchos Californianos están buscando.

Este capítulo cubre las condiciones climáticas características del Sur de California y como el clima afecta a los jardines nativos.

SOIL

Assessing & Preparing Soil for Healthy Native Plants

Native plants are recommended for California gardens and landscaping because they are adapted to local soils, climate and available sources of water. What is often forgotten is the importance of the root systems of native plants in achieving this adaptation. Roots anchor the above-ground plant structure against the stresses of wind and gravity. Roots utilize and store nutrients available in the soil environment, either through roots designed to interact with that particular soil or through symbiotic relationships between roots and local soil organisms such as bacteria or fungi.

To grow healthy native plants the root systems must be healthy. Determining the characteristics of the soil on the planting site, choosing the right native plants for the site and nurturing a healthy soil environment are the first steps toward the goal of a sustainable garden and landscape.

Healthy soil is filled with life! It contains millions of nematodes, earthworms, tiny insects, arthropods, fungi, single-celled bacteria, protozoa and many more unnamed microscopic multicellular creatures. Soil has structure, chemical processes, a complex matrix of roots and fungal threads, minerals, organic molecules and particles constantly being renewed by the activities of its living components. Plant roots are nurtured by the living soil and in turn, supply nutrients and structure to the entire system.

Learn a few basic soil principles such as how to determine soil texture, water drainage, acidity or alkalinity of soil, how to handle certain soil problems and when to ask for help. Understanding soil characteristics of the site and managing them correctly will result in healthier plants, less disease and infestations, fewer problems and overall easier maintenance.

In a handful of typical healthy soil there are more creatures than there are humans on the entire planet, and hundreds of miles of fungal threads.

—David W. Wolfe
Tales of the Underground

SUELOS

Evaluación y preparación del suelo para obtener plantas nativas saludables.

Se recomiendan plantas nativas para los jardines y paisajes de California porque están adaptadas a los suelos, clima y recursos potables locales disponibles. Uno de los aspectos que frecuentemente se olvidan es la importancia del sistema de raíces de las plantas nativas para lograr adaptarse. Las raíces sujetan la estructura de la planta que observamos sobre el suelo contra los embates del viento y la gravedad. Las raíces utilizan y guardan los nutrientes disponibles del suelo que las rodea, a través de la interacción directa con el suelo o a través de una relación simbiótica entre las raíces y organismos del lugar tales como bacterias u hongos.

Para obtener plantas nativas saludables el sistema de raíces debe estar saludable. Determinando las características del suelo en el que la planta se encuentra, escogiendo la planta nativa adecuada al lugar donde se va a poner y dándole los nutrientes necesarios al suelo escogido son los primeros pasos para obtener un jardín y paisaje sostenible.

¡Los suelos que son saludables están llenos de vida! Tienen millones de nematodos, lombrices, pequeños insectos, artrópodos, hongos, bacterias, protozoarios y muchas criaturas microscópicas multicelulares. El suelo tiene estructura, procesos químicos, una red compleja de raíces y hongos filamentosos, minerales, moléculas orgánicas y partículas que son constantemente renovadas por las actividades de sus componentes vivos. Las raíces de las plantas obtienen sus nutrientes de el suelo y a cambio dan nutrientes y estructura al sistema entero.

Aprende algunos principios básicos del suelo por ejemplo como determinar la textura, la capacidad de drenaje, la acidez o alcalinidad del suelo, cómo manejar algunos problemas del suelo y cuando pedir ayuda profesional. Entender las características del suelo del lugar y manejarlas correctamente dará como resultado plantas más saludables con menos enfermedades y plagas, menos problemas y en general una planta más fácil de manejar.

Al agarrar un puño de la tierra sana encontrará que existen más criaturas de lo que hay seres humanos en el planeta y cientos de miles de hongos filamentosos.
—David W. Wolfe
Cuentos del subterráneo

Measuring Soil Drainage

Soil drainage is the soil's ability to move water through the soil and deliver nutrients to plant roots. Measuring drainage characteristics based on how fast a soil drains will help determine what can be done to help establish and maintain your native plant garden.

Use the method below to measure soil drainage in the places where you sampled the soil texture:

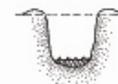
1. Dig a one- to two-foot deep hole. The hole should be wide enough so the level of the water can be seen easily.



2. Fill the hole with water and note the time at which the hole is filled.



3. Note how long it takes for the water to completely disappear (i.e. 5 minutes, 60 minutes, etc.)



Soil Drainage Results

0 - 4 minutes

If the water disappears as you pour it in or within 1 - 4 minutes, the soil drains too fast. If your chosen native plants require longer contact with water, you will need to use soaker-type irrigation (see Watering, page 31).

5 - 15 minutes

The soil drainage is average.

16 - 60 minutes

The soil drainage is low, so plant root systems must be infrequently deep-watered. Since surface watering will probably not soak in, deep water when indicated. (See Watering, page 31) Surface mulching is also needed twice a year.

Several hours/days

The soil is compacted or clay. Native plants will need to be planted in large holes with compost mixed into the soil at the bottom to help plant root systems properly establish themselves. The soil surface needs to be broken up and well-mulched. The plants will need infrequent deep-watering. (See Watering, page 31)

For areas with poor soil drainage, build mounds of soil on the garden site (see Planting, page 59).

Understanding Soil pH

Easy tests of the acidity or alkalinity of soil samples from the planting site and how the soil interacts with the water supply will indicate which native plants will grow best on site.

Soil testing kits are available at many garden centers. Some kits use pH color strips, some kits provide a powder. Water and the powder are mixed into a paste and applied to a water-saturated soil sample. The paste changes color and the color is matched to a pH color scale. Each color on the scale represents a number from 1 to 14. Soil scientists and soil labs use a pH meter with two electrodes. The electrodes are probes that are submerged in a 1:1 soil to water suspension. The meter reads the result as a pH value.

pH is a set of numbers running from 1 to 14. A pH of 7 is neutral, lower pH numbers are increasingly acidic (2 is very acidic). Higher pH numbers are alkaline (12 is very alkaline). The pH of the wet soil indicates how water ionizes and reacts with minerals, salts and soil structure. This can be very helpful in determining what nutrients are available to plant roots and what toxic levels of metals or salts may be present.

- A pH of 6 - 7 is average.
- Use native plants that prefer the pH of your soil. Some tolerate a range of pH values (i.e. pH 6-8, or pH 5-7).
- Generally, soil-decomposing bacteria and nitrogen-fixing soil bacteria will not thrive in acidic conditions.
- Most fungi acting as a decomposing agent prefer acidic conditions.
- If the results show that the soil is highly acidic, a nitrogen-rich compost may be required to establish plants.
- Do not add sulfur or lime to alkaline soils as these worsen the soil condition as a planting medium.

pH	REACTION
10	Extremely Alkaline
9.5	Very Strongly Alkaline
9.0	Strongly Alkaline
8.5	Alkali
8.0	Alkaline
7.0	Neutral
6.5	Very Slightly Acid
6.0	Slightly Acid
5.5	Medium Acid
5.0	Strongly Acid
4.5	Very Strongly Acid
4.0	Extremely Acid

Note: pH numbers represent the negative logarithm to base 10 of hydrogen ion activity. The pH of pure water is 7.

Soil p. 11



www.attra.org/attra-pub/soil-lab.html

WATERING

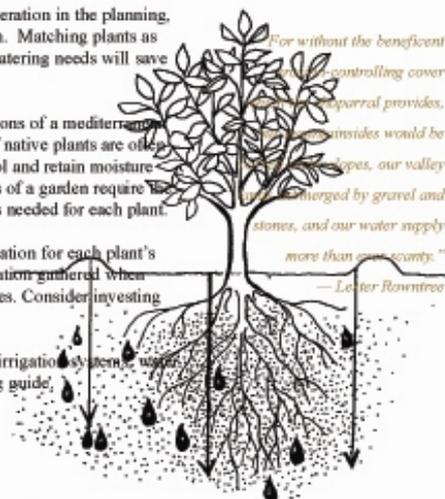
When and How to Water Native Plants

Water – how much and when – is an important consideration in the planning, planting and maintenance of a healthy native garden. Matching plants as closely as possible to existing soil conditions and watering needs will save time, money and aggravation in the long run.

Southern California native plants are accustomed to the conditions of a Mediterranean climate – mild, rainy winters and hot, dry summers. Leaves of native plants are often small, leathery, thick, fuzzy and/or waxy to keep the leaves cool and retain moisture during long summers of drought. However, varying conditions of a garden require the gardener to pay close attention to when and how much water is needed for each plant.

To help remember, use a personal notebook to compile information for each plant's needs including soil type and watering needs. Include information gathered when purchasing the plant, as well as from guides and on-line sources. Consider investing in a rain gauge.

This chapter includes when to water, establishing new plants, irrigation systems, water quality, special situations, hydrozoning, and a species watering guide.



For without the beneficent chaparral provides, our mountainsides would be as desolate as our valley floors. Our valley floors are emergent by gravel and stones, and our water supply is more than ever scanty.”
— Lester Rowntree

RIEGO

Cuando y como regar a las plantas nativas.

“Sin la acción benéfica de la cobertura del chaparral que controla la erosión, nuestras laderas de las montañas serían laderas rocosas áridas, nuestras tierras del valle se sumergirán en grava y rocas, y nuestra fuente de agua como nunca antes será escasa.”
— Lester Rowntree

El riego – cuanto y cuando – es un factor importante en la planeación, en el momento de plantar y en el mantenimiento de un jardín nativo saludable. Escoger la planta adecuada lo mejor posible a las condiciones existentes de suelo y necesidades de riego le ahorrará tiempo, dinero y problemas a largo plazo.

En el sur de California las plantas nativas están acostumbradas a las condiciones del clima del mediterráneo – inviernos lluviosos moderados y veranos secos y cálidos. La mayoría de las hojas de las plantas nativas son pequeñas, correas, gruesas, vellosas o cerosas para mantener a las hojas frías y retener humedad durante los días largos del verano seco. Sin embargo, las condiciones cambiantes que existen en un jardín requieren que el jardinero ponga mucha atención a cuando y cuánta agua es necesaria para que cada planta crezca.

Se sugiere que para recordar los requerimientos de cada planta se use una libreta para anotar la información de las necesidades de cada planta incluyendo el tipo de suelo y el riego. Incluya la información obtenida cuando compró la planta, así también como las guías e información en Internet.

Esta capítulo incluye cuando regar, establecer una planta, los sistemas de riego, la calidad del agua, situaciones especiales y una guía del tipo de riego por especie.

Plant List by Watering Needs

For convenience, the plants are organized into lists by water needs (very low, low, medium, high). Plants in each of these lists are then sorted by plant form (trees, small trees / large shrubs, shrubs, subshrubs / perennials, vines, groundcovers, and cacti / succulents). Information on exposure is also provided. These are all relative guidelines to help in planning, selecting and caring for native landscapes. No classification system is perfect and many species bridge several categories.

Plant Form

- **Trees** – plants with one or more woody stems (trunks) usually growing taller than 20 feet.
- **Small trees / Large shrubs** – typically multi-stemmed and spreading, reaching an average of 20 feet in height. Some can be trimmed into a tree-like form.
- **Shrubs** – vary in size from approximately 3 to 12 feet. They often provide structure to a home landscape and serve diverse functions including hedges, focal points, background plantings, screens and accents.
- **Sub-shrubs / Perennials** – a diverse group comprising smaller, shrub-like plants, herbaceous perennials, grasses and bulbs. These plants often provide texture and color to a garden.
- **Vines** – provide vertical coverage, but require a structure for support.
- **Groundcovers** – low growing plants. This category includes low-growing, spreading shrubs, herbaceous perennials, and grasses.
- **Cacti / Succulents** – fleshy, water-storing plants.

Water Usage

Plants are arranged by water needs. For best performance of established plants, some will require supplemental water to average winter rainfall. Water needs will vary depending on soil type (clay soils need less water) and geographic location (inland valleys usually require more water). For more information see When to Water section, page 25.

Very Low – Requires no supplemental water.

Low – Requires a minimal amount of supplemental water.

Medium – Requires a moderate amount of supplemental water.

High – Requires a high amount of supplemental water.

Exposure

Be aware that as plants grow, the conditions of the garden change. Some plants grow taller shading out others – going from full sun to partial or full shade. Be prepared to change out some plants as conditions change.

su – full sun

ps – part shade

sh – full shade

Type

This column provides additional information on growth form and seasonal responses. Unless otherwise noted, all plants are evergreen. Deciduous trees and shrubs lose their leaves seasonally, others may die back to the ground. Grasses, and bulbs are also identified.

Adopted from Landscaping Guidelines and Plant Palettes.

RIEGO/WATERING

Botanical Name <i>Nombre botánico</i>	Common Name <i>Nombre común</i>	Exposure <i>Exposición</i>	Type <i>Tipo</i>
Very Low Water Use <i>Requieren muy poco riego</i>			
Trees <i>árboles</i>			
<i>Juglans californica</i> var. <i>californica</i>	California walnut	su/ps	deciduous <i>caducifolios</i>
Small Trees / Large Shrubs <i>Árboles pequeños / Arbustos Grandes</i>			
<i>Adenostoma sparsifolium</i>	red shanks	su	
<i>Arctostaphylos glauca</i>	bigberry manzanita	su	
<i>Ceanothus spinosus</i>	greenbark ceanothus	su/ps	
<i>Fremontodendron californicum</i>	California fremontia	su	
<i>Juniperus californica</i>	California juniper	su	
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	honey mesquite	su	
<i>Prosopis pubescens</i>	screw bean mesquite	su	
X <i>Chitalpa tashkentensis</i>	chitalpa	su	deciduous <i>caducifolios</i>
X <i>Chitalpa tashkentensis</i> 'Morning Cloud'	Morning Cloud chitalpa	su	deciduous <i>caducifolios</i>
X <i>Chitalpa tashkentensis</i> 'Pink Dawn'	Pink Dawn chitalpa	su	deciduous <i>caducifolios</i>
Shrubs <i>Arbustos</i>			
<i>Adenostoma fasciculatum</i>	chamise	su	
<i>Arctostaphylos glandulosa</i>	Eastwood manzanita	su	
<i>Artemisia tridentata</i>	Great Basin sagebrush	su	
<i>Atriplex lentiformis</i> ssp. <i>lentiformis</i> (<i>A. lentiformis</i> ssp. <i>breweri</i>)	saltbush	su	
<i>Calliandra eriophylla</i>	fairy duster	su	deciduous <i>caducifolios</i>
<i>Dendromecon rigida</i>	bush poppy	su	
<i>Fallugia paradoxa</i>	Apache plume	su	deciduous <i>caducifolios</i>
<i>Larrea tridentata</i>	creosote bush	su	
<i>Malacothamnus arcuatus</i> 'Edgewood'	Edgewood bush mallow	su	
<i>Malacothamnus fasciculatus</i>	chaparral bush mallow	su	
<i>Malacothamnus palmeri</i>	Santa Lucia bush mallow	su	
<i>Malosma laurina</i>	laurel sumac	su	
<i>Salvia</i> 'Aromas'	Aromas sage	su	
<i>Salvia brandegeei</i>	Brandegeee sage	su	
<i>Salvia</i> 'Carl Nielson'	Carl Nielson sage	su	

Water Usage *Consumo de agua*

Very Low – Performs with no supplemental water
 Low – Minimal supplemental water need
 Medium – Moderate supplemental water need
 High – High supplemental water need

Muy poco riego – no necesita regarse para crecer
Poco riego – mínima de riego suplementario
Riego medio – moderada de riego suplementario
Mucho riego – grande de riego suplementario

Sun Need

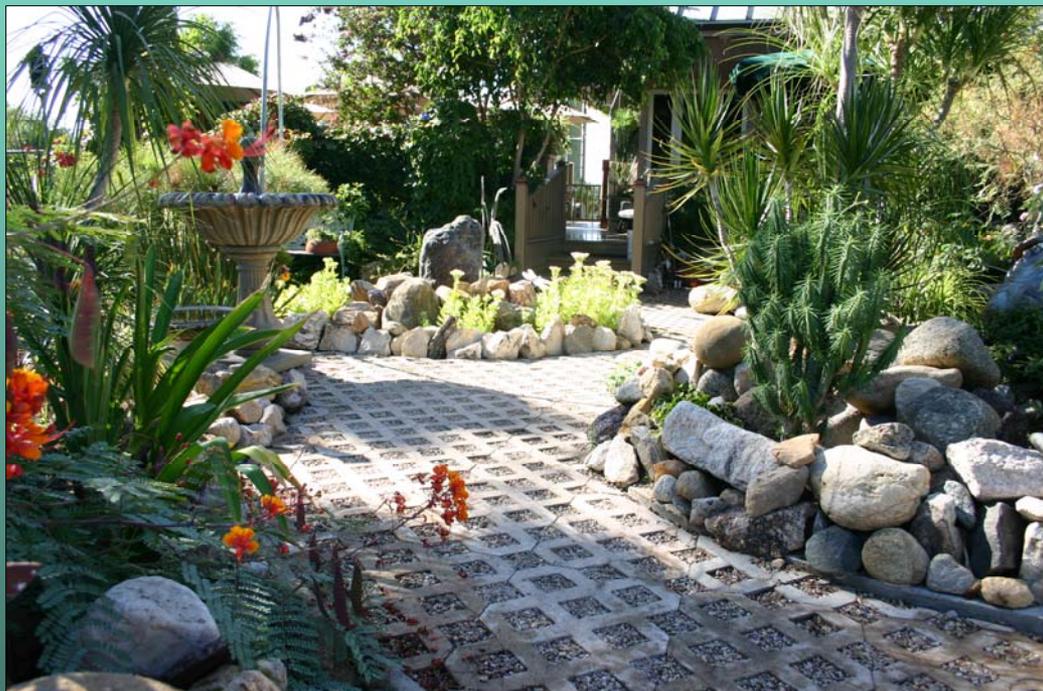
Exposición al sol
 su – full sun *sol*
 ps – part shade *sol parcial*
 sh – full shade *sombra*

Watering

- Combine plants in groups by water needs
- Hydrate most CSS/CHA plants deeply monthly (depending on soil)
- Some plants DO NOT want summer water



Stormwater



Planting p. 49



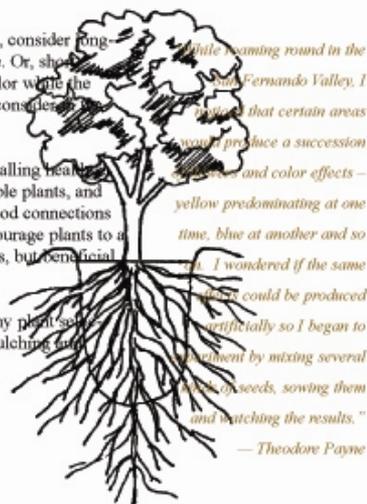
PLANTING

When, Where and How to Plant Natives

View the garden or landscape as a living architecture. For instance, consider long-term goals such as permanent plantings that need room to mature. Or, show short-term goals such as annuals or perennials to provide cover and color while the larger shrubs and trees become established. These are just two things to consider in the planning process.

Don't make life complicated either. Keep maintenance costs down by installing healthy plants at the right season, in the right site conditions, with other compatible plants, and make sure they are far enough apart for their root systems to establish good connections with available nutrients. Then carefully irrigate, mulch and weed to encourage plants to a healthy maturity. Mature plantings will not only be a delight to the senses, but beneficial to the maintenance budget.

This chapter gives recommendations for planting natives including healthy plant selection, what to consider for long-term planning, when and how to plant, mulching and planting options.



While roaming round in the San Fernando Valley, I noticed that certain areas would produce a succession of colors and color effects – yellow predominating at one time, blue at another and so on. I wondered if the same effects could be produced artificially so I began to experiment by mixing several kinds of seeds, sowing them and watching the results.”
— Theodore Payne

Plantar

Cuando, Donde y Como Plantar Plantas Nativas

“Recorriendo los alrededores del Valle de San Fernando, noté que ciertas áreas pueden producir una sucesión de flores y dar un efecto especial con sus colores- el amarillo predominaba en un momento, el azul en otro etcétera. Me pregunté si los mismo efectos ópticos podrían producirse artificialmente así que comencé un experimento mezclé diferentes tipos de semillas, las sembré y observé los resultados.”
— Theodore Payne

Ve a el jardín o el paisaje como una obra arquitectónica viva. Por ejemplo, considere una planeación de las metas a largo plazo tales como plantas permanentes con la idea que son plantas que necesitan espacio para madura. O puede pensar planear su jardín a corto plazo poniendo plantas tales como las anuales o perennes para proveer cobertura y color mientras que los arbustos y árboles se establece. Estos son sólo algunos puntos a considerar durante el proceso de planeación.

No se complique la vida. Mantenga los costos de mantenimiento bajos por medio de la instalación de plantas sanas en la estación adecuada, en el lugar con las condiciones adecuadas, con otras plantas compatibles y asegurándose que una planta está lo suficientemente alejada de las otras para que sus sistemas de raíces puedan desarrollar conexiones buenas para absorber los nutrientes disponibles. Entonces riegue cuidadosamente, ponga una capa de hojarasca y quite las malezas para ayudar a que las plantas lleguen a la madurez saludables. Plantar individuos maduros no solamente tendrá un efecto visual agradable sino que puede ser benéfico para el presupuesto de mantenimiento.

Este capítulo da sugerencias de cómo ayudar a las plantas nativas a sobrevivir incluyendo una selección de consejos de salud para las plantas, que plantas considerar cuando se esta planeando a largo plazo, cuando y como plantar, capas de hojarasca y opciones para plantar.

When to Plant

Hot, Dry Areas

In areas where the only moisture is provided by winter rains, the best time to plant is after the temperature of the soil cools down. The cool moist conditions are ideal for roots broken in the planting process to heal and grow with reduced risk of bacterial or fungal infections.

- Trees and shrubs: mid-October through February.
- Subshrubs, perennials and vines: mid-October through April.
- Wait several days to plant in open areas where the temperature has been, or is expected to be, over 100°F. The plant should be installed when it will not immediately lose a lot of water through its leaves. If the ground is hot, water is lost through evaporation. The roots will have a difficult time supplying needed water to the plant. If the roots are damaged during installation hot, wet soil may promote root diseases.

Near Permanent Sources of Water

Trees, shrubs, perennials, and vines which naturally grow near water can be planted any time of the year.

- Mid-October through February is the best time because of cooler temperatures.

Southern California Mountain Areas

Planting season varies considerably.

- A hot south-facing slope is significantly different from a north-facing slope – regardless of elevation. In general, in our higher mountain communities (where the ground consistently freezes for weeks or months each winter – typically above 4000 to 5000 feet elevation) planting should be done soon after the last killing frost. This allows new plants the longest period of time to get established before the winter.
- The combination of intense sunlight, drying winds, and well-drained soils are challenges to the establishment of mountain gardens. To cope with these conditions, young plants often require temporary shading and frequent watering.
- Planting in the mountains is a matter of experimenting and observing other gardeners' successes and failures. Planting local natives – those found on or very near your property – will most likely be successful.

Southern California Desert Areas

The planting season is similar to that of low elevation gardens: plant in the fall months at the beginning of the rainy season.

- New plantings in these challenging environments will require careful tending to get established.

Annual Seeds

Plant in two to three month intervals.

- Sow seeds every two to three months from August/September through April.
- Seeds sown in late summer, early fall or late spring may require supplemental water.

Nursery Timeline

Tree, shrubs and subshrubs

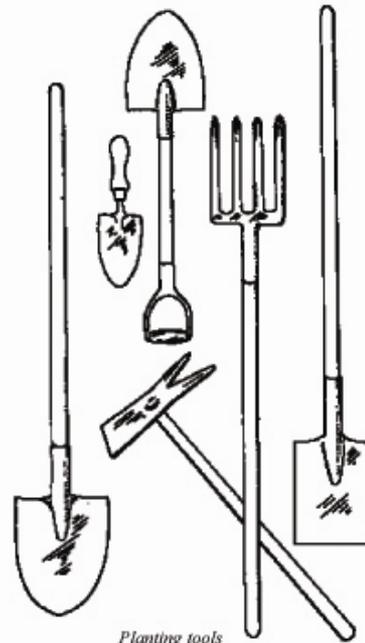
May be ready for planting in three months to three years.

Perennials

May need one month to a year in the nursery before planting.

Annuals

When grown from seed, will be ready for planting within a month to two months of germinating.



Planting tools

PLANT CARE

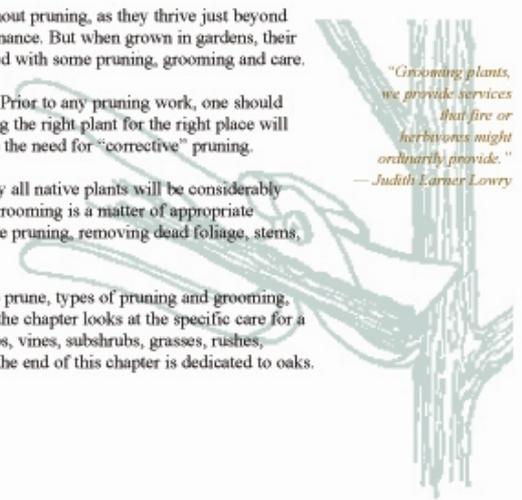
Pruning, Grooming & Maintenance of Native Plants

All California native plants may be grown without pruning, as they thrive just beyond our backyards with no special care or maintenance. But when grown in gardens, their performance and appearance may be enhanced with some pruning, grooming and care.

Often it is not necessary to prune most native plants. Prior to any pruning work, one should always ask, "Does this plant need pruning?" Choosing the right plant for the right place will minimize the need for pruning, but will not eliminate the need for "corrective" pruning.

Grooming is another matter. The appearance of nearly all native plants will be considerably improved when properly cared for and maintained. Grooming is a matter of appropriate horticultural care – watering, dead-heading, corrective pruning, removing dead foliage, stems, and branches, and rinsing off dirt, dust, and debris.

The following chapter covers when, why, and how to prune, types of pruning and grooming, and the use of specific tools and equipment. Finally, the chapter looks at the specific care for a select group of natives including types of trees, shrubs, vines, subshrubs, grasses, rushes, sedges, succulents, and annuals. A special section at the end of this chapter is dedicated to oaks.



*"Grooming plants,
we provide services
that fire or
herbivores might
ordinarily provide."*

— Judith Larner Lowry

CUIDADO DE PLANTAS

Poda, Arreglo y Mantenimiento of Plantas Nativas

Todas las plantas nativas de California pueden ser cultivadas sin que se poden, de la misma manera en que crecen naturalmente en nuestros traspatios sin ningún cuidado especial o mantenimiento. Sin embargo, cuando crecen en nuestro jardín, su desarrollo y apariencia se puede mejorar mediante la poda, arreglo y cuidados adecuados.

*"Al acicalar plantas,
estamos facilitando los
servicios que
normalmente
facilitarán el fuego y
los herbívoros."*

— Judith Larner Lowry

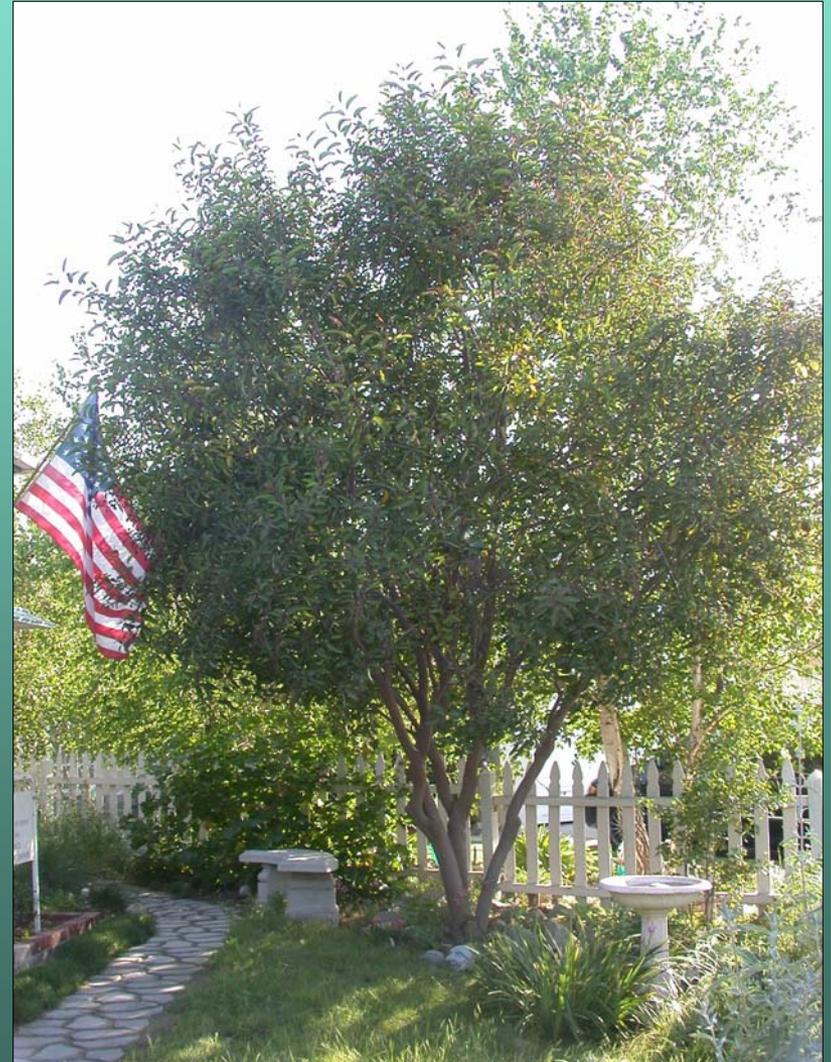
Regularmente no es necesario podar a la mayoría de nuestras plantas nativas. Antes de iniciar la poda uno siempre debería preguntarse ¿es necesario podarla? Escoger la planta adecuada para el lugar adecuado minimiza la necesidad de podarlas, aunque no elimina la necesidad de podas correctivas.

El arreglo es otro aspecto. La apariencia de casi todas las plantas nativas se mejorará considerablemente cuando se le cuide y mantenga apropiadamente. El arreglo se refiere a un cuidado apropiado en términos de horticultura regado, remover las partes muertas, poda correctiva, remoción del follaje, tallos y ramas muertas, y aseo de la planta.

El siguiente capítulo describe cuando, porqué y como podar, tipos de poda y arreglo de la planta, así como el uso de equipo y herramientas específicas. Finalmente, este capítulo se refiere al cuidado específico de un grupo selecto de plantas nativas que incluyen árboles, arbustos, enredaderas, pastos, juncos, suculentas y anuales. Al final de este capítulo, se hace una mención especial de los encinos.

Plant Care p. 67

- Pruning terms
- Tools & equipment
- Types of pruning and grooming (illustrations)
- Pruning by plant type (photos)
- Special section for oaks



Tools and Equipment

To ensure successful pruning, grooming and care, **ALWAYS** use the following guidelines:

- Use the correct tools when pruning.
- Follow appropriate safety procedures when using or operating pruning equipment.
- Sterilize your cutting blades between each cut to prevent the spread of fungal, bacterial or viral pathogens. (See sidebar.)
- Thoroughly clean tools after use and store them in a clean, dry location.
- Sharpen tools regularly.
- Oil cutting blades to avoid rust.

STERILIZING SOLUTION

- Mix 9 parts water with 1 part bleach.
- Pour solution into a clearly labeled bucket or spray bottle.
- Dip the cutting blades into the bucket or thoroughly spray them, after each cut.

If the bleach/water mix is not available, lysol or rubbing alcohol may be used.

Hand Shears

A short-handled tool used to cut stems and branches.

- There are two primary types: drop-forged and anvil. Drop-forged are preferred for their clean cuts.
- Use hand shears for branches $\frac{1}{2}$ " in diameter or smaller.

Loppers

A long-handled tool used to cut larger branches.

- Use loppers for branches no larger than $\frac{3}{4}$ " in diameter.

Hedging Shears

A long-bladed tool used to trim hedges.

- Electric or gas-powered versions are also available.

Pruning Saw

A curved-blade tool used to cut branches larger than $\frac{3}{4}$ " in diameter.

- Tool is available in various lengths.

String Line Trimmer

An electric or gas-powered tool used to mow, edge, or dead-head annuals, perennials, and some shrubs.

Pole Pruner

A long-poled tool used to cut otherwise unreachable branches.

- Be aware of all utility wires before you start cutting. Do not use this tool near electrical wires.

Chain Saw

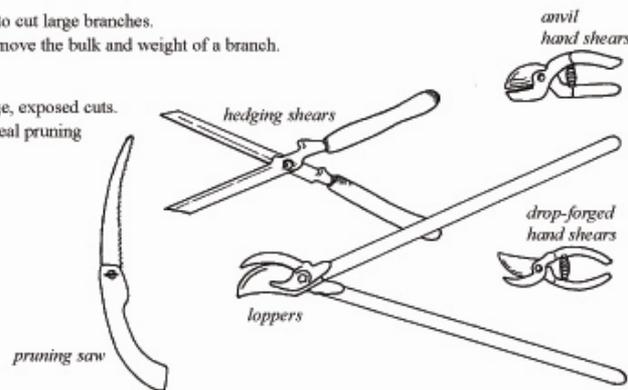
An electric or gas-powered tool used to cut large branches.

- Used to make the initial cuts to remove the bulk and weight of a branch.

Sealing Compound

A compound used to seal areas of large, exposed cuts.

- It is *not* necessary or desirable to seal pruning wounds with a sealing compound.

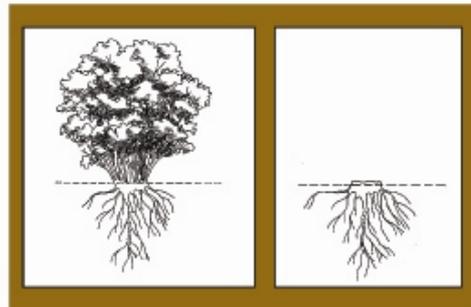




Pollarding

The pruning back of all shoots to the same point every year.

- Pollarding is typically done to deciduous trees. The only natives likely to use pollarding would be California sycamore (*Platanus racemosa*) and velvet ash (*Fraxinus velutina*).
- After pollarding, the tree produces abnormally thickened, club-like branches. Each spring a profusion of straight shoots (watersprouts) emerge and create shade from a low, dense canopy.
- The lopping off of large tree branches to avoid power lines, roof tops, etc. is *NOT* pollarding. A properly pollarded tree is the result of skilled pruning.



Coppicing

The cutting of a woody plant or tree to the ground or to 6" or less stubs.

- This method is used to reinvigorate an older plant, or to produce an abundance of vigorous upright shoots.
- The following are plants that may accept coppicing: western redbud (*Cercis occidentalis*), American dogwood (*Cornus sericea*), chamise (*Adenostoma fasciculatum*), redshanks (*Adenostoma sparsifolium*), basket bush (*Rhus trilobata*), willows (*Salix* spp.), cottonwoods (*Populus* spp.), green bark ceanothus (*Ceanothus spinosus*), jojoba (*Simmondsia chinensis*), and Eastwood manzanita (*Arctostaphylos glandulosa*).

Cottonwood *Populus* spp.

Pruning season: Winter months. Prune especially vigorous shoots back in June or July to reduce height and bulk. Fast-growing tree.

- Critical: avoid planting root-bound plants.
- Trees grow very quickly and can easily overgrow their root system and tip over. Stake young trees securely.
- Roots will invade water and sewer systems.

Valley Oak *Quercus lobata*

Pruning season: Winter months. Best pruned when tree is dormant.

Large tree, often regarded as the largest of all oaks. In the wild, valley oaks inhabit areas with deep fertile soils and their roots tap into the ground water table.

- Young trees with multiple leaders should have all but one removed or headed back. Otherwise requires very little pruning.
- In most situations, allow fallen leaves to be left as a natural mulch.

Before pruning*Removing one of the leaders**After pruning***Willow** *Salix* spp.

Pruning season: Winter months. Prune especially vigorous shoots back in June or July to reduce height and bulk. Fast-growing trees or shrubs.

- It is critically important to avoid planting rootbound plants.
- Trees grow very quickly and can easily overgrow their root system and tip over. Stake young trees securely.
- Roots will invade water and sewer systems.

Mexican Elderberry *Sambucus mexicana*

Pruning season: Winter months.

Can be difficult to prune effectively, as most specimens prefer to grow as large shrubs producing numerous basal watersprouts. Basal watersprouts should be removed as soon as they are noted if a single-trunked tree is desired.

- Plants have weak wood.

CONIFEROUS

- Our native conifers can be pruned at nearly any time of the year.
- Pruning to control the size should be done after the new growth has emerged and has begun to harden off.
- Structural problems such as multiple leaders or crossing branches, should be pruned in the fall or early winter, prior to the production of new growth.
- Conifers should never be pruned back into old wood, as they generally will not resprout.
- When foliage from another plant touches or shades a conifer, the conifer's foliage and branches die back and rarely, if ever, recover (even if the other plant is removed or pruned back). Conifers need unobstructed space around them. Some will tolerate shading from taller plants, structures, etc., as long as the conifer's foliage and branches are not actually touching them.

There are exceptions to heavy pruning. Most of the plants with very narrow, bunched leaves and thicker, woodier stems Hurricane Point California fuchsia (*Zauschneria* 'Hurricane Point') and El Tigre California fuchsia (*Zauschneria* 'El Tigre') are best grown with light pinching and pruning as needed.

- Taller California fuchsias: Catalina California fuchsia (*Zauschneria* 'Catalina'), Route 66 California fuchsia (*Zauschneria* 'Route 66'), should be pinched or lightly sheared at least once during late spring. Depending upon how vigorously the plant is growing, pinching may be done several times while light shearing is necessary only once. This will produce more side shoots that will cause the plant to hold itself together better when it produces a heavy load of late summer and fall blossoms. Unpinched or unsheared tall plants will look fine until their profuse blooms weigh down the branches and the plants open up and reveal an interior abundance of dried leaves or bare stems.
- California fuchsia spreads by seeds or underground shoots. It can be difficult to tell which emerging shoots are unwanted seedlings and which are new vegetative shoots from the plant. Proceed cautiously! Sometimes the foliage of new vegetative shoots can appear different from the "adult" foliage. Careful observation over time will help determine what is desirable new growth and what is an unwanted seedling. Seedlings that are not wanted should be completely taken out as soon as they appear or they may reemerge at a later time from underground roots and stems. California fuchsia seeds are produced in abundance as the plant ends its bloom cycle in time for fall and winter rains. The seeds are small and have white hairs that enable them to float about on the wind. To avoid seed production, remove the flowering stems before the first seed pods ripen (California fuchsias bloom from the bottom to the top, so plants with taller inflorescences may still be in bloom at the top when the first seed pods at the bottom are opening). Or, if the plant is still blooming into late fall and early winter, give the plant its annual hard cutting back at this time.
- Insect pests can some times be a problem for California fuchsias. Leafhoppers suck on leaves and tender stems leaving them dry. Severe infestations will require chemical intervention or the plants will die. Oil sprays may prevent smaller outbreaks. Caterpillars of white-lined sphinx moths or those of tomato horn worms may become a problem. Hand picking these larvae shortly after dark is suggested for light infestations. Heavy outbreaks may be brought under control by using *Bacillus thuringiensis* following the manufacturer's instructions.



before



after

Annual hard heading back of California fuchsia

Perennials

Flower over the course of several to many years.

Many varieties are evergreen.

Look best when massed in groups of 10 or more.

Coral Bells *Heuchera* species, hybrids, and cultivars

Pruning season: Late fall.

Long-lived plants with large- and small-sized types.

- Small plants require only deadheading.
- The big plants produce large, lush rosettes of green to pale green leaves, supported on tall stems that reach up to an inch in diameter. Cut the tall stems back hard (either individually or with a string trimmer). If the cut-back plantings are old and declining, fertilize at the same time, at a rate of $\frac{1}{4}$ to $\frac{1}{2}$ the label recommendation. Plants that are pruned and fertilized will recover and bloom well the following spring. These larger coral bells need to be dead-headed, also. Some, such as 'Genevieve' and 'Wendy' may rebloom.



Pests

p. 135, 209

- Pest tables
by plant genus
by symptom
- UC Davis Pest Notes

PESTS

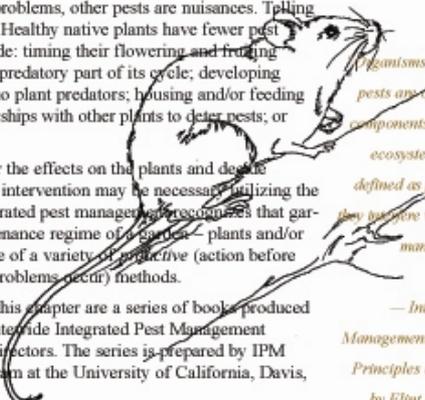
Native Plant Pests – Symptoms and Management Methods

Every garden has pests. Some pests are major problems, other pests are nuisances. Telling one from the other takes most of this chapter. Healthy native plants have fewer pest problems than most ornamentals. These include: timing their flowering and fruiting cycles to be completed before the pest is in the most predatory part of its cycle; developing chemicals in their leaves that are toxic or distasteful to plant predators; housing and/or feeding predators that feed on the plant pests; forming partnerships with other plants to deter pests; or crown sprouting if shoots are lost.

When pests do occur in native plant gardens, monitor the effects on the plants and decide whether the plants' defenses are adequate or whether intervention may be necessary utilizing the management methods described in this chapter. Integrated pest management recognizes that garden pests are organisms that interfere with the maintenance regime of a garden – plants and/or soils – and that the health of a garden requires the use of a variety of *proactive* (action before pest problems occur) and *reactive* (action after pest problems occur) methods.

The sources of most of the information presented in this chapter are a series of books produced under the auspices of the University of California Statewide Integrated Pest Management Program, R. Roush, J. M. Lyons, and F. G. Zalom, Directors. The series is prepared by IPM Education and published by the Statewide IPM Program at the University of California, Davis, Mary Louise Flint, Director.

This chapter identifies native plant pests, lists signs of injury or disease caused by each pest, and suggests various management options. See Appendices for table of Some Pests of Native Plants.



Organisms that become pests are often integral components of managed ecosystems. They are defined as pests because they interfere with people's management of a resource."

— Integrated Pest Management in Practice, Principles and Methods by Flint and Gouveia

PLAGAS

Plagas de las plantas nativas – Síntomas y métodos de mantenimiento

"Por lo general, los organismos que catalogamos como plagas son componentes integrales de los ecosistemas controlados. Se les identifica como plagas porque interfieren en el manejo que el ser humano hace de algún recurso."

— Integrated Pest Management in Practice, Principles and Methods by Flint and Gouveia

Las plantas nativas tienen diferentes formas para defenderse de las plagas. Algunas de ellas son: el control de la duración del ciclo de floración y de producción del fruto, de manera que éste haya sido completado antes de que la plaga se encuentre en la etapa más depredadora de su ciclo; la aplicación de productos químicos tóxicos o de sabor desagradable en las hojas de la planta para ahuyentar a los depredadores; el fomento de la alimentación a depredadores de las plagas de la planta; la creación de alianzas con plantas de la misma o de diferente especie, hongos, insectos, artrópodos, etc. para detener la infestación y la aparición de protuberancias o raíces, si la planta está demasiado dañada.

Cuando los jardines de plantas nativas ya están infestados, monitorea los efectos que han sufrido las plantas y decida si las defensas propias de la planta son suficientes o si se requiere la intervención de los métodos que se describen en este capítulo. El manejo integrado de plagas reconoce que las plagas en los jardines son organismos que interfieren con el régimen de mantenimiento del mismo – plantas y/o suelos – y que la salud de un jardín requiere el uso de una variedad de métodos *proactivos* (acción tomada antes de que ocurra el problema) y *reactivos* (acción tomada después de que ya existe el problema).

Las fuentes de la mayoría de la información presentada en este capítulo son una serie de libros producidos bajo la ayuda del University of California Statewide Integrated Pest Management Program, de los directores R. Roush, J. M. Lyons, y F. G. Zalom. La serie será preparada por IPM Education y publicada por the Statewide IPM Program at the University of California, Davis, Mary Louise Flint, Director.

Este capítulo identifica a las plagas de las plantas nativas, enumera los signos de las heridas o enfermedades causadas por cada peste y da varias opciones o sugerencias para el manejo de estos daños. Vea el apéndice donde encontrará una tabla de algunas plagas de las plantas nativas.

Pest Management Methods

Vertebrates

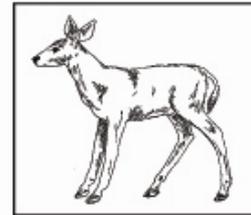
Deer, Bear, Coyotes, & Domesticated Animals

When these animals are very hungry no chemicals, soap, human hair, cougar urine, hot pepper sauce or other repellents will work.

Signs of Pest Problems	Probable Pest
Buds, flowers, fruit eaten	Deer, bear, coyotes raccoons, opossums, domestic animals
Plants eaten down to ground	Deer, domestic animals such as sheep, goats, cows, horses
Browse lines on tree canopies	Deer, domestic animals such as sheep, goats, cows, horses
Plants pulled out of ground	Bear, raccoons, domestic animals such as dogs

Management Methods

- Build an 8-foot high chainlink or metal fence around the garden with support posts firmly anchored in cement at least 2 feet into the ground. Coyotes are able to climb chainlink fencing. The fencing material should be extended at least 1 foot under ground to frustrate digging efforts by these animals. If an ornamental steel fence is built, vertical bars must be no more than 3 inches apart to keep out fawns, coyotes and most dogs. For adult deer a 5-foot tall electric fence with horizontal strands less than 8 inches apart for first forty inches and 10 inches apart for last 2 feet.
- Other fences to keep out deer include double fencing with an outer fence 4- to 5-feet tall separated by a 3 to 5 foot open space from an inner fence 8-feet tall, and on flat land, a 7-foot chainlink fence slanting outward (at 45°) and well secured into the ground.
- Use as little irrigation as possible to reduce water content of leaves. Pick all fruit from plants before it is completely ripe. Do not leave any food outside.
- Use strong-smelling plants, i.e. sages (*Salvia* spp.), onions (*Allium* spp.), gnaphaliums (*Gnaphalium* spp.) around plants to deter browsing by deer. Black plastic bird netting spread over flowering bushes will protect covered flowers from deer.



Deer

Moles, Voles, Gophers

Predators of these animals should be encouraged and the habits of the pests discouraged when designing the garden. Predators of moles, voles and gophers include owls, hawks, felines, canines, and reptiles.

Signs of Pest Problems	Probable Pest
Tunneling or digging around plants	Gophers, moles, voles
Broken or sliced stems, missing roots	Gophers
Gnawed stems, girdled woody stems	Voiles
Missing earthworms, gnawed bulbs & roots	Moles
Chewed black plastic irrigation pipe	Gophers
Cropped grasses and seedlings	Voiles

Management Methods

- A 6-foot fence anchored 1-foot into the ground with hardware-cloth extending 2-feet underground and 2-feet above ground will deter tunneling and entry.
- Clear 15 feet around the garden or around young trees to remove hiding places.
- Protect the trunks of young trees with 2-foot tall hardware-cloth wrapped around the lower trunk with the hardware cloth anchored in the soil at the base of the trunk.



Mole

APPENDICES

Appendix A Some Native Plant Pests *Algunas plagas de las plantas nativas*

Adapted from Pests of Landscape and Garden, 2nd Edition, S. Dreistadt & M. L. Flint 2004, ANR Publication 3359, Statewide IPM Program, University of California and other sources.

Plant Name Nombre De la Planta Common Name Nombre Común	Invertebrates Invertebrados	Diseases Enfermedades	Environmental Disorders Trastornos Ambientales	Parasitic Plants Plantas Parásito
<i>Aesculus californica</i> California Buckeye	Foliage Miner Omnivorous looper	Yellow Leaf Blister <i>Taphrina aesculi</i> Powdery Mildew <i>Phyllactinia guttata</i> Sudden Oak Death <i>Phytophthora ramorum</i>	Poor Water Management <i>Manejo Inadecuado de la Irrigación</i>	Mistletoe Broadleaf Mistletoe (<i>Phorodendron</i> spp.)
<i>Arctostaphylos</i> spp. Manzanitas	Aphids Woolly aphid, <i>Wahlgreniella nervata</i> <i>Tamalia coweni</i> Flatheaded Borers <i>Agrius</i> spp. Foliage Miners Madrone shield bearer Foliage-feeding Caterpillars Tent caterpillar, Western tussock moth Mealybugs Pseudococcidae Scales Soft scale (Brown scale) Armored scales (Greedy scale, Manzanita scale, Oleander scale) Whiteflies Aleyrodidae	Canker Madrone twig blight (<i>Botryosphaeria ribes</i>) Leaf Gall Kinnikinnick (<i>Exobasidium vaccinii</i>) Rots Crown rot - water mold, <i>Phytophthora cinnamomi</i>	Poor Water Management <i>Manejo Inadecuado de la Irrigación</i>	
<i>Artemisia</i> spp. Mugwort, Sagebrush	Aphids <i>Aphis</i> spp. Foliage Miner Leaf beetle (<i>Trichobius flavolimbata</i> , <i>T. pilosa</i>) Gall Mite Eriophyid gall mites (<i>Aceria</i> spp.)	Rots Crown and root rots (<i>Phytophthora</i> spp.) Rusts <i>Puccinia</i> spp.	Poor Water Management <i>Manejo Inadecuado de la Irrigación</i>	

Pests – NOT!



Weeds p. 177



- Weed control methods
- Common weeds & management
- Cal-IPC website

WEEDS

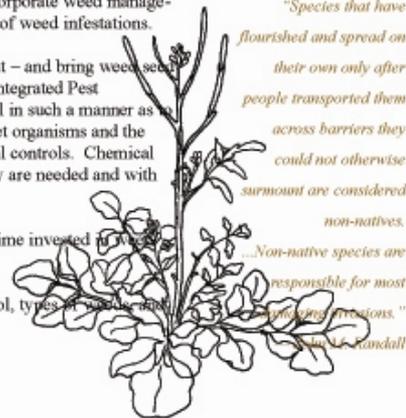
Prevention & Management of Unwanted Plants

Integrated Pest Management programs define a weed as “a plant growing where it is not wanted.” For those “unwanted plants” the best practice is to incorporate weed management as part of the planning process, and reduce the magnitude of weed infestations.

Since birds, other wildlife, wind, and rain are part of a garden habitat – and bring weed seeds with them – it is inevitable that weeds will have to be confronted. Integrated Pest Management for weeds implies utilizing all methods of weed control in such a manner as to achieve optimum control with the least negative impact on non-target organisms and the environment. These methods include physical, cultural and chemical controls. Chemical controls – herbicides – are used only after monitoring indicates they are needed and with the goal of removing only the target plant.

Remember, all weeds are easier to control as small seedlings. The time invested in this work pays off in the long term health of your garden.

This chapter includes weed management both prevention and control, types of weeds, and common weed management strategies for specific garden weeds.



“Species that have flourished and spread on their own only after people transported them across barriers they could not otherwise surmount are considered non-natives. ...Non-native species are responsible for most damaging invasions.”
—John M. Randall

MALEZAS

Prevención y mantenimiento de plantas “indeseables”

“Especies que han crecido y propagado por su propio medio después de que la gente los transportó a través de barreras naturales que de otra manera no podría hacerlo se consideran plantas no nativas. Las especies no nativas son responsables por la mayoría de las invasiones dañinas.”
— John M. Randall

Programas integrales de mantenimiento de plagas definen a la maleza como “una planta que crece en un sitio no deseado.” Para controlar estas “plantas indeseables” lo mejor es incorporar un mantenimiento de malezas como parte del proceso de siembra y reducir la magnitud de la infección con malezas.

Ya que los pájaros, otros animales silvestres, viento y lluvia son parte del hábitat del jardín – y acarrean semillas de malezas – es inevitable que tendrá que enfrentarse a las malezas. Un programa integral de mantenimiento de malezas implica utilizar todos los métodos de control de malezas de tal manera que se optimice el control con el menor impacto negativo posible para los otros organismos y el medio ambiente. Estos métodos incluyen controles físicos, culturales y químicos. Los controles químicos – herbicidas – se usan únicamente después de que el monitoreo indica que es necesario y con la meta de eliminar únicamente la planta deseada.

Recuerde que todas las malezas son fáciles de controlar cuando apenas han empezado a crecer. El tiempo invertido en quitar las malezas será redituable a largo plazo para obtener un jardín saludable.

Este capítulo incluye control y prevención de malezas, tipos de malezas y estrategias populares de manejo de malezas para malezas específicas de jardín.

Fountain Grass *Pennisetum setaceum**Warm season grower*

Fountain grass is a showy, feathery perennial. It spreads by seed rather than by the underground stems.

Prevention

- Fountain grass is difficult to eliminate as it has long-lived seeds. Early hand removal of plants can help contain spreading.
- Clean maintenance equipment after use in contaminated areas to keep seeds from uninfested sites.

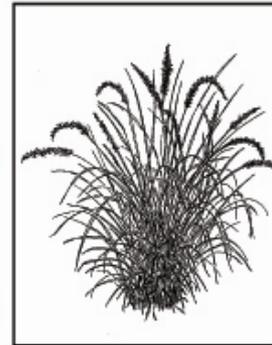
Physical Control

- The primary method of control is by hand-removing individual plants.
- Well adapted to periodic fire, fountain grass recovers quickly after fire and may increase in numbers.

Chemical Control

- Preemergent herbicides limit the germination of seeds. Check product labels for use.
- A postemergent application of non-selective herbicide either as a spot treatment or as a broadcast application may not kill established fountain grass.

Physical methods combined with chemical methods may be most effective.



Fountain grass
(*Pennisetum setaceum*)

Non-Woody Weeds**Creeping Woodsorrel** *Oxalis corniculata**All season grower*

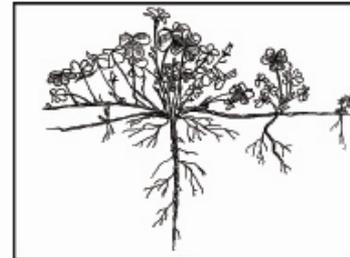
Creeping woodsorrel is a low and creeping plant that lives for several seasons. It can grow in full sun and in areas of shade that receive adequate moisture. Creeping woodsorrel forms roots along its stems where nodes contact the soil.

Physical Control

- Hand weeding is the primary method of managing both mature plants and seedlings.
- For planting beds, bury seeds or cover them with mulch to prevent germination.

Chemical Control

- Control germinating seeds through the use of preemergent herbicides.
- Waxy leaves make treatment with postemergent herbicides difficult.



Creeping woodsorrel (*Oxalis corniculata*)

Bermuda Buttercup *Oxalis pes-caprae**Cool season grower*

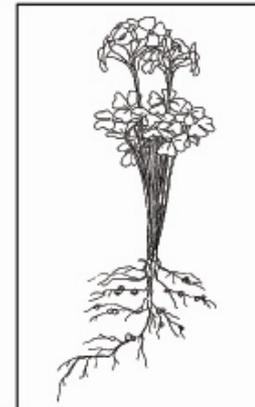
A perennial weed that grows in full sun in cool coastal areas, and semi-shaded areas inland. Grows from bulbs in fall to flowers in late winter or early spring.

Prevention

- Do not move soil from an infested site to one that is free of this weed.

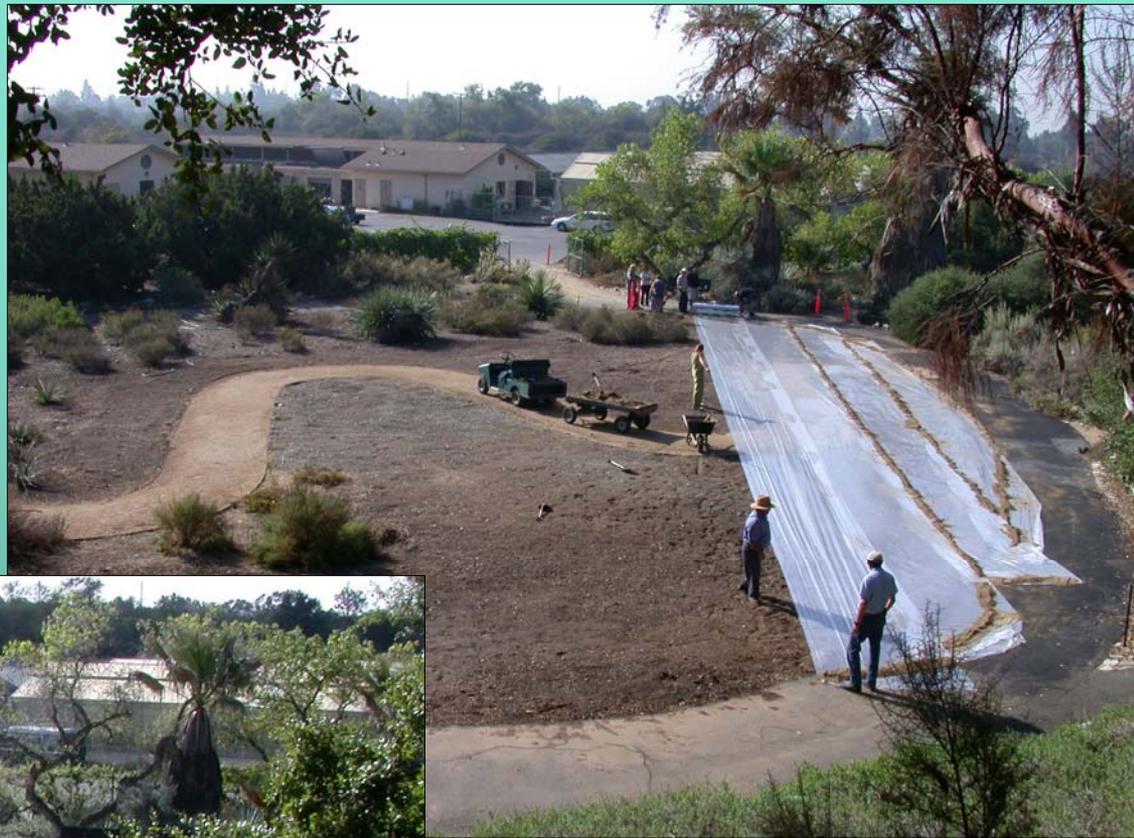
Physical Control

- Cultivating or cutting the top off will only control Bermuda buttercup but not kill it.



Bermuda buttercup (*Oxalis pes-caprae*)

Solarization



Flaming



Foaming



treatment



1 week after treatment



5 weeks after treatment

Appendix C Southern California Native Plant Nurseries

Viveros de plantas nativas en el sur de California

Always call ahead for hours and plant availability.

ALBRIGHT SEED COMPANY

(retail outlet for S&S Seeds)
487 Dawson Drive, Bay 5S
Camarillo, CA 93010
805-484-0551
www.ssseeds.com

EL NATIVO GROWERS

200 S. Peckham Road
Azusa, CA 91702
626-969-7299
www.elnativogrowers.com
Retail sales only via e-mail at:
retailsales@elnativogrowers.com

LAS PILITAS NURSERY NORTH

Star Route, Box 23X
Santa Margarita, CA 93453
805-438-5992
www.laspilitas.com

LAS PILITAS NURSERY SOUTH

8331 Nelson Way
Escondido, CA 92026
760-749-5930
www.laspilitas.com

MATILJA NURSERY

8225 Waters Road
Moorpark, CA 93021
951-780-3571
www.matiljanursery.com

MOCKINGBIRD NURSERY, INC.

8225 Jackson Street
Riverside, CA 92504
951-780-3571

NATIVE SONS WHOLESALE NURSERY

379 W. El Campo Road
Arroyo Grande, CA 93420
805-481-5996
www.nativeson.com

RANCHO SANTA ANA BOTANIC GARDEN

1500 N. College Avenue
Claremont, CA 91711
909-625-8767
www.rsabg.org
California Garden Shop plant sales all year.
spring & fall plant sales

S & S SEEDS (WHOLESALE)

P.O. Box 1275
Carpenteria, CA 93013
805-684-0436
www.ssseeds.com

SAN MARCOS GROWERS (WHOLESALE)

125 S. San Marcos Road
P.O. Box 6827
Santa Barbara, CA 93111
805-683-1561
www.smgrowers.com

SANTA BARBARA BOTANIC GARDEN

Garden Growers Nursery
1212 Mission Canyon Road
Santa Barbara, CA 93105
805-682-4726
www.sbbg.org
(spring & fall plant sales)

THEODORE PAYNE FOUNDATION

10459 Tuxford Street
Sun Valley, CA 91352
818-768-1802
www.theodorepayne.org
(spring & fall plant sales)

TREE OF LIFE NURSERY

3321 Ortega Hwy. / P.O. Box 635
San Juan Capistrano, CA 92693
949-728-0685
www.treeoflifenuresery

CALIFORNIA NATIVE PLANT SOCIETY

Sacramento office
916-447-2677
www.cnps.org

SOUTHERN CALIFORNIA CHAPTERS

Check Chapter websites for spring and/or fall plant sales

Channel Islands Chapter

www.cnpsci.org

Los Angeles/Santa Monica Mountains Chapter

www.lacnps.org

Orange County Chapter

www.ocnps.org

Riverside / San Bernardino Chapter

www.enceliaCNPS.org

San Diego Chapter

www.cnpsd.org

San Gabriel Mountains Chapter

www.cnps-sm.org

South Coast Chapter

www.sccnps.org



**Produced with financial support from
Metropolitan Water District of Southern California**



Park Maintenance Manuals?

- Even the best projects fail without maintenance
- Site-specific plan
- Summarizes project history in one place as project changes hands
- Accessible to maintenance crews
- Can be used as an education manual
- Includes all aspects of maintenance
- Details responsibilities & phone numbers
- Includes a monthly checklist



Ceanothus 'Dark Star'

Old Marengo Park

Maintenance Manual



- 1. Introduction
 - 2. Soils, planting, fertilization, and mulch
 - 3. Watering, irrigation, and stormwater
 - 4. Plant maintenance
 - 5. Weed management
 - 6. Pest management
 - 7. Hardscape, site amenities, and graffiti
 - 8. Litter management
 - 9. Green waste management
- Maintenance Monitoring Checklist

Plant Maintenance - Salvia 'Tera Seca'



- Grows to 2' high and spreads 8'
- Needs full sun
- Needs well-drained soils
- Water requirements very low especially in the summer
- Never fertilize; results in excessive growth
- Only lightly pinch and dead-head. Never cut into woody stems
- If aphids appear, warmer, drier weather will drive them off if the lady bug larvae do not get them first. Or spray them with soapy water
- Prone to mildew but condition will resolve itself when the weather gets warmer/drier

Plant Maintenance - Red Monkeyflower



- Grows 2'-3' tall and 2' -4' wide
- Prefers partial shade or will go dormant in the summer and fall
- Adaptable but prefers well-drained soils
- Hydrate with occasional summer water
- Pinch or tip young plants regularly to promote dense growth
- Never prune back to old wood as the plants rarely recover
- May succumb to fungal or viral assault. May show symptoms of powdery mildew due to poor water management
- Cut off flowering stems in May or early June then water to obtain a second flowering display in late summer

Plant Maintenance -

Salvia 'Bee's Bliss'



- Grows to 2' tall and spreads to 8' wide
- Needs full sun
- Needs well-drained soils
- Low water requirements especially in summer
- Never fertilize; results in excessive growth
- Rarely needs pruning; pinch back the center of the plant while it is young
- Prune in late fall/early winter as new growth begins. Never cut into woody stems
- If aphids appear, warmer, drier weather will drive them off if the ladybug larvae do not get them first.
- Prone to mildew but condition will resolve itself when the weather gets warmer/drier

Plant Maintenance - Ceanothus 'Dark Star'



- Grows to 6' high and 8'- 10' wide
- Needs full sun
- Short-lived if given too much water
- Sensitive to water molds on poorly drained soils
- Never fertilize; when grown in poor soil, develops nodules of nitrogen-fixing bacteria in roots
- Spring; tip or pinch lightly after flowering in late winter
- Never cut into any growth that is larger around than a pencil

					Maintenance Checklist & Schedule					
Task	January	February	March	April	May	June	July	August	September	
Soil testing										
Fertilization	no	never	not	no	never	not	no	never	not	
Mulch replacement		check/add				check/add				
Irrigation equipment	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	
Soil moisture monitoring	as	needed	as	needed	as	needed	as	needed	as	
Backflow preventet certification	X									
Tree maintenance	check guy wires	check guy wires	check guy wires	check guy wires	check guy wires	check guy wires	check guy wires	check guy wires	check guy wires	
<i>Quercus agrifolia</i>							prune if needed	prune if needed	prune if needed	
<i>Quercus engelmannii</i>							prune if needed	prune if needed	prune if needed	
<i>Cercis occidentalis</i>		prune if needed	prune if needed							
Shrubs and perennials										
<i>Ceanothus 'Dark Star'</i>		prune/pinch back	prune/pinch back							
<i>Eriogonum grande rubescens</i>						dead head	dead head	dead head	dead head	
<i>Lessingia 'Silver Carpet'</i>										
<i>Mimulus aurantiacus</i>		pinch back lightly		pinch back lightly	prune flwr stems					
<i>Muhlenbergia capillaris</i>					prune if needed					
<i>Penstemon heterophyllus</i>							cut back hard			
<i>Penstemon spectabilis</i>							cut back hard			
<i>Ribes aureum</i>				prune						
<i>Salvia 'Bee's Bliss'</i>										
<i>Salvia clevelandii</i>	prune									
<i>Salvia mellifera 'Tera Seca'</i>	prune									
<i>Salvia spathacea</i>			dead head ?	dead head ?	dead head ?	dead head ?				
<i>Trichostema lanatum</i>	dead head ?	dead head ?	dead head ?	dead head ?	dead head ?	dead head ?	dead head ?	dead head ?	dead head ?	
<i>Zauschneria californica</i>	prune	prune			remove seedlings		remove seedlings			
Annuals										
<i>Eschscholzia californica</i>						pull by hand	pull by hand			
<i>Nemophila menziesii</i>						pull by hand	pull by hand			
Plant replacement	plant									
Weed management										
hand pulling	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	
oil sprays	as	needed	as	needed	as	needed	as	needed	as	
Pest management										
Vertebrates (rodents, etc.)	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	
Invertebrates (ants, slugs)	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	
Disease, fungi, etc.	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	
Hardscape management	as	needed	as	needed	as	needed	as	needed	as	
Graffiti	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	
Litter management	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	
Greenwaste management	as	needed	as	needed	as	needed	as	needed	as	

www.lasgrwc.org



- Plant Profiler – information for landscape designers (www.theplantprofiler.com)
- Link to Landscaping Guidelines for the LAR
- Alternatives List - common natives instead of . . .
- Maintenance Manual – site specific manual



Questions?