Pros and Cons of Eucalyptus Stands on the Landscape

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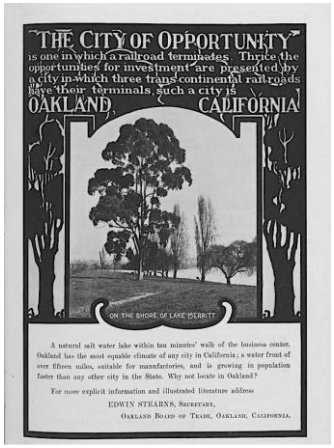
Objectives

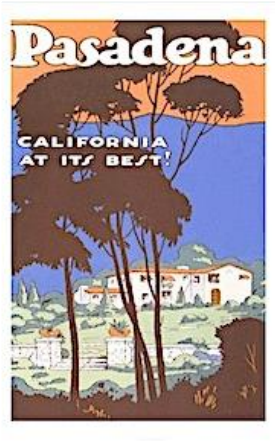
1. Briefly review the history of Eucalyptus in California
2. Discuss the pros and cons of eucalyptus on the landscape
3. Suggestions on how to proceed

Planting Eucalyptus in California

Farmland Improvement

City Improvement





Firewood

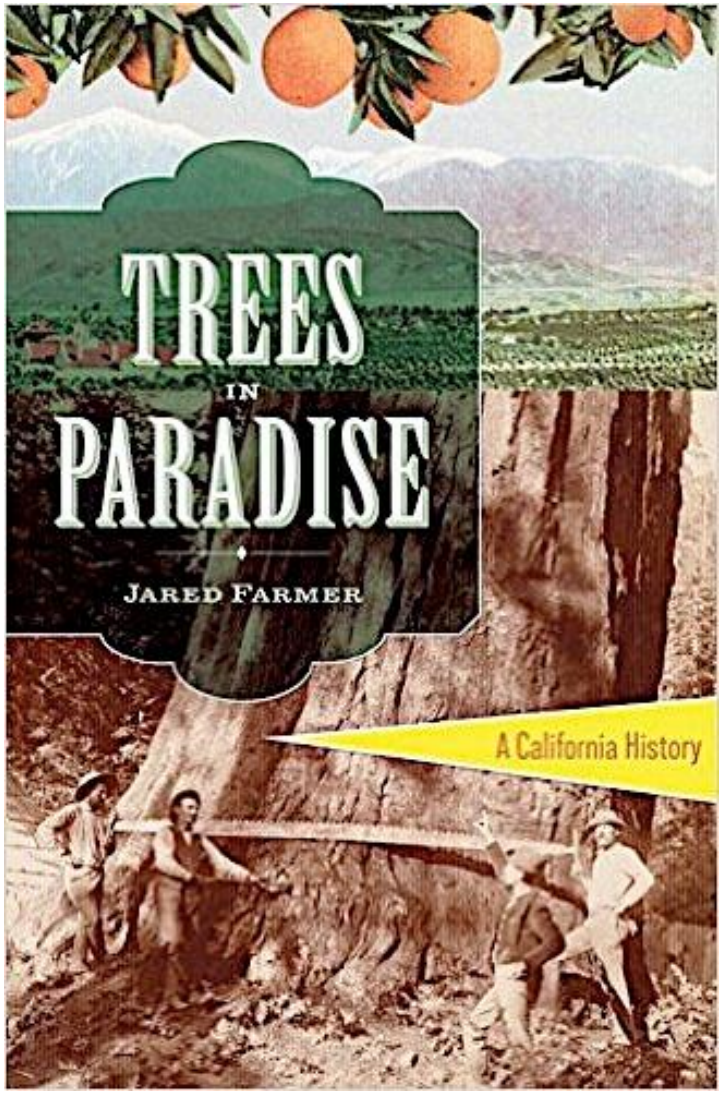
Malaria Control

Forest Products

Eucalyptus Plantations

Plantation Near Capitola, CA

Eucalyptus Plantations in the CCNRA



Pros and Cons
of Eucalyptus

Pros and Cons of Eucalyptus

Pros

Recreation
Landscape Aesthetics
Wildlife Habitat
Role in the Regional Landscape
Novel Ecosystem

Cons

Fire Hazard
Tree Fall Hazard
Invasive Species
Allelopathic Effects
Public Attitude

Recreation

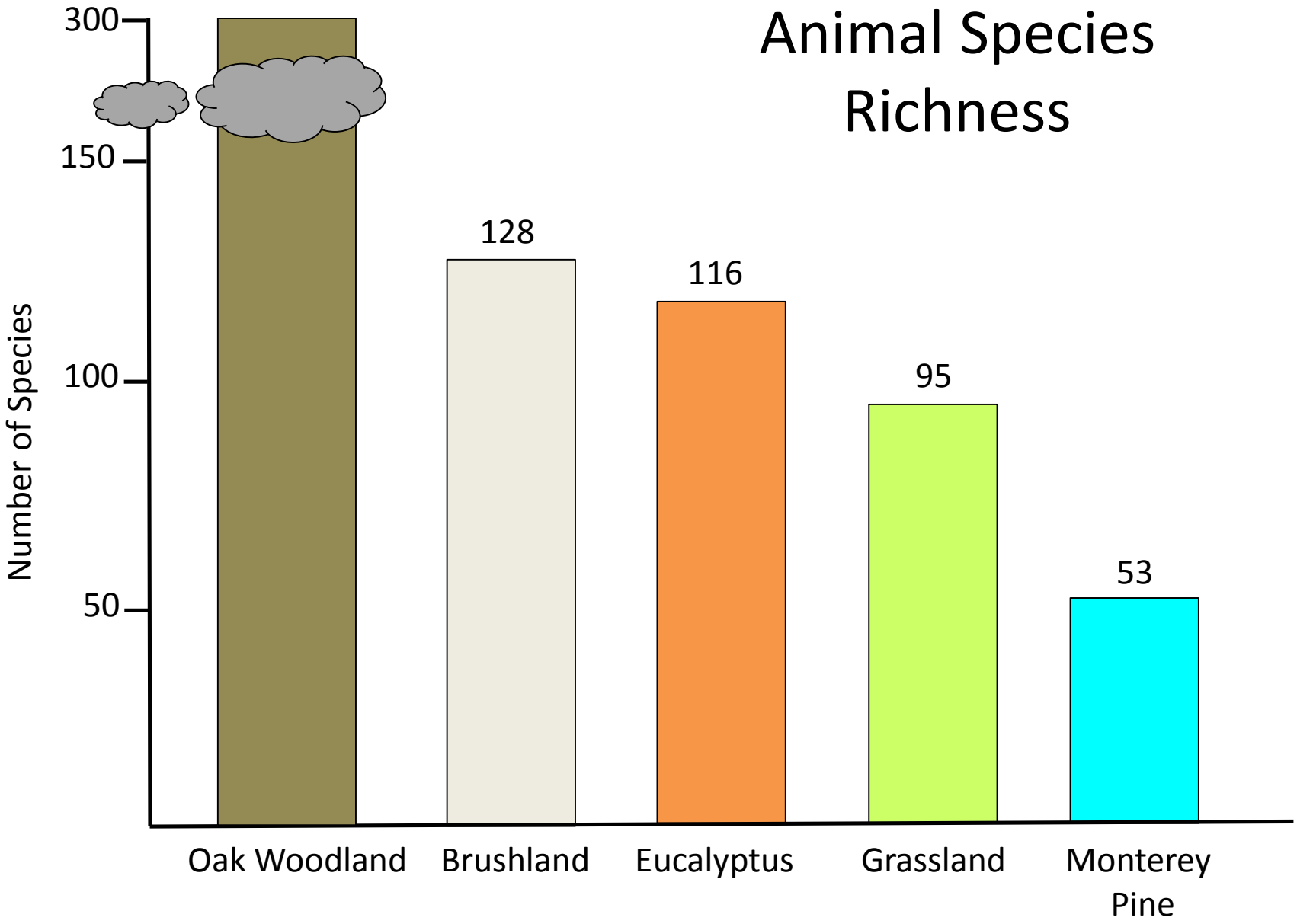
Landscape Aesthetics

Franz Bischoff ca. 1920

Wildlife Habitat



Animal Species Richness



(*from:* Stebbins, 1978)

Birds making “Great” use of Eucalyptus Stands

Mourning Dove

Great Horned Owl

Steller Jay

Yellow-bellied Sapsucker

Allen Hummingbird

Olive-sided Flycatcher

Brown Creeper

Dark-eyed Junco

Audubon Warbler

Reptiles and Amphibians making “Great” use of Eucalyptus Stands

Southern Alligator Lizard

Slender Salamander

Small Mammal Use of Eucalyptus Stands

(Tilden Park, 1990)

	Number of Animals Captured*	
Vegetation Type	Deer Mouse	California Meadow Mouse
Eucalyptus	35	0
Grassland	3	1

(*200 trap nights)

Deer Mouse
(Peromyscus maniculatus)

California Meadow Mouse
(Microtus californicus)

Mt. Sutro Eucalyptus Stand

Number of Species	
Birds	100
Mammals	15
Reptiles	6
Amphibians	3

(Nature in the City, 2010)

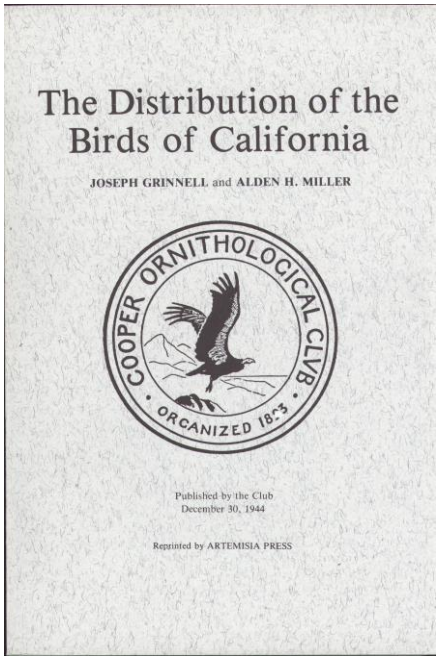
Role in the Regional Landscape

Anna's Hummingbird

Eucalyptus

Monarch Butterfly

Overwintering of Anna's Hummingbirds



Monarch Butterfly Migration

Eucalyptus and Monarch Butterflies

Site	County	Number	Tree
Presidio Park	San Diego	900	Eucalyptus
UCSD	" "	4,500	Eucalyptus
Hosp Grove	" "	900	Eucalyptus
Doheny Grove	Orange	1,000	Not specified
Huntington Central Park	" "	3,500	Eucalyptus
Norma Gibbs Park	" "	700	Not specified
Leo Carrillo State Beach	Los Angeles	800	Eucalyptus
Camino Real Park	Ventura	10,000	Eucalyptus
Harbor Boulevard	" "	23,000	Eucalyptus
Ellwood Main	Santa Barbara	85,000	Not specified
Tecolote Canyon	" " "	22,000	Eucalyptus
Refugio State Beach	" " "	2,500	Palm & Eucalyptus
Oceano Campground	San Luis Obispo	20,000	Monterey cypress
Pismo State Beach	" " "	110,000	Not specified
Los Osos, Sweet Springs	" " "	8,000	Not specified
Andrew Molera State Park	Monterey	10,000	Eucalyptus
Pacific Grove	" "	45,000	Monterey pine
Lighthouse Field State Beach	Santa Cruz	50,000	Monterey cypress & Eucalyptus
Natural Bridges State Beach	" "	95,000	Not specified
New Park Mall	Alameda	500	Eucalyptus
Ardenwood Regional Reserve	" "	20,000	Eucalyptus
San Leandro Golf Course	" "	25,000	Eucalyptus
Muir Beach	Marin	4,000	Monterey cypress
Bolinas Terrace	"	18,000	Not specified
Bodega Dunes Campground	Sonoma	400	Eucalyptus & Monterey cypress

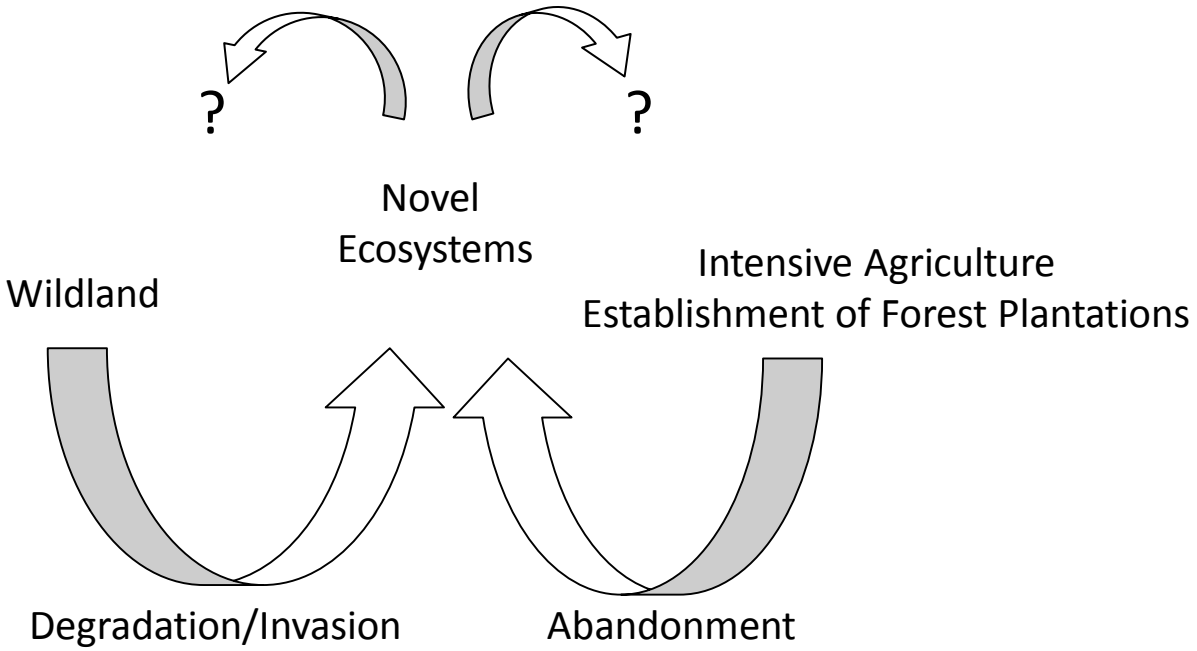
Novel Ecosystem

A self-sustaining ecosystem resulting from alteration of the landscape by humans

Characteristics

- unique assemblage of biota and environmental conditions
- change in species composition relative to ecosystems present in the same landscape prior to human alteration
- self-sustaining in terms of species composition, structure, biogeochemistry and ecosystem services
- not under human management

Development of Novel Ecosystems



from: Hobbs et al. 2006. Novel Ecosystems. Global Biology and Biogeography

Degradation/Invasion

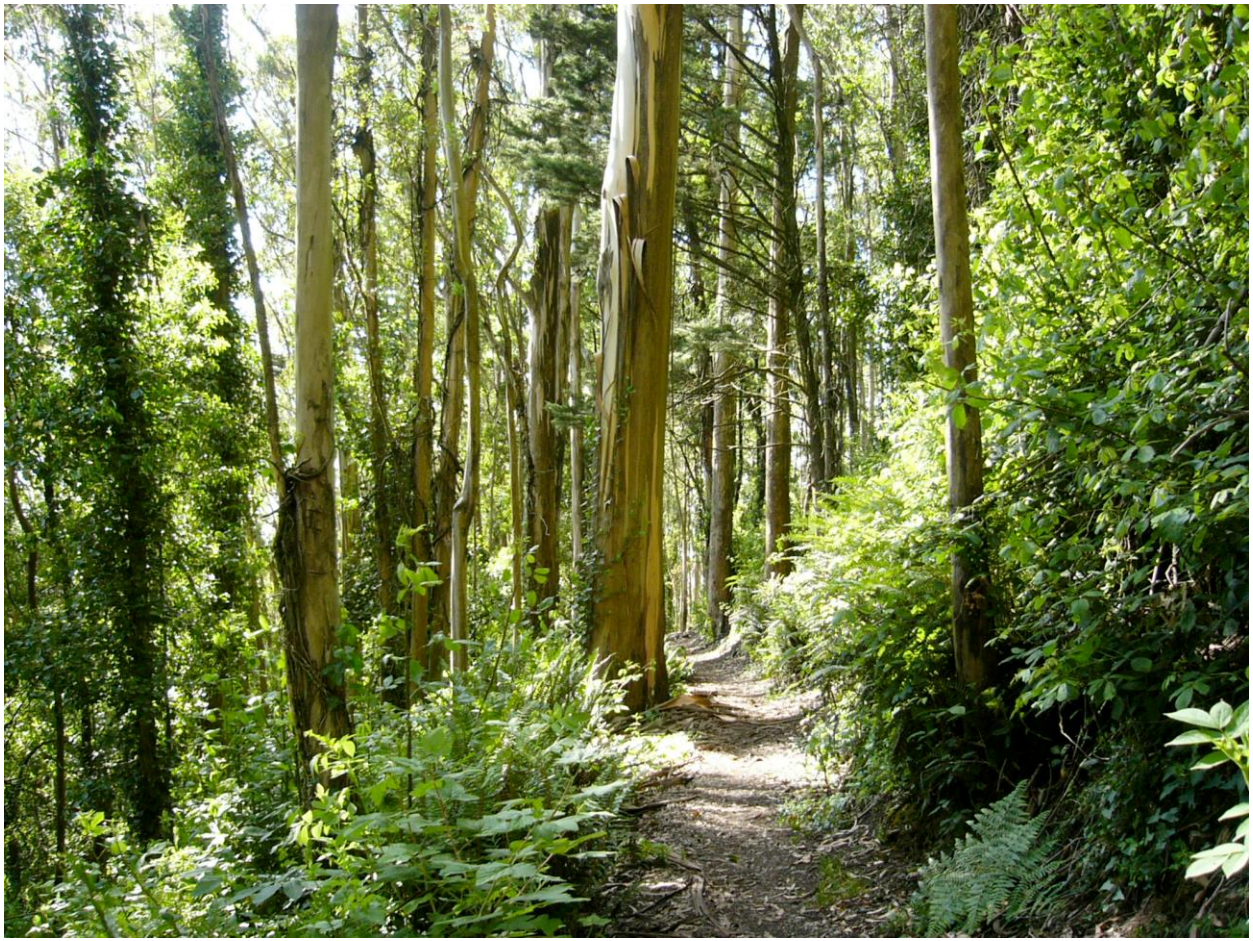
California Annual Grassland

from: ECORP Consulting, Inc.

Abandonment

Eucalyptus Plantation

Abandoned Eucalyptus Plantations = Novel Ecosystems



Mt. Sutro, San Francisco

Intrinsic Value

"Species (*novel ecosystems*) have value in themselves, a value neither conferred nor revocable, but springing from a species' (*novel ecosystem's*) long evolutionary heritage and potential" (Soule 1985).

Cons

Fire Hazard

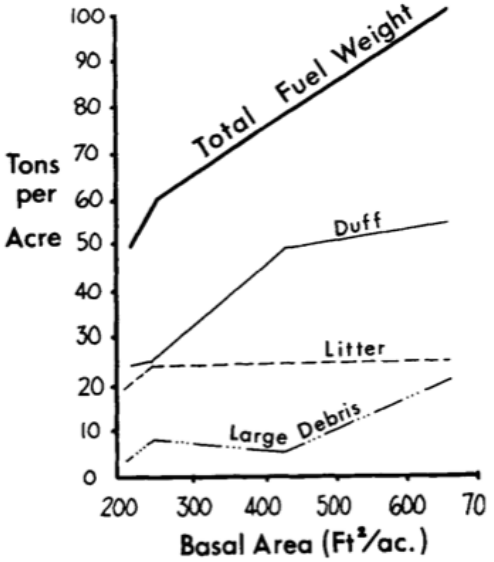
Eucalyptus Fire Hazard

EUCALYPTUS

Fuel Dynamics, and Fire Hazard in the Oakland Hills

J. K. AGEE · R. H. WAKIMOTO
E. F. DARLEY · H. H. BISWELL

GRAPH 2. RELATION OF TREE BASAL AREA TO FUEL WEIGHT



California Agriculture, September, 1973

Conflicting Views of Fire Risk

Oakland Hills Fire - 1991

Scripps Ranch Fire - 2003

BAY NATURE
AN EXPLORATION OF NATURE IN THE SAN FRANCISCO BAY AREA

From *Bay Nature* magazine October-December 2016

The Burning Question in the East Bay Hills: Eucalyptus Is Flammable Compared to What?

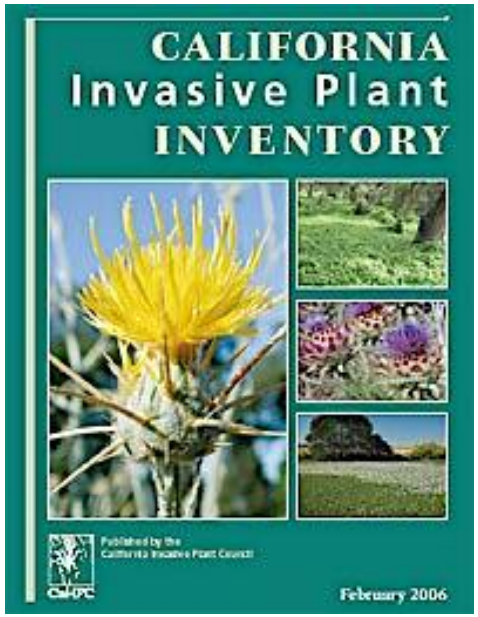
Twenty-five years after the Oakland Hills fire, people still disagree about whether blue gum eucalyptus is a fire threat in the East Bay Hills

by Zach St. George on October 18, 2016

Tree Fall Hazard

Hazard to Trails and Roads

Invasive Species



Re-evaluation of invasiveness of Eucalyptus, 2015

Eucalyptus globulus, Tasmanian blue gum, was last assessed by Cal-IPC in 2006 as part of a major initiative to update and document assessments for some 200 plant species. In 2014, Cal-IPC reassessed E. globulus. This new assessment revises scores for some criteria and results in a change in overall score from “Moderate” to “Limited.”

http://cal-ipc.org/paf/site/paf/538

Allelopathic Effects of Eucalyptus

VOLATILE GROWTH INHIBITORS PRODUCED BY ECUALYPTUS GLOBULUS

HERBERT G. BAKER

The possibility that plants of some species gain advantage in natural competition by the excretion of substances (exocrines or ectocrines) inhibitory to the growth of their potential neighbors is under investigation in a number of laboratories. Among these investigations, the studies by Muller and his co-workers on volatile substances produced by aromatic shrubs have aroused considerable interest. Working particularly with *Salvia* and *Artemisia* they have shown that volatile terpenes from the leaves may inhibit root-growth of *Cucumis* seedlings placed in a closed container with them (Muller, Muller, and Haines, 1964). They have also demonstrated the presence of these terpenes in the air surrounding these shrubs in nature (Muller and Muller, 1964; Muller, 1965) and have postulated how they may enter the cells of victimized seedlings through solution in cuticular lipids (Muller, 1965).

From: Madrono Vol. 18 (7):201-210

Tilden Park

Species Composition

Tilden Park

Family	Scientific Name	Common Name
Amaryllidaceae	*Brodiaea pulchella*	Blue dicks
Anacardiaceae	*Toxicodendron diversiloba*	Poison oak
Apiaecae	*Heracleum lanatum*	Cow parsnip
	Sanicula crassicaulis	Snakeroot
Boraginaceae	*Cynoglossum occidentale*	Hound's tongue
Brassicaceae	*Brassica nigra*	Black mustard
Caprifoliaceae	*Lonicera hispidula*	Califotnia honeysuckle
	Sambucus caerulea	Blue elderberry
Compositae	*Artemisia douglasiana*	California mugwort
	Aster radulinus	Broad-leaf aster
	Cirsium vulgare	Bull thistle
	Solidago californica	California goldenrod
Crucifereae	*Dentaria californica*	Milkmaids
Curcurbitaceae	*Marah fabaceus*	Wild cucumber
Euphorbiaceae	*Euphorbia heliscopia*	Wartweed
Fagaceae	*Quercus agrifolia*	Coast live oak
Graminae	*Avena fatus*	Wild oat
	Bromus diandrus	Ripgut
	Bromus mollis	Soft chess
	Cynosurus echinatus	Dogtail
	Elymus glaucus	Blue wild rye
Iridaceae	*Sisyrichium bellum*	Blue-eyed grass
Labiatae	*Mentha arvensis*	Field mint
	Mentha pulegium	Pennyroyal
	Stachys bullata	California hedge nettle
	Stachys rigida	Hedge nettle
Lauraceae	*Umbellularia californica*	California bay
Leguminosae	*Lathyrus vestitus*	Hillside pea
	Lupinus albifrons	Lupine
	Vicia americana	American vetch
	Vicia sativa	Spring vetch
Plantaginaceae	*Plantage lanceloata*	English plantain
Polygonaceae	*Rumex pulcher*	Fiddle dock
Rosaceae	*Fragaria californica*	Wood strawberry
	Rubus ursinus	California blackberry
Solanaceae	*Solanum nigrum*	Black nightshade
Umbelliferae	*Conium maculatum*	Poison hemlock

Understory Plant Species

(Tilden Park – 1990)

Summary

Number of Families = 21

Number of Genera = 34

Number of Species = 38

Comparison of Species Composition of Novel Eucalyptus Ecosystem with Oak Woodland

Novel Eucalyptus Ecosystem	Oak Woodland
Number of Families = 21	Number of Families = 16
Number of Genera = 34	Number of Genera = 19
Number of Species = 38	Number of Species = 19
Native to California = 24	Native to California = 14
Introduced to California = 14	Introduced to California = 5

(*Data from Tilden Park – 1990*)

Mt. Sutro Eucalyptus Stand

Number of Plant Species	
Native	84
Non-native	57
Total	141

(Nature in the City, 2010)

Public Attitude

Audubon

1/2002

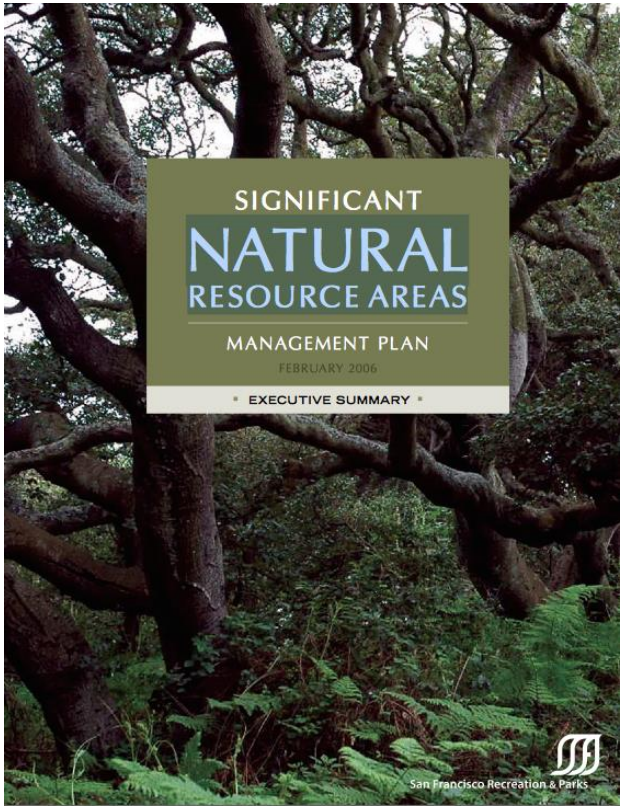
(incite)

America's Largest Weed

Eucalyptus has its defenders, but today, 150 years after these "wonder trees" were first brought to coastal California, their dark side is coming to light.

By Ted Williams

If you smell like a cough drop when you stumble out of the California woods, it's because 100 of the world's 600 species of eucalyptus grow there. None is native. They were imported from Australia during the second half of the 19th century as we were hawking our redwoods to the Aussies. "Wonder trees," the eucs were called, because they shot up in coastal scrub and vast redwood clearcuts.



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Proceed on a stand by stand basis

Tilden Park

Capitola

Develop a ranking matrix for decision making

Factor	High	Medium	Low
Recreation			
Aesthetics			
Wildlife			
Regional Landscape			
Novel Ecosystem			
Fire Hazard			
Tree Fall Hazard			
Invasive Species			
Allelopathy			
Public Attitude			

End

Eucalyptus Litter and Stream Insects

Freshwater Biology

Freshwater Biology (2010) **55**, 739–752 doi:10.1111/j.1365-2427.2009.02312.x

Similar breakdown rates and benthic macroinvertebrate assemblages on native and *Eucalyptus globulus* leaf litter in Californian streams

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SUMMARY

1. *Eucalyptus globulus*, a tree species planted worldwide in many riparian zones, has been reported to affect benthic macroinvertebrates negatively. Although there is no consensus about the effects of *Eucalyptus* on aquatic macrobenthos, its removal is sometimes proposed as a means of ecological restoration.

2. We combined the sampling of macroinvertebrates with measurement of the colonisation of leaf packs in mesh bags, to examine the effects of riparian *Eucalyptus* and its litter on benthic macroinvertebrates in three small streams in California, U.S.A. Each stream included one reach bordered by *Eucalyptus* (E-site) and a second bordered by native

6. The presence of *Eucalyptus* was less important in explaining the taxonomic composition of the macrobenthos than either 'season' or 'stream'. Similarly, these same two factors (but not litter species) also helped explain the variation in leaf breakdown. We conclude that patches of riparian *Eucalyptus* and its litter have little effect on stream macrobenthos in this region.

Pinole Creek

Lack of Appreciation

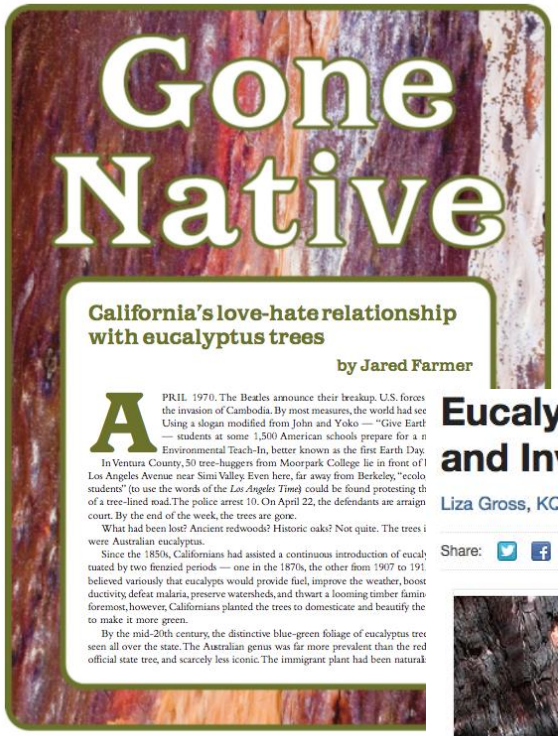
January 12, 2014

The Great Eucalyptus Debate: A Love/Hate Relationship

SF Chronicle "Insight"

Photo by Michael Short, Special to the Chronicle

(Posted by John Maybury, Pacifica Riptide, Pacifica, California)



Eucalyptus: California Icon, Fire Hazard and Invasive Species

Liza Gross, KQED Science Contributor | June 12, 2013 | 42 Comments

Share: Print

Specialized reproductive structures called "epicormic shoots" sprout from buds on the bushfire damaged trunk of a Eucalyptus tree, about two years after the 2003 Eastern Victorian alpine bushfires. Near Anglers Rest, Victoria, Australia. (Photo: jjron)

Eucalyptus Plantation

Forestry Seminar

Novel Forest Ecosystems

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Initial Introduction of Eucalyptus to California