

VEGETATION MANAGEMENT FOR FIRE SAFETY IN THE EAST BAY HILLS

A model for fire prevention designed to reduce fire risk, encourage healthy ecosystems, and reduce the financial burden on taxpayers.

PLANNING FOR DRY TIMES:

Given the very serious drought conditions facing California, combined with longer and more serious wildfire seasons due to climate disruption, it's more important than ever to prioritize fire prevention in our vegetation management strategies for the East Bay hills.

Ever since the Great Fire of 1991 devastated the East Bay hills, the Sierra Club has worked closely with fire experts, public officials, fire fighters, and fellow environmental groups like the Golden Gate Audubon Society, the California Native Plant Society, and the Claremont Conservancy to design an ecologically- and fiscally-sustainable model for fire management that not only reduces the risk of fires, but also promotes diverse and healthy ecosystems.

When it comes to preventing fire, replacing flammable invasives with diverse ecosystems of fire-resistant native species is the best, safest, and cheapest option.

The Sierra Club's program for vegetation management can be summarized as the "Three R's"

1. **Remove** the most flammable and ember-generating species in select areas considered most at risk for fire along the urban-wild interface of the East Bay hills;
2. **Restore** those areas with more naturally fire-resistant native trees and plants; and
3. **Re-establish** greater biodiversity of flora and fauna, including endangered species like the Alameda whipsnake.

HOW DID THE EUCALYPTUS GET HERE IN THE FIRST PLACE?

Non-native eucalyptus trees were introduced to the East Bay in the early 1900s by two Oakland businessmen who forested the hills with eucalyptus plantations for hardwood lumber production. The brittle wood proved unsuitable for lumber, however, and the plantations were abandoned and allowed to spread throughout the hills, overwhelming native species and changing the nature of the ecosystem. Today, we're experiencing the result: monoculture groves of highly flammable invasives, which can become densely packed at 400 to 900 trees per acre and can exceed 120 feet in height, with a tendency to dramatically explode when on fire.



This antique postcard shows that the East Bay hills were primarily grasslands with areas of riparian vegetation along streams before the spread of the eucalyptus.

WHAT COVERED THE HILLS BEFORE THE INTRODUCTION OF NON-NATIVES?

Before the introduction of non-natives like eucalyptus and Monterey pines, the East Bay hills were a mix of chaparral grasslands and riparian vegetation along streams. Native plants adapted to the local climate over millennia to be drought tolerant and low consumers of water. Many natives are also naturally more fire resistant.



Restored prairie grasslands at Redwood Park.

WHY ARE THESE PARTICULAR NON-NATIVE TREE SPECIES A GREATER FIRE HAZARD THAN NATIVE VEGETATION?

Greater fuel creation: Eucalyptus and Monterey pines can leave up to 50 tons of flammable fuel on the ground per acre. This compares with one to five tons of fuel per acre in grasslands, native live oak groves, and bay forest.

Hazardous debris structure: Eucalyptus branches, leaves, and bark slough off in long pieces that end up draped on one another, creating a near-optimal mixture of oxygen and fuel for fire. The smooth, aerodynamic bark provides a way for fire to climb into the tree canopy and send burning material aloft. Dead debris can also become suspended between branches, creating a nearly continuous arrangement of fuels — horizontally and vertically.

Explosive tree content: In Australia, eucalyptus trees are sometimes referred to as "gasoline trees" for their tendency to quickly spread explosive fires. Eucalyptus leaves contain enough oil that it is sold as a product in some countries. The leaves have three times the energy of cellulose, so they burn hotter. Blue gum eucalyptus leaves release volatile chemical gases at relatively low temperatures and ignite easily.



Eucalyptus trees drop much more fuel than native trees, and debris buildup can become a near-optimal mixture of oxygen and fuel.

WHAT HAPPENS WHEN A EUCALYPTUS CATCHES ON FIRE?

Groves of eucalyptus trees create fuel ladders that spread rapidly into the canopy. When wind-driven wildfire reaches eucalyptus tree crowns, it can spur flames that reach over 150 feet into the air, with burning embers blowing downwind beyond a half mile. Eucalyptus embers stay lit longer than embers from other vegetation. In contrast, native plants generally grow below 40 feet in height and are more easily controlled in the case of a wildfire.



Remains of the 1991 East Bay hills fire. Photo courtesy of the California Governor's Office of Emergency Services Flickr account.



A program of thinning is not only bad for the environment; it is also much more expensive.

WHY SHOULDN'T WE JUST THIN THE EUCALYPTUS AND OTHER NON-NATIVES?

While thinning the eucalyptus and Monterey pine plantations seems like an appealing compromise, in reality it compounds the problem. Thinning actually denudes hillsides to an even greater extent than removing them altogether, because in order to keep the hills fire safe, it requires regular, wholesale clearing of the understory and hanging debris — including native vegetation. This has to happen on an ongoing basis for the life of the remaining eucalyptus. Then, as trees die, they must be removed to prevent accidents.

HOW DO YOU PREVENT THE EUCALYPTUS FROM GROWING BACK?

Simply cutting down the eucalyptus trees doesn't solve the problem. Unless the stumps are disabled, multiple stems or "suckers" will quickly sprout, producing several new trees where only one existed previously. There are various methods to prevent eucalyptus stumps from sprouting, and the Sierra Club does not endorse any particular method. The agencies that manage the land must weigh the costs and benefits of all options in order to find the most sustainable and responsible approach. If an herbicide is used, a minimal amount would be hand applied by licensed professionals under strict controls. Any herbicide application protocols must undergo a full environmental review to restrict impacts on humans, wildlife, and habitat.

Thinning leaves behind a monoculture with a bare understory — conditions that will not support diverse ecosystems.

HOW DOES "REMOVE, RESTORE, RE-ESTABLISH" MEASURE UP ON COST?

"Remove, Restore, and Re-establish" is the most cost-effective strategy in the long term. Because thinning and debris removal would have to be done regularly, it would burden taxpayers with hundreds of millions of dollars in future maintenance costs; a conservative estimate is \$250 million over 20 to 40 years. These long-term costs would force agencies to levy fire-maintenance taxes as high as \$150 for each East Bay household — or else defer maintenance and risk a deadly and destructive fire. On the other hand, once established, native plant communities are much cheaper to maintain.

Remember that wildfires are incredibly expensive, both in terms of lives and money. The 1991 East Bay hills fire destroyed over 3,450 homes, killed 25 people and injured 150 others, and cost \$3.9 billion in present-day dollars. Given these stakes, it's critical to employ the most effective fire-management strategy.



Brush rabbit. Photo courtesy J. Maughn via Flickr Creative Commons.

WILL EVERY EUCALYPTUS IN THE EAST BAY HILLS BE REMOVED?

Not at all. Only eucalyptus that are located in the areas most at-risk for fire and at the urban-wild interface would be removed. Thousands of acres of eucalyptus would remain under this model for vegetation management.



California newt. Photo courtesy randomtruth via Flickr Creative Commons.

WON'T REMOVING NON-NATIVES LEAVE A BARREN LANDSCAPE?

Quite the opposite! Hidden among the eucalyptus and Monterey pine plantations are native oaks, bays, and willows that are struggling to survive under the canopy. These native species cannot grow to full size beneath the canopy of eucalyptus and Monterey pines.

The goal of the "Remove, Restore, Re-establish" program is to promote healthy, diverse ecosystems. Oaks, bays, and other native trees present under eucalyptus or pine canopies should be saved during removal of the flammable non-natives. Then the natives can get the sunlight and water they need to grow and thrive.

"Remove, Restore, and Re-establish" is not an abstract theory; it has been done successfully in a number of areas. To see it for yourself, drive up Claremont Avenue to Signpost 29 and look south; not too long ago, the diverse flourishing landscape in front of you was a eucalyptus forest!

HOW DOES THE STRATEGY OF "REMOVE, RESTORE, AND RE-ESTABLISH" IMPACT WILDLIFE AND ENDANGERED SPECIES?

The restoration of native vegetation creates healthier ecosystems and promotes greater biodiversity. As the California Native Plant Society wrote in its letter of support for the Sierra Club's position on fuels management:

"We recognize the importance of native plant communities and native plant habitats in the intricate and complex web of life that is our natural world. Our locally evolved flora supports a rich palette of interconnected life, from the insect world to birds, amphibians and reptiles, mammals, fungi, etc."

Restoration of native vegetation also provides an opportunity for the return of endangered species like the Alameda whipsnake, which cannot survive in eucalyptus and pine groves, even thinned.



Butterfly mariposa lily. Photo courtesy Philip Bouchard on Flickr Creative Commons.

HAVE QUESTIONS?

Don't hesitate to reach out! Contact the Sierra Club San Francisco Bay Chapter office at 510-848-0800 or info@sfbaysc.org.

