Questions and Answers about Eucalyptus Trees in Claremont Canyon

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Where is Claremont Canyon?
Claremont Canyon is the last relatively undeveloped canyon on the western slope of the Oakland/Berkeley Hills. The canyon lies south of Strawberry Canyon and north of Highway 24. Claremont Avenue winds up the canyon from Ashby Avenue to Grizzly Peak Boulevard. The City of Oakland owns the portion known as Garber Park and the East Bay Regional Park District owns much of the undeveloped lower canyon. The University of California owns the upper canyon with areas along the ridgelines owned by the Park District and the East Bay Municipal Utility District.

Why is it important to remove eucalyptus trees from the Canyon?
Nearly every professional involved with fire prevention and suppression, wildland management or the study of fire science and fire ecology who has studied Claremont Canyon cites the high fuel load that eucalyptus trees contribute to the canyon and the surrounding area. Since most of the eucalyptus trees in Claremont Canyon grow on public land, a large cost required to maintain them is borne by local taxpayers. Removal both lessens the threat of wildfire and removes a large, unending periodic public expenditure.

Is the goal of the eucalyptus removal to address fire safety or is it the removal of non-native, invasive species?
The focus of the three public agencies is on fire safety. Eucalyptus is a major fire hazard – particularly in the wildland-urban interface close to dense urban centers. It also happens that eucalyptus is a prolific seedling producer and is invasive, especially on slopes, crowding out native, less flammable plants.

How did the eucalyptus trees get here in the first place?
They were planted in the early 1900s by Frank Havens, co-owner of Realty Syndicate and the People's Water Company and a prominent figure the early development of the Bay Area. The eucalyptus trees were intended to be a source of hardwood lumber to make wagons, furniture, and pier pilings. However, the wood proved to be unsuitable as lumber. The effort was soon abandoned but the trees themselves flourished. Havens and his partner Francis "Borax" Smith also planted 13,000 acres of Monterey pine and eucalyptus in future residential areas of the Oakland and Berkeley hills.

Are eucalyptus trees a greater hazard than other vegetation?
Yes. Fire hazard is often linked to the volume of material available to burn. Eucalyptus fuel loads have been measured at between 29 and 50 tons per acre. This compares with one-to-five tons per acre, in grassland, native live oaks, and bay forest.[1] In addition a study conducted by the US Forest Service states that a mature eucalyptus forest in the Berkeley Hills contains 8.23 tons per acre of litter while an oak-bay woodland contains 1.71 tons per acre.[2] Just like in a fireplace fire, more fuel generally produces more heat.

What about the distribution of this burnable mass?
Eucalyptus branches, leaves and bark slough off in long pieces that end up draped on one another, creating a near optimum mixture of oxygen and fuel. This "goldilocks situation" of not too dense and not too airy fuel provides close enough contact for a fire to burn and transfer heat easily. Furthermore, near-ground fuels from eucalyptus debris tend to be continuous horizontally, further facilitating the spread of fire. The smooth, aerodynamic bark provides a way for fire to climb into the tree canopy and send burning material aloft. Dead debris is suspended between multiple stems in a nearly continuous arrangement of fuels—horizontally and vertically. This equates to a nearly certain level of torching and crown fire, and spread of burning embers into residential areas and open space vegetation.

What about the chemical content of the trees?
Eucalyptus leaves contain enough oil that it is sold as a product in many countries. The oil in the leaves has three times the energy of cellulose so it burns hotter. The fat content of eucalyptus is between 10 and 20 percent of its dry weight, higher than all other plant sources that have been measured, even higher than chamise or greasewood.[3] Blue gum eucalyptus leaves release volatile chemical gases at relatively low temperatures and ignite easily.

Do climate and weather conditions contribute to the problem?
Yes. Climatologists classify the San Francisco Bay region as a Mediterranean west coast climate with mild, wet winters and warm, dry summers. The risk of wildfire therefore is most severe in October and November—near the end of the long dry season. Annually, the Pacific high pressure cell moves inland over the land, reversing the normal weather pattern and winds blow from the northeast to the southwest through the gaps or canyons in the East Bay Hills creating what we know as the "Diablo Wind". The combination of dry vegetation with low ignition points and strong winds create ideal wildfire conditions, commonly referred to as "Red Flag Days".

Do burning embers stay lit as they are blown by the wind?
Yes, wind is an important factor, even more important than the length of flames on burning embers. The fact that Claremont Canyon is aligned with an easterly wind means the wind flow is accelerated in the canyon. Fire officials have noted that eucalyptus embers stay lit longer than embers from other vegetation. Once started, a fire in a eucalyptus forest spreads quickly. Fire rises to the canopy and blows from tree to tree. In his paper on eucalyptus fire management prepared for the East Bay Regional Park

District, Australia brush fire consultant Roger Fenwick discusses the phenomenon of spotting in Blue Gum eucalyptus groves.[4] In Diablo wind conditions a fire can spread at the rate of four miles per hour or six feet per second. However, with spotting, the burning material is thrown long distances ahead of the main fire, two-to-five miles with a chance of spotting to 12 miles. In the fall 1991 firestorm the burning embers even blew across Highway 24, and onto residential rooftops in upper Rockridge.

Will removing the trees leave a barren landscape?
Not for long. Hidden among the eucalyptus trees in Claremont Canyon are native oaks, bays and willows, struggling to survive among the towering eucalyptus coppice, which grow in bunches on old stumps. Some of the bay trees are 20-to-30-feet tall. Once the eucalyptus are removed, the native trees and shrubs are exposed to enough daylight and moisture to thrive. When the eucalyptus trees on the south side of Claremont Avenue were removed, it did not take long for the native trees and shrubs to flourish and become a beautiful native landscape. Drive up Claremont to signpost 29. To the right, looking south is the restored native landscape that was once a eucalyptus forest. Turn and face the opposite direction and you will see the dense forest of eucalyptus suckers that sprouted after the 1972 freeze. Look closer and you will find native bays, oaks and willows hidden in the eucalyptus shadows.

What would replace the eucalyptus trees?
In March and April 2014 Claremont Canyon Conservancy volunteers counted the number of trees in several areas of the canyon above Signposts 26 and 28, places where the University could remove the eucalyptus with sufficient finding. They found that on average there are 353 eucalyptus trees per acre. Under the canopy there are on average 387 other, smaller bay and oak trees.[5] When the eucalyptus trees are removed, these bays and oaks will find the sunlight and water they need to grow and thrive. The carbon now sequestered in the eucalyptus would find a new home in the bays and oaks. Their root systems would continue to prevent erosion on the hillside.

What will prevent the eucalyptus from growing back?
Simply cutting the eucalyptus trees does not solve the problem. Unless the stumps are treated within minutes of being cut, multiple stems will eventually sprout, producing several new trees where only one existed previously. However, this problem is easily solved by squirting the herbicide Garlon by hand to the cambium layer of freshly cut stumps.

Will herbicides used to treat eucalyptus harm other plants, animals and people?
No. There would be no broadcast spraying, only local, topical applications squirted by hand, not by spraying the massive amounts that some critics have alleged. Experience suggests that from .5 to 1 ounce of Garlon per linear foot of the tree's circumference is sufficient.[6] Scientific studies have demonstrated that these treatments do not harm surrounding vegetation, animals or people. They simply prevent the eucalyptus from re-sprouting. Garlon's active ingredient is triclopyr. It does not contain glyphosate, the active ingredient in Roundup.

What will happen to the eucalyptus trees once they are felled?
The tree trunks and branches are ground up into chips. The chips decompose and disintegrate rapidly and fire professionals agree they do not impose anywhere near the fire hazard of the standing trees due to the compact arrangement of the fuel.

What happens after the trees are felled and chipped?
The area will require on-going monitoring to remove eucalyptus sprouts and other invasive weeds that will appear, most likely from seeds remaining in the soil. The Claremont Canyon Conservancy is committed to work with the University to build and maintain the trails needed to patrol the area and to access the new sprouts. As eucalyptus can grow up to fifteen feet a year, ongoing efforts are essential. This work has been successful on the south side of Claremont Avenue and the Conservancy looks forward to continuing on the north side once the existing trees are cut and chipped.

Why not simply thin the eucalyptus, like the East Bay Regional Park District does?
While thinning the eucalyptus trees seems like an appealing compromise, in reality it compounds the problem. In order to make a thinned eucalyptus forest fire-safe, all vegetation under the eucalyptus including bay, oaks, and native shrubs and all the hanging eucalyptus bark and other litter must be removed during the thinning operation and during followup maintenance. In order to keep a fire from climbing to the tree crowns, trees and shrubs under the remaining eucalyptus trees will need to be removed. All trees must be pruned of lower branches to a height of eight-to-10-feet above ground. The eucalyptus trees that are removed would be treated with herbicide to prevent resprouting. However, seedlings and sprouts from the remaining eucalyptus trees would grow since they would not be treated in the original thinning operation. Debris from the remaining eucalyptus as well as new sprouts and all understory and hanging fuel and plants must be removed or chipped periodically on an ongoing basis for the life of the remaining eucalyptus. Then, as the trees die, they must be cut down and removed to prevent accidents. Many of the sprouts that have grown from eucalyptus stumps of trees that froze during the 1972 freeze are prone to falling because their boles are not well attached to the original stumps. If maintenance stops, trees and shrubs will grow and form continuous fuels under the thinned eucalyptus tree canopy. This provides an easy avenue for a fire to climb from the forest floor to the canopy, torching the material just as before the stand was thinned. Thus, maintenance can never stop. If it did, the fuel condition will revert to the pre-thinning condition.

What is the cost of this on-going effort?
It has been estimated that clearing the debris must be done every five years at a cost of $4,500 per acre. It is much more cost effective to remove all the eucalyptus (and Monterey Pine) and then patrol the area to remove new sprouts rather than have on-going debris removal. Past experience in Claremont Canyon has shown that after eight years there will be few if any new sprouts to remove as opposed to a 50-year time frame for maintaining thinned groves. Local public agencies simply will not have the financial resources to maintain a thinned area. For example, the Park District is allocating $1,000 per acre per year for eucalyptus maintenance.[7] With 1,200 acres containing about 50,000 to 60,000 trees remaining after thinning, the maintenance cost

over 50 years would be $60 million. On top of that is the cost of removing the remaining trees as they die and are in danger of falling. Since it is unlikely that the Park District, the City of Oakland or the University will have the financial resources to maintain thinning, it is likely that the fire hazard we have today will reappear in the future. It makes more sense from an financial as well as an environmental perspective to remove the eucalyptus trees and enable conversion to a more fire safe brushland or woodland without these invasive, fire-prone trees.

Isn't it less expensive to thin the eucalyptus trees rather than remove all of them to enable conversion to less flammable native forest or brushland?
No. The initial cost could be greater due to the cost of identifying which trees to remove and which to leave. In addition, great care must be taken to remove some trees but leave the remaining ones intact and in good condition. Furthermore, the loose bark and other fire prone materials must be removed from the remaining trees up to 24 feet above ground to prevent potential fires from starting and moving up into the crowns of the remaining trees.

Is there a danger of eucalyptus trees falling?
Yes. Young eucalyptus grow up to fifteen feet a year to diameters of more than six feet but they do not live forever. Eventually, they die and fall, posing a safety issue, especially in a park area with unsuspecting visitors and adjacent to roads with heavy traffic. Mature trees would have to be inspected and ones in danger of falling would have to be detected and removed. The cost of removing a single mature eucalyptus tree varies from $3,000 to $10,000. Thinning intensifies the problem of the remaining trees being blown over in high winds because thinning lessens the wind break and the wind hits the remaining trees with more force.

What would happen if we leave the eucalyptus alone and do nothing?
The fire hazard would grow. Eucalyptus trees not only grow rapidly but they spread relentlessly, dominating, shading out and taking water from native oak, bay and willow woodlands and grass and brushlands as well. As time passes, the more expensive and more difficult this problem is to solve.

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[1] Rice, Carol, "The Science Behind Eucalyptus Fire Hazards", Claremont Canyon Conservancy Newsletter, Spring 2013, pp. 3-4.
[2] Volume XIII, Digital Photo Series, Pacific Wildland Fire Sciences Lab, Fire & Environmental Research Applications Team, USDA Forest Service, PNW Research Station.
[3] Rice, Carol, Ibid.
[4] Fenwick, Roger, "Proposed Fire Management Plan for the Lake Chabot Eucalyptus Plantation", East Bay Regional Park District, August 31, 1980, p. 3.
[5] Claremont Canyon Conservancy Fall 2014 Newsletter, p. 6.
[6] Garlon 4 and Stalker label instructions and Tom Klatt, qualified applicator certificate number 93426.
[7] Doyle, Robert, "2014 Fuels Management Program of Work and Fuels Cost Analysis," memo from East Bay Regional Park District General Manager, August 14, 2013.