Oakland Draft Vegetation Management Plan

Public Comment

I am broadly supportive of the Draft Vegetation Management Plan (DVMP) because:

- It will create defensible space around structures in Very High Wildfire Hazard Severity Zones (VHWHSZ).
- It will clear easily ignited vegetation along roadsides in places where fire hazards are greatest.
- It sets priorities for implementation in places where fire hazards are greatest.

These three elements of the plan will reduce fire hazards while limiting destruction of trees and vegetation and being fiscally responsible.

My public comment will identify some weaknesses in the plan and make specific suggestions for improving the plan with the goal of minimizing fire hazards as well as collateral damage to the environment.

The 300-foot "buffer" zone is unnecessarily destructive. California law requires 100-feet of defensible space around structures. The DVMP proposes extending defensible space along roadsides and around structures to 300-feet, the length of a football field. Such a wide clearance of vegetation greatly exceeds California fire code and is therefore unnecessarily destructive. In a recently published op-ed in the *Los Angeles Times,* two academic scientists confirm our understanding of how to keep our communities safe: "The science is clear that the most effective way to protect homes from wildfire is to make homes themselves more fire-safe, using fire-resistant roofing and siding, installing ember-proof vents and exterior sprinklers, and maintaining "defensible space" within 60 to 100 feet of individual homes by reducing grasses, shrubs and small trees immediately adjacent to houses. **Vegetation management beyond 100 feet from homes provides no additional protection."**[1]

The buffer zone should be eliminated, reduced, or reduced to Priority 3 so that it is less destructive and costly.

The DVMP does not explain which vegetation management techniques will be used. The chief weakness of the plan is that it provides little information about the specific methods that will be used to manage vegetation. A list of potential methods is provided with few clues about where they will be used.

Grazing is the least destructive method and the most supported by the public, according to the survey conducted by the VMP consultants. Although legally protected plant species require protection during grazing, there is no legal obligation to protect other native plants. The VMP is a fire hazard mitigation program, not a native plant restoration project.

The description of herbicide use in the draft is unnecessarily vague, because it provides no information about what herbicides will be used and the health and environmental hazards of specific herbicides. Nor does it explain how, where, or why herbicides will be used.

Instead of providing that information, the plan describes the public's opposition to herbicides as "social stigma," which implies that our opposition is a baseless prejudice against herbicides. In fact, our opposition is based on scientific information about the dangers of herbicides and those dangers must be acknowledged by the final version of this plan.

[1] http://www.latimes.com/opinion/op-ed/la-oe-hanson-miller-governor-fire-orders-20180525-story.html

The dangers of herbicides are well documented and well known. When the City of Oakland adopted Resolution 79133 to enable use of herbicides (glyphosate and triclopyr) to eradicate vegetation and control resprouts of destroyed trees, City Attorney John Russo wrote a letter to the City Council, informing them that such a change in the City's IPM ordinance would require an Environmental Impact Report because, "Herbicides such as Roundup are potential carcinogens. There may be a safety risk in exposing city workers, firefighters and other individuals tasked with applying these chemicals for fire prevention purposes. The potential latency period between exposure and symptoms may leave the City exposed to risk well into the future." (Attachment 1)

Mr. Russo's warning was prophetic. In fact, much more is known about the toxicity of Round Up (glyphosate products) since he wrote his letter to the City Council in 2005. Furthermore, the legal liability of using Round Up is also established by 4,000 lawsuits by plaintiffs who believe they or members of their family were harmed or killed by Round Up.[2] Here is a brief list of some of the most recent studies that conclude that glyphosate products are very dangerous to the health of animals and humans:

- The International Agency for Research on Cancer classified glyphosate as a "probable human carcinogen" in 2015. The IARC is composed of an international team of scientists convened by the World Health Organization of the United Nations.
- The State of California responded to that news by requiring all glyphosate products sold in the State to be labeled as carcinogens. The State was sued several times by the manufacturer of Round Up—Monsanto--to prevent the labeling requirement. The State of California recently won in the state court of appeals[3]. Unless Monsanto appeals and wins in the State Supreme Court, all glyphosate products will be labeled as carcinogens in California.
- US National Toxicology Program recently conducted tests on formulated glyphosate products for the first time. In the past, tests were conducted only on the active ingredient…that is glyphosate alone. The formulated products that are actually applied as weed killers contain many other chemicals, some of which are not even known. The head of the National Toxicology Program Laboratory, told *The Guardian* newspaper the agency's work is ongoing but its early findings are clear on one key point. "We see the formulations are much more toxic. The formulations were killing the cells. The glyphosate really didn't do it," DeVito said. A summary of the NTP analysis said that "glyphosate formulations decreased human cell 'viability', disrupting cell membranes. Cell viability was 'significantly altered' by the formulations, it stated."[4]
- The Global Glyphosate Study is being conducted by six scientific institutions all over the world: The Ramazzini Institute, the University of Bologna (Faculty of Agriculture, Veterinary Science and Biostatistics) the Genoa Hospital San Martino, the Italian National Institute of Health, the Icahn School of Medicine at Mount Sinai in New York and the George Washington University. This international consortium of scientific institutions recently published preliminary results of their study: "The results of the short-term pilot study showed that glyphosate-based herbicides (GBHs) were able to alter certain important biological parameters in rats, mainly relating to sexual development, genotoxicity and the alteration of the intestinal microbiome, at the 'safe' level of 1.75

[2] https://www.theguardian.com/us-news/2018/may/08/weedkiller-tests-monsanto-health-dangers-active-ingredient

[3] https://www.sfgate.com/news/article/State-can-label-widely-used-herbicide-as-possible-12849147.php

[4] https://www.theguardian.com/us-news/2018/may/08/weedkiller-tests-monsanto-health-dangers-active-ingredient

mg/kg/day set by the U.S. Environmental Protection Agency (EPA)."[5] In other words, at doses deemed safe by the US EPA, significant negative health effects were found in animals used in testing.

- German Agriculture Minister Julia Kloeckner announced on April 17, 2018 that she was finalizing a draft regulation to end use of the weed-killer glyphosate in household gardens, parks and sports facilities, and to set "massive" limits for its use in agriculture.[6] Germany is one of 25 countries that have issued outright bans on glyphosate, imposed restrictions or have issued statements of intention to ban or restrict glyphosate-based herbicides, including Roundup. Countless US states and cities have also adopted such restrictions.[7]
- Marin Municipal Water District quit using all pesticides in 2015. In a letter to East Bay Municipal Utilities District, a member of the Board of MMWD explains why that decision was made. (Attachment 2) MMWD hired scientists at UC Davis to conduct a study of the biological persistence of glyphosate. They found that glyphosate persisted for at least 84 days when applied to foliage, and perhaps longer after the study ended.

Garlon with the active ingredient triclopyr is more toxic than glyphosate. Garlon is the herbicide that is used to prevent eucalyptus and acacia from resprouting when the trees are destroyed. Its use was also specifically allowed for that purpose by Oakland City Council Resolution 79133. Although the DVMP does not mention its use, we assume—unless specifically told otherwise by the final version of the VMP—that Garlon will be used to control resprouts.

- Triclopyr is an organochlorine product, in the same family of pesticides as DDT, which was banned in the US in 1972. Organochlorine products bioaccumulate and are very persistent in the environment. Nearly 50 years after it was banned, DDT is often found in the ground, in the water, and in people's bodies.[8]
- Organochlorine products are endocrine disrupters. The Pesticide Research Institute did a risk assessment of triclopyr for the California Invasive Plant Council. They reported that triclopyr "poses reproductive and developmental risks to female applicators." [9]
- The Pesticide Research Institute did a risk assessment of triclopyr for Marin Municipal Water District in which they informed MMWD that birds and bees are both harmed by triclopyr and mycorrhizal fungi in the soil are damaged by triclopyr.[10]

More research has been done on Round Up than on Garlon because it is more widely used. It is more widely used, partly because it is actually less dangerous than Garlon (it is also a non-selective plant-killer). Because of the toxicity of Garlon, three public land managers in the Bay Area have made a commitment to controlling resprouts without using herbicides:

- Marin Municipal Water District quit using all herbicides in 2015. Marin County Parks and Open Space has eliminated most herbicides.[11] They quit using glyphosate products completely in 2016. In 2017 they managed 126 of their 147 parks without using any pesticides.

---

[5] https://sustainablepulse.com/2018/05/22/monsanto-in-epic-fail-with-attempted-attack-on-global-glyphosate-study/?utm_source=newsletter&utm_medium=email&utm_campaign=gmos_and_pesticides_global_breaking_news&utm_term=2018-05-23#.WwhUfkgvyUl

[6] https://sustainablepulse.com/2018/04/17/germany-moving-ahead-with-plans-to-restrict-weed-killer-glyphosate/?utm_source=newsletter&utm_medium=email&utm_campaign=gmos_and_pesticides_global_breaking_news&utm_term=2018-04-18#.WwhWWUgvyUl

[7] https://www.baumhedlundlaw.com/toxic-tort-law/monsanto-roundup-lawsuit/where-is-glyphosate-banned/

[8] https://www.sciencealert.com/ddt-consistently-found-in-humans-study

[9] https://www.pesticideresearch.com/site/pri-resource-centers/weed-management-resource-center/herbicide-risk-comparisons/workers/

[10] http://www.marinwater.org/DocumentCenter/View/254/HRA_Chap4_Triclopyr_1_1_2010

- UC San Francisco is destroying most eucalyptus trees on Mount Sutro. They have made a written commitment in the EIR for their project to not use any herbicides on Mount Sutro. Eucalyptus resprouts will be managed manually.
- East Bay Municipal Utilities District (EBMUD) destroys eucalyptus and native bay trees on ridgelines and topographical areas that are considered high fire hazards. EBMUD has been controlling resprouts without using herbicides. They control resprouts manually. They made a written commitment to not use herbicides to control resprouts in their recently revised Watershed Master Plan.[12]

The final version of the VMP must inform the public what herbicides will be used and for what purpose. The dangers of the herbicides that Oakland intends to use to implement the VMP must be acknowledged by the Environmental Impact Report in order to meet the legal requirements of CEQA.

I strongly prefer that herbicides not be used in Oakland to implement the VMP. However, I suggest adding the following Best Management Practices to the list of BMPs for herbicide use, if herbicides are used:

- Herbicides will be used as a last resort when other methods cannot be used.
- Herbicides will not be sprayed when rain is forecast within the next 24 hours or when winds are greater than 10 miles per hour. This will reduce run off and pesticide drift.
- Vegetation that is killed by herbicide will be removed from the site to reduce fuel loads and reduce pesticide exposure to animals and the public. (This requirement is consistent with all other methods described in the DVMP.)
- The City of Oakland will maintain a monthly record of pesticide use (required by California law). Pesticide records will include the location of the application, the amount and type of product used, and the reason why another method could not be used. This record should be available to the public on request and posted to the Oakland City website annually.
- Records of pesticide use will also include applications done by contractors (not required by California law). When contractors are hired to apply herbicides, purchase orders for their work must include the requirement that they provide the following information about the application before payment is made for the application: location of the application, amount and type of product used.
- All pesticide applications must be posted at the location of the application 24 hours prior to the application. The notice of application must remain after the application for at least 24 hours. The notice must specify the type of product that will be used and include the telephone number of the City employee who can answer questions about the application.

The addition of these BMPs will reduce risk of pesticide exposure and improve public acceptance of herbicide use. It is in the City's interests to make every effort to ensure the public's safety. The point of the DVMP is public safety. There is no point in jeopardizing the public's safety by using herbicides unnecessarily. As you know, the public expressed overwhelming opposition to the use of pesticides in the survey conducted by the VMP consultants.

<u>There is no evidence that eucalyptus is inherently more flammable than native trees.</u>

Eucalyptus is well adapted to California because it comes from a similar climate. Both Australia and California are Mediterranean climates in which seasonal fires are common. In Mediterranean climates, the rains of winter produce

[11] https://www.marincountyparks.org/~/media/files/departments/pk/integrated-pest-mgmt/all-reports/fnl_web_lores_ipm-ar_2017.pdf?la=en
[12] http://www.ebmud.com/recreation/east-bay/east-bay-watershed-master-plan-update/

copious herbaceous growth such as grasses that become dry and dormant during the dry summer months. They become the primary fuel of summer fires because they ignite easily. Therefore, the vegetation in Mediterranean climates is adapted to frequent fires.

Carol Rice is one of many people in the East Bay who insist that eucalyptus is more flammable than native trees. Ms. Rice was interviewed for an article in *Bay Nature* about the flammability of eucalyptus. The author of that article reported his conversation with Ms. Rice, "I asked her why the consortium gave blue gum a high ignitability rating as well as a high hazard rating—what studies was that based on? It wasn't based on any specific studies, she told me, but was rather an agreement among the experts—as she recalled it, a sort of, "This is what we think. What do you think?'"[13] In other words, **Ms. Rice was unable to provide any actual evidence supporting her opinion that eucalyptus is more flammable than other types of vegetation**.

Starting from the baseline that all plants native to Mediterranean ecosystems are fire adapted and fire dependent, we must address specific accusations regarding the flammability of eucalyptus.

The 1991 fire in the East Bay is most often cited as the evidence that eucalyptus is more flammable than native trees. In fact, the FEMA technical report of that fire does not substantiate that claim. **Eucalypts contributed more fuel to the fire than they normally do because of the deep freeze that occurred the winter preceding that fire**: "The unprecedented drought was accompanied by an unusual period of freezing weather, in December 1990, which killed massive quantities of the lighter brush and eucalyptus. Dead fuel accumulated on the ground in many areas and combined with dropped pine needles and other natural debris to create a highly combustible blanket. Due to the fiscal cutbacks, governmental programs to thin these fuels and create fuel breaks were severely curtailed, so the fuel load was much greater than normal by the second half of 1991."[14] Such freezes, sufficiently deep and sustained, causing eucalypts (and other plants) to die back are very rare in the Bay Area. There has not been such a freeze since 1990 and its predecessor was in the early 1970s. In the warming climate, such deep freezes are increasingly unlikely.

Weather is an important factor in creating the conditions for wildfires in Mediterranean climates. In addition to rare deep freezes resulting in dead leaf litter, high winds from the hot interior—called Diablo winds in the Bay Area—are an important factor. These Diablo winds are associated with high temperatures. **If a fire ignites during a Diablo wind, it is quickly fanned into a conflagration and quickly spreads, burning everything, including homes and eucalypts.**

As we should expect, those who experienced the 1991 fire in the East Bay were heavily influenced by what they witnessed. Those who saw eucalyptus burn have a different opinion about the cause of the fire than do those who saw oaks or redwoods burn. A book about the 1991 wildfire in the Oakland/Berkeley hills illustrates the power of the legend that non-native trees are more flammable than native trees. In *Firestorm: The study of the 1991 East Bay fire in Berkeley* (Margaret Sullivan, 1993) the author **states repeatedly that native plants and trees were involved in that fire.** The book was based on interviews with survivors of the 1991 wildfire. Every tree mentioned in the following quotes from that book is native to the Bay Area:

- "…flames surging through the dry underbrush and **live oaks** that line the street…"
- "…neighborhoods…are built into the contours of the grassy hills and **live-oak-and-laurel studded canyons**…"
- "…hillsides covered in seasonal grasses or had overlooked ravines of **oak and madrone**…were devastated by the fire."
- On Vicente Road, **"Two redwoods up the street caught fire like matchsticks."**

[13] https://baynature.org/article/burning-question-east-bay-hills-eucalyptus-flammable-compared/
[14] https://www.usfa.fema.gov/downloads/pdf/publications/tr-060.pdf

- "Roble Road and… Roble Court, derive their name from the…Spanish word for the **live oak tree that grows densely there**…the devastation on lower Roble…was fairly complete…"

In the single mention of the role of eucalypts in the fire, the fire skips over the tree canopy: "The fire swept right over [the houses] scorching the crowns of surrounding eucalyptus trees." And the Monterey pine—also targeted for eradication by native plant advocates—plays a similar role in a nearby location: "Across the street a grove of Monterey pines shields the white clapboard buildings of the private Bentley School…"

The Center for Investigative Reporting (CIR) is a highly respected source of deeply researched news stories. They published an excellent article about the 1991 fire in the East Bay, based on an interview with Jan Null, who was the lead forecaster for the National Weather Service in the Bay Area at the time of the fire. Mr. Null explains the important role that weather played in the 1991 fire, including the prolonged winter freeze preceding the fire and Diablo Winds. **He recommends that we focus on the factors that we can control because we can't control the weather: "The largest issues identified afterwards were mostly related to firefighting. These included better communication between agencies, standardization of equipment and ensuring defensible space around homes."**[15]

The claim that eucalyptus is highly flammable is contradicted by the following laboratory study of the combustibility of blue gum eucalyptus that reported that leaves of *E. globulus* are resistant to ignition:

"*E. globulus* ***leaves, both juvenile and adult, presented the greatest resistance [to ignition] of all the eucalypts studied. In this case, leaf thickness was important as well as the presence of a waxy cuticle."*** Also, in a table entitled *"Rate of flame front movement,"* **the comment for** *E. globulus* **leaves is *"resistant to combustion*."** [16]

The fact that blue gum eucalyptus leaves are resistant to ignition is also observable in many actual wildfires. The publication of the Golden Gate National Recreation Area regarding fuel loads[17] contains this footnote about a fire in eucalyptus on Mt. Tamalpais**:** "The live foliage proved fire resistant, so a potentially catastrophic crown fire was avoided." **Here is a photo of a wildfire in San Diego that destroyed hundreds of homes, without igniting the blue gum eucalyptus that surrounded those homes:**

[15] https://www.revealnews.org/blog/remembering-the-oakland-hills-firestorm-how-weather-fueled-the-flames/

[16] Dickinson, K.J.M. and Kirkpatrick, J.B., "The flammability and energy content of some important plant species and fuel components in the forests of southeastern Tasmania," Journal of Biogeography, 1985, 12: 121-134.

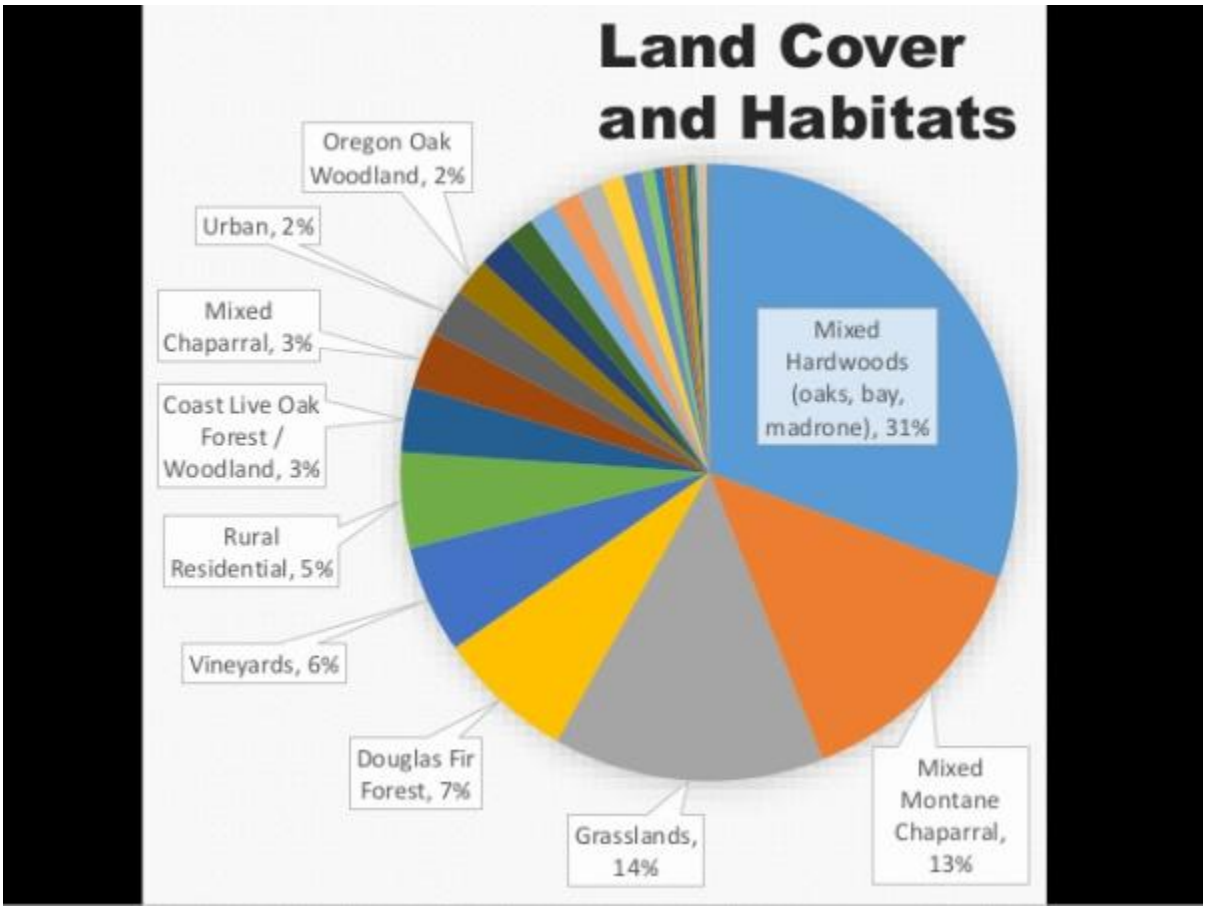
[17] https://www.nps.gov/pore/learn/management/upload/firemanagement_fireeducation_newsletter_eucalyptus.pdf

Scripps Fire, San Diego, 2003. New York Times photo

Jack Cohen is a fire scientist at the US Forest Service fire lab in Missoula Montana (recently retired). For decades he has researched fire behavior in the Wildland Urban Interface areas (WUI). His research includes scores of post-fire investigations, as well as controlled experiments in the only forest fire lab in this country. In response to an inquiry he said this about the role of eucalyptus in the 1991 fire in the East Bay hills: "…eucalyptus trees did not burn with high intensities (or any intensity) leading to home destruction. This strongly suggests that eliminating eucalyptus and replacing it with some other vegetation would not prevent future WU fire disasters because the problem was inappropriately defined as a eucalyptus vegetation problem and not a home ignition-home ignition zone problem." (Attachment 3)

Recent fires in the North Bay provide another example of a wind driven fire in which everything burned without any involvement of eucalyptus trees. On November 16, 2017, the Bay Area Open Space Council held a symposium about the fires in the North Bay that was billed as a "Community discussion on the impacts of the recent wildfires." *Bay Nature* magazine moderated a panel of experts representing CalFire and 8 managers of public and private open space reserves in the North Bay. The Director of Conservation for the Bay Area Open Space Council showed a slide of the vegetation types that burned in the fires. With the exception of vineyards, only 2% of the burned vegetation was "urban." All other vegetation was native grassland, chaparral, and native trees. [18]

[18] https://openspacecouncil.org/2017novgathering/



Vegetation that burned in the North Bay files of October 2017. Source: Bay Area Open Space Council

The speaker from CalFire at the symposium said that we must learn to live with fire. He suggested that the way to accomplish that goal is with better land use planning, using fire and ember resistant building materials, creating defensible space, and improving the health of our forests.

The most common accusation about the flammability of eucalyptus is that its leaves contain flammable oils. Eucalyptus leaves do not contain more oil than native California bay laurel. In fact, the leaves of native bay laurel trees contain twice as much oil as eucalyptus leaves[19] and the fuel ladder to their crowns is much lower than eucalyptus, increasing the risk of crown fires. Three local resources about the flammability of local vegetation all consider bay laurel highly flammable:

- Marin Fire Safe says, "Bay laurel is fire prone, and may contribute significantly to wildfires due to its high volatile oil content. It is recommended that all Bay laurel trees be removed within 30' of structures. As a primary host for the Sudden Oak Death pathogen, remove any Bay laurel within 30' of any Live oak or Black oak."[20] There are many other native plants on the list of flammable plants on the Marin Fire Safe website.

[19] Ron Buttery et. al., "California Bay Oil. I. Constituents, Odor Properties," *Journal Agriculture Food Chemistry*, Vol. 22, No 5, 1974.
[20] http://www.firesafemarin.org/plants/fire-prone/item/california-bay

- Oakland Fire Safe Council includes bay laurel in its list of "Fire Prone Plants" and recommends removal. There are many other native plants on its list of "Fire Prone Plants."[21]
- The "Wildfire Hazard Reduction and Resource Management Plan" of the East Bay Regional Park District states explicitly that bay laurel is very flammable and recommends selective removal: "Consider selecting young bay trees for removal, as bay trees tend to produce ladder fuels and are known for their oil content. This species also is known to be a vector for sudden oak death and may prevent oak regeneration."[22] The "Wildfire Hazard Reduction" plan also identifies native chamise and coyote brush as highly flammable.

In the *Bay Nature* article regarding the flammability of eucalyptus, Ms. Rice expressed her opinion that although bay laurel leaves contain more oil than eucalyptus leaves, the fact that they contain more moisture than eucalyptus leaves "mitigates" for the high oil contain. Once again, Ms. Rice provides no evidence in support of her claim that bay leaves contain more moisture. I have been unable to find any reputable studies that compare the moisture content of bay leaves with that of eucalyptus leaves. Without such empirical evidence, I conclude that such an assumption is more a reflection of the prejudice against non-native species than it is of greater flammability of eucalyptus. **Bay laurel must be added to the list of "Highly Flammable Plants in Oakland" in the DVMP (Table 4, page 59).**

The bias against non-native species in the DVMP is also reflected in the inappropriate focus on the removal of broom. Broom is not more flammable than native coyote brush because the branches of broom are green, living tissue to the ground unlike mature stands of coyote brush that contain a lot of dead woody branches. Ironically, the DVMP acknowledges that broom does not ignite easily in its citation of a study that reported that prescribed burns in uncut stands of broom were unsuccessful: "Despite high temperatures and low humidity, researchers in Marin County, California, were unable to burn a mature, uncut broom stand, and a young uncut stand had only spotty combustion (Odion and Haubensak 2002)." (DVMP, page 66)

Coyote brush is on the lists of fire prone plants of Marin Fire Safe and Oakland Fire Safe Council. The "Wildfire…Plan" of the East Bay Regional Park District also mentions that coyote brush is very flammable: " The overall hazard for coyote brush scrub is rated as High, with flame lengths ranging from 14 to 32 feet…"[23]

These examples of native trees and shrubs that are as flammable as non-native plants and trees that the DVMP proposes to destroy are intended to illustrate one of the weaknesses of the DVMP: **eradicating non-native trees and shrubs will not reduce fire hazards because they are not inherently more flammable than the native vegetation that will remain. Therefore, the reduction of fuel loads must be based on flammability, NOT the nativity of the flammable species. The nativity of plant species is irrelevant to reducing fire hazards and must be abandoned as criterion for destroying plants and trees.**

The modeling of fire behavior reported in the DVMP corroborates the evidence that extreme fire behavior is as likely to occur in native trees as it is in non-native trees:

- **"** Fire behavior modeling resulted in primarily surface fire throughout the property, although small pockets of active crown fire were modeled in the coastal oak woodland area along Park Boulevard…" (page 154)

[21] http://oaklandfiresafecouncil.org/firesafe-landscaping-in-the-current-california-drought/

[22] http://www.ebparks.org/civicax/filebank/blobdload.aspx?BlobID=23678 (page 190)
[23] Ibid. page 148

- **"**Fire behavior modeling resulted in active and passive crown fire in coastal oak woodlands in upland areas in the eastern and northern portions of the park and primarily surface fire within redwood stands along the drainage bottom." (page 156)
- **"**Fire behavior modeling resulted in active crown fire in coastal scrub (where overstory trees are present), oak stands with a heavy shrub understory, and isolated areas within oak woodlands with grass understory…" (page 160)
- **"**Fire behavior modeling resulted in active crown fire in the coastal scrub and chaparral stands in the central and eastern portions of the property (where overstory trees are present)…" (page 162)
- **"**Fire behavior modeling resulted in isolated active crown fire only in coastal scrub where overstory trees are present…" (page 165)

Yet, despite the evidence that extreme fire behavior occurs in native trees and vegetation, the DVMP recommends that the closed canopy of oak-bay woodland be retained. The DVMP also recommended "shaded fuel breaks," based on the same principle of retaining moisture and suppressing weed growth: "For fuel breaks in tree-dominated vegetation types (shaded fuel breaks), clearance pruning and dripline thinning are applied to provide horizontal and vertical spacing between retained trees and tree groupings and understory vegetation." (DVMP, page 112) **If that is good strategy for fire hazard mitigation in native vegetation, it is equally good strategy for non-native vegetation.**

In a recently published op-ed in the *Los Angeles Times*, two academic scientists express their opposition to planned tree removals in California: "…increasing logging, as [Governor] Brown proposes, does not tend to curb fire behavior--in fact, it typically does the opposite. This is because logging reduces the cooling shade of the forest canopy, creating hotter and drier conditions, and removes tree trunks, which don't burn readily, while leaving behind "slash debris" — kindling-like branches and treetops."[24]

I support the thinning of eucalyptus, acacia, Monterey pine and cypress to reduce fuel loads, as long as the canopy is intact. This is the method being used by East Bay Regional Park District (EBRPD) and their approach is supported by Cal-Fire. When the canopy is intact, the forest floor is shaded which retains moisture that retards ignition and suppresses the growth of easily ignited weeds. EBRPD has been using that method since its plan and EIR were approved in 2011. Their plan has withstood the tests of several lawsuits from those who demand clear-cutting of all non-native trees and it is supported by many members of the public, including me.

The DVMP proposes to thin the targeted non-native trees to distances of 35 feet, creating gaps in the canopy of 10 feet within the 300-foot "buffer zone." The distance between the trees must be reduced to 25 feet to maintain the canopy. In addition to reducing fire hazards, maintaining the canopy will also be less destructive and will reduce the amount of stored carbon released into the atmosphere.

My greatest disappointment in the DVMP is its proposal to remove all individual non-native trees where they presently exist in native vegetation outside the 300-foot "buffer zone":

- "Remove individual eucalyptus, pine, or acacia trees from within oak woodlands" (DVMP, page 129)
- "Remove individual eucalyptus, pine, or acacia trees from within redwood vegetation communities." (DVMP, page 130)

[24] http://www.latimes.com/opinion/op-ed/la-oe-hanson-miller-governor-fire-orders-20180525-story.html

- "Remove individual eucalyptus, pine, or acacia trees from within riparian vegetation communities." (DVMP, page 130)
- "Individual, isolated pyrophytic trees located within brush/scrub stands shall be prioritized for removal." (DVMP, page 124)

This proposal is another clue that the DVMP is as much a native plant "restoration" as it is a fire hazard mitigation project. Removing non-native trees in riparian areas and in redwood groves is not fire hazard mitigation because fire hazards in those areas are minimal: "Similar to redwood forest, riparian vegetation communities/land cover types present relatively low fire hazard due to year-round high moisture levels." (DVMP, page 130)

Furthermore, destroying healthy trees damages the trees that remain because:

- The herbicide that is used to prevent eucalyptus and acacia from resprouting is mobile in the soil and it is known to damage mycorrhizal fungi in the soil that is essential to the health of the native trees. The herbicide is applied to the stump, immediately after the tree is cut down, while the cambian layer is still functional. The herbicide is transported to the roots of the tree through the cambian layer. Because the roots of trees growing closely together are intertwined, the herbicide can damage neighboring trees that are remain. The herbicide also damages the soil, which compromises the health of the trees that remain.
- It is not possible to destroy isolated trees without damaging neighboring trees in close proximity. Heavy equipment is used to destroy the trees. The heavy equipment compresses and disturbs the soil. The trees that remain are often unintentionally damaged by the heavy equipment. The dead trees are dragged out of the forest, damaging vegetation and soil in their wake.

Studies show that eucalyptus trees in native forests are not doing any damage to neighboring trees:

- In "Similar breakdown rates and benthic macroinvertebrate assemblages in native and *Eucalyptus globulus* leaf litter in Californian streams"[25] three small streams in Alameda and Contra Costa counties in the East Bay were studied because they have sections of shore with eucalyptus forest and sections with native trees (oak, bay, big leaf maple, and alder). This study hypothesized that it would find reduced abundance and diversity of insect populations in the streams bordered by eucalyptus based on the assumption that eucalyptus is *"lower-quality food resource for macroinvertebates than a mixture of native litter."* The authors did not find evidence that supported their theory:
    - *"[Differences in] yearly litter input rates in reaches bordered by Eucalyptus and by native vegetation were not statistically significant."*
    - Species diversity and pollution tolerance did not differ significantly between eucalyptus and native sites, with one exception. There was a higher proportion of one complex of insects (Ephemeroptera, Trichoptera, Plecoptera) in the eucalyptus samples.
    - The abundance of the five most common taxa (species or genus) did not differ significantly between eucalyptus and native sites with the exception of mayflies which were on average twice as abundant in eucalyptus sites.

[25] Igor Lacan, Vincent Resh, Joe McBride, "Similar breakdown rates and benthic macroinvertebrate assemblages in native and *Eucalyptus globulus* leaf litter in Californian streams," *Freshwater Biology*, 55, 739-752, 2010.

- One metric of diversity (Shannon Diversity Index) found greater species diversity in eucalyptus sites compared to native sites.
- The decay of litter in the bags of eucalyptus litter was similar to the bags of native litter, i.e., *"leaf mass loss was not significantly different between eucalyptus and native leaves."* Decay of litter is a proxy for the amount of litter consumed by insects and microorganisms in the litter and by extension the population of these organisms in the litter: *"…the importance of biotic factors (bacteria, fungi, macroinvertebrates) in litter breakdown is greater than that of the physical fragmentation."*

- In "Evaluating the myth of Allelopathy in California blue gum eucalyptus plantations," Kristen Nelson and Jennifer Yost (Cal Poly) studied the claim that nothing grows under blue gum eucalyptus trees because of allelopathic chemicals emitted by eucalyptus that suppress the germination of other species of plants. They concluded, "In these experiments, we found that germination and seedling growth of the species tested were not inhibited by chemical extracts of blue gum foliage, either at naturally-occurring or artificially concentrated levels."[26]

If individual non-native trees within native vegetation are not doing any damage and do not increase risk of fire they should not be destroyed because destroying them WILL damage native vegetation. Please leave them alone!

Putting the DVMP into the long-term big picture

Finally, I suggest that we all take a step back from the details of the DVMP and consider the proposal in the context of the entire environment. The final VMP must minimize damage to the environment while mitigating fire hazards because:

- **The climate has changed and it will continue to change. When the climate changes, the vegetation changes.** That is one of the axioms of ecology and it will continue to be. If non-native plants and trees are better adapted to the current and anticipated climate, we should abandon futile attempts to force plants to live where we want them to live.
- **If we want trees in California, we must look to the future, not the past.** 130 million native conifers have died in California since 2010. 5-10 million oaks in California have been killed by Sudden Oak Death. The future of redwoods in California is in jeopardy because they require a lot of water and they don't tolerate wind.

  Greg McPherson (US Forest Service) is conducting a 20-year study of the tree species that are likely survive in the climate of the future in California.[27] Three years into the study, his research team has made some preliminary recommendations for the trees that are likely to survive anticipated change in the climate. None is native to Northern California. Most are foreign, particularly Australian.

  A climate change specialist at the US Forest Service tells us in a recent study that native tree species are the most vulnerable to climate change. USFS found that native trees are more vulnerable to the changes in temperature, precipitation, growing season, and other effects of accumulating greenhouse gases. The assessment found that 88 percent of invasive tree species are expected to prove resilient in the changing climate, ranked with low vulnerability, compared to 20 percent of natives.[28]

[26] http://digitalcommons.calpoly.edu/theses/1643/
[27] http://climatereadytrees.ucdavis.edu/
[28] https://www.forbes.com/sites/jeffmcmahon/2018/04/15/hug-your-native-trees-goodbye-thanks-to-climate-change/#4ad4a4176abd

- **We are contributing to climate change by destroying healthy trees that are storing tons of carbon that will be released into the atmosphere as the destroyed trees decay. The primary reason why wildfires are more frequent and more intense is because of the warmer, drier climate.** Therefore destroying more trees than necessary increases fire hazards because we are exacerbating climate change by destroying more trees than necessary.
- **It is a fiction that destroying trees will release less carbon than the wildfires imagined by those who demand their destruction**. According to a recently completed study at Oregon State University, "wildfire is not the biggest source of climate-warming carbon dioxide in Oregon forests—logging and wood products are."[29]

  A recently published op-ed by two academic ecologists corroborates the study in Oregon: "Only a relatively minor portion of the carbon in forests (typically about 10%) is emitted during forest fires, because trees themselves are not consumed in wildfires — only twigs and "leaves" — pine needles, in the California forest fires — even where forest fires burn hottest. Due to vigorous post-fire regrowth, spurred by nutrient cycling from the fire, burned forests begin to absorb more CO2 than they emit generally within five years or less after fires occur. By contrast, logging is a major source of CO2 emissions because less than half the wood in a tree is usable as lumber. The rest is burned or quickly decays in a landfill. "Thinning" operations actually cause a large net decrease in forest carbon storage and a net increase in emissions. "Thinning" sounds benign, but such projects often kill and remove more than 70% of the trees in a given stand, including many old-growth trees."[30]
  The trees that will be destroyed in Oakland will not be used as lumber, which means they will contribute even more carbon to the atmosphere. Timber that is used for building retains its stored carbon until the building deteriorates or is destroyed.

  CEQA requires that carbon loss of projects be quantified by the Environment Impact Report for the project. The EIR must estimate carbon loss resulting from the destroyed trees plus the loss of potential sequestered carbon when the trees are gone. The trees that will be destroyed will not be allowed to regenerate and no replacement trees will be planted. Carbon loss will be one of the most important criterion in evaluating the environmental impact of the VMP.

- **The herbicides that are used to destroy vegetation and prevent trees from resprouting damage the soil and pose serious health risks to animals and humans.** The more vegetation and trees the VMP destroys, the greater the damage caused by herbicides. Therefore, we must minimize the amount of vegetation that is destroyed as much as possible if herbicides are used.

We achieve nothing if the damage we do to the environment and to ourselves is greater than real or imagined reduction in fire hazards.

Thank you for your consideration.

A Resident of
Oakland, California
June 2018

[29] https://www.hcn.org/articles/climate-change-timber-is-oregons-biggest-carbon-polluter
[30] http://www.latimes.com/opinion/op-ed/la-oe-hanson-miller-governor-fire-orders-20180525-story.html