

REVISED AGENDA
Special Meeting
Disaster Fire and Safety Commission
April 27, 2022
7:00 PM

District 1 – Kim-Mai Cutler

District 5 – Shirley Dean

District 2 – Weldon Bradstreet

District 6 – Nancy Rader

District 3 –

District 7 – Tobias Simmons

District 4 – Antoinette Stein

District 8 – Paul Degenkolb

Mayor’s Appointee- Jose Luis Bedolla

PUBLIC ADVISORY: THIS MEETING WILL BE CONDUCTED EXCLUSIVELY THROUGH VIDEOCONFERENCE AND TELECONFERENCE

Pursuant to Government Code Section 54953(e) and the state declared emergency, this meeting of the Disaster and Fire Safety Commission will be conducted exclusively through teleconference and Zoom videoconference. The COVID-19 state of emergency continues to directly impact the ability of the members to meet safely in person and presents imminent risks to the health of attendees. Therefore, no physical meeting location will be available.

To access the meeting remotely: Join from a PC, Mac, iPad, iPhone, or Android device: Please use this URL <https://us06web.zoom.us/j/81595546232> If you do not wish for your name to appear on the screen, then use the drop down menu and click on "rename" to rename yourself to be anonymous. To request to speak, use the “raise hand” icon by rolling over the bottom of the screen.

*To join by phone: Dial 1-669-900-9128 and enter Meeting ID 815 9554 6232 If you wish to comment during the public comment portion of the agenda, Press *9 and wait to be recognized by the Chair. Please be mindful that all other rules of procedure and decorum will apply for Commission meetings conducted by teleconference or videoconference*

Preliminary Matters

Call to Order

Action Items

1. Measure GG and Measure FF Budget Recommendations. *
2. Measure FF Budget Recommendation - Expanded Fire Prevention Inspection Program* (Rader)

Adjournment

Internal

| FY23 Salary & Benefits | | |
|------------------------------------|-----------|--------------------|
| Division & Job Classification | # FTE | Recurring |
| Admin | 4 | \$705,976 |
| Associate Mgmt Analyst | 1 | \$196,731 |
| Communications Specialist | 1 | \$198,012 |
| Administrative Assistant | 2 | \$311,232 |
| Dispatch | 1 | \$284,679 |
| Emergency Medical Services Advisor | 1 | \$284,679 |
| EMS | 18 | \$2,866,851 |
| Assistant Fire Chief | 1 | \$384,685 |
| Captain II | 1 | \$277,629 |
| Firefighter (Paramedic) | 3 | \$665,172 |
| Single Function EMT | 12 | \$1,391,944 |
| Paramedic Supervisor I | 1 | \$147,421 |
| Training | 1 | \$277,629 |
| Captain II | 1 | \$277,629 |
| WUI | 4 | \$1,135,593 |
| Assistant Fire Chief | 1 | \$384,685 |
| Sworn Fire Inspector | 3 | \$750,908 |
| Grand Total | 28 | \$5,270,727 |

| Category | Total |
|--------------------------------|-------------|
| Admin (Supports all Divisions) | \$1,362,726 |
| EMS | \$3,036,293 |
| Training | \$478,754 |
| WUI | \$3,095,973 |
| Operations | \$273,715 |
| Paramedic Tax Defecit | \$705,525 |

| FY23 Overtime | |
|---------------------------|------------------|
| Division | Recurring |
| Oprations | \$70,452 |
| Technical Rescue Training | \$70,452 |
| Operations | \$70,452 |
| HazMat Training | \$70,452 |
| Grand Total | \$140,904 |

| FY23 Non-Personnel | | |
|--|--------------------|--------------------|
| Division & Project | One Time. | Recurring. |
| Administration | \$50,000 | \$356,750 |
| Standards of Cover & Continued Data Analysis | | \$50,000 |
| Project Management (WUI, Recruiting, Admin) | | \$306,750 |
| Real Estate (WUI, Training) | \$50,000 | |
| EMS | | \$169,443 |
| BLS Ambulances | | \$122,700 |
| Medical Specialist Team (MST) | | \$30,675 |
| Replacement Funds for Vehicle | | \$16,068 |
| Operations | | \$132,811 |
| HazMat Equipment | | \$50,675 |
| Tech Rescue Equipment | | \$50,000 |
| Replacement Funds for Vehicles | | \$32,136 |
| Paramedic Tax | | \$705,525 |
| Cover Paramedic Tax Budget Defecit | | \$705,525 |
| Training & Development | | \$201,125 |
| Cirriculum & Policy Development | | \$51,125 |
| Recruiting | | \$50,000 |
| Contracts, Equipment & Supplies | | \$100,000 |
| WUI/FP | \$850,000 | \$1,110,380 |
| Outdoor Alerting System | | \$44,200 |
| PubEd | | \$100,000 |
| Safe Passages Program | \$350,000 | \$150,000 |
| Tablet Command | | \$30,000 |
| Vegetation Management Program | \$500,000 | \$500,000 |
| Replacement Funds for Vehicle | | \$16,068 |
| Replacement Funds for Vehicles | | \$10,113 |
| CWPP Wild Res Mgmt | | \$20,000 |
| Lease of office space | | \$240,000 |
| WUI, EMS, Trng | \$200,000 | \$50,000 |
| Workstaton Configuration (WUI, EMS, Trng) | \$200,000 | \$50,000 |
| Grand Total | \$1,100,000 | \$2,726,034 |

4/27/22 ACTION ITEM

Rader Recommendation for Measure FF spending in FY 23 & FY 24 – Expanded Fire Prevention Inspection Program

To: Honorable Mayor and Members of the City Council
From: Disaster and Fire Safety Commission
Submitted by: José Luis Bedolla, Chairperson, Disaster and Fire Safety Commission
Subject: Measure FF Budget Recommendation - **Expanded Fire Prevention Inspection Program**

RECOMMENDATION

Summary. With the risk of catastrophic wildfire steadily increasing due to climate change, the Disaster and Fire Safety Commission (DFSC) recommends prioritizing wildfire fuel reduction in the FY 23 and FY 24 Measure FF budget by expanding the Fire Department’s Fire Prevention Inspection Program and fully enforcing the existing Fire Code to clear vegetation build-up and overgrowth within 100 feet of structures in Berkeley’s Very High Fire Severity Zones (VHFSZs) (Fire Zones 2 and 3). In addition, the Fire Code would be strengthened as needed to require removal of hazardous vegetation on the entirety of properties beginning in FY 25. The program would provide for City vegetation management crews to clear vegetation where property owners opt into the program or fail to comply, with no-interest liens placed upon properties to recover direct costs upon transfer. Special emphasis should be placed on eucalyptus groves due to their high flammability and potential to create spot fires.

Funding for this expanded program, together with the Fire Department’s existing home inspection program, which is focused on creating defensible space around structures, would be supported by devoting 21 percent and 26 percent of Measure FF revenues for FY 23 and FY 24, respectively. (See table below.)

Description. The Fire Department’s existing home inspection program is focused primarily on ensuring 30 feet of defensible space around structures in Fire Zones 2 and 3. Consistent with Berkeley’s and California’s regulations, the DFSC recommends that the program be expanded to routinely require defensible space within 100 feet of any structure, particularly on any portion of a slope, including the removal of particularly fire-prone vegetation. The City should develop additional regulations to require removal of highly fire-prone vegetation on the entirety of properties beginning in FY 25. Highly fire-prone vegetation is widely recognized to include eucalyptus, Monterey pine, juniper, and limited other species.

The DFSC also recommends that the City expand its capability, possibly in conjunction with the Parks and Recreation Department, to clear brush and remove trees as necessary to meet existing regulations where property owners fail to comply, with liens

placed upon properties to recover direct costs upon transfer, as provided under BFC Sec. 4907.2.2. As a City program is likely to provide economies of scale, other efficiencies, and expert guidance, and as the health and safety of Berkeley residents is promoted by facilitating compliance, property owners should be allowed to opt into the City's vegetation clearance program with cost-recovery provided through property liens. In either case, no interest should be assessed on direct costs, given the public benefits and the availability of Measure FF funds to carry the cost.

This proposed program is consistent with the recommendations of the Hills Emergency Forum, of which the City is a member along with other East Bay authorities, to thin and remove hazardous vegetation on private property as well as public property.¹ The initial phase of the program (FY 23) would be focused on requiring removal of debris build-up on the ground, loose bark to 8 feet above ground, tree limbs to 10 feet above ground, and saplings and subordinate trees that could ignite upper canopy throughout each property. The second phase (planned in FY 23, implemented beginning no later than FY 24) would require removal of hazardous trees and other hazardous vegetation, provide for any necessary erosion control measures, and encourage revegetation with native, fire-resistant species. Beginning in FY 25, property owners would be required to properly maintain their entire property, adding or clarifying Fire Code provisions as necessary that the Fire Department and the DFSC would develop in consultation with the City Attorney for Council's consideration. The proposed budgets may include a program manager, additional inspectors, expert consultants, and crews as needed.

Three additional elements of the program should include: (a) removal of trees and vegetation on private and City property to meet existing regulations that require unobstructed 20-foot clearance for emergency egress and emergency vehicle access²; (b) removal of hazardous trees and vegetation on City property as needed,³ and (c) removal of large trees posing public safety hazards on private property that have been identified outside of the VHFSZs, included in this program as an equity measure, if possible.⁴ The cost of clearing City property could be funded through Measure FF as needed.

¹ See Hills Emergency Forum (<http://www.hillsemergencyforum.org/MgmtRecmdtn.html>).

² Cal. Code Regs. tit. 14 § 1273.01.

³ The City's Parks and Recreation Department is currently addressing these hazards in city parks and may largely complete the effort in FY 22.

⁴ Consultation with the City Attorney as to the ability to expend Measure FF funds on trees posing safety hazards other than wildfire is advised.

| RECOMMENDATIONS - EXPANDED INSPECTION PROGRAM | | |
|--|---------------------|---------------------|
| | FY 23 \$ | FY 24 \$ |
| Continue current (FY 22) spending on Inspection Program, recurring) (<u>Estimated</u>) | \$ 1,000,000 | \$ 1,080,000 |
| Expanded Program* | \$ 770,000 | \$ 1,140,000 |
| Develop new fire safety regulations as needed | \$ - | \$ - |
| Total | \$ 1,770,000 | \$ 2,220,000 |
| Measure FF Annual Revenue | \$ 8,500,000 | \$ 8,500,000 |
| TOTAL % FF Funds | 21% | 26% |

* Cost of fuel removal, where necessary, to be recovered via property liens

FISCAL IMPACTS OF RECOMMENDATION

This DFSC recommendation addresses the prioritization of Measure FF funds and will have no impact on General Funds. However, by prioritizing the reduction of flammable vegetation throughout Berkeley’s VHFSZs, these recommendations will reduce the likelihood of wildfire and the intensity and severity of any wildfires that occur in the City, which would destroy homes and other property and have other far-reaching negative fiscal impacts, including exacerbation of the existing housing crisis.

The Fire Department recently abandoned an application for a CalOES/FEMA grant to address hazardous vegetation due to competing priorities, disqualifying events, costs and disproportionate commitment of staff time needed for grant application and performance.⁵

CURRENT SITUATION AND ITS EFFECTS

The Fire Department’s existing home inspection program is generally limited to addressing a 30-foot radius around structures in Fire Zones 2 and 3, and removal of hazardous vegetation (e.g., eucalyptus and junipers) is generally not required. Therefore, the inspection program does not address major areas of vegetation build-up and hazardous trees on private land. Such vegetation is widely recognized to contribute to the likelihood, severity and speed of a wildfire and thus poses an immediate wildfire threat to the City. As discussed below, however, California’s and Berkeley’s regulations provide for more aggressive inspections and enforcement.

BACKGROUND

Measure FF passed on November 3, 2020, with a 74.2 percent “yes” vote and generates approximately \$8.5 million annually. Among other important objectives, including improvements to the 9-1-1 dispatch system, training facility improvements,

⁵ BFD Monthly Report to the DFSC, March 23, 2022.

and funding of new ambulances and technicians, the measure supports wildfire prevention and preparedness activities including vegetation management. In a 2020 community survey, a tax for wildfire prevention received 69 percent approval from residents and was the most popular rationale for a new tax to support fire and emergency services.⁶

Measure FF funds have been used in part to create a home inspection program housed in the Fire Department, which is aimed primarily at creating 30 feet of “defensible space” around structures. “Defensible space” means the area adjacent to a structure where wildfire prevention or protection practices are implemented to provide defense from an approaching wildfire or to minimize the spread of a structure fire to wildlands or surrounding areas.⁷ Slope is a primary factor that increases an area’s susceptibility to wildfire.⁸ Berkeley’s Fire Department inspectors may require additional treatments within 100 feet of any property,⁹ however this is the “exception rather than the rule.”¹⁰ State law, however, requires 100 feet of defensible space for all properties in wildfire-urban interface areas,¹¹ and most of Fire Zones 2 and 3 is on slopes. Given the threat of wildfire and given that many private property areas within Berkeley contain dense and hazardous vegetation that will go untreated under current practice, Berkeley should fully enforce state requirements, which are consistent with Berkeley’s Fire Code that requires maintenance of an effective firebreak by “removing and clearing away flammable vegetation and combustible growth.” Flammable vegetation is widely recognized to

⁶ See p. 5 of the supplemental material for item 13 on the June 2, 2020 Council meeting: https://www.cityofberkeley.info/Clerk/City_Council/2020/06_June/City_Council_06-02-2020_-_Regular_Meeting_Agenda.aspx.

⁷ See Cal. Gov. Code Sec. 51177(a) and BFC Sec. 4907.2.1. <https://berkeley.municipal.codes/BMC/19.48.020>.

⁸ See CalFire, Prepare for Wildfire – Defensible Space, <https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/>.

⁹ Berkeley Fire Department, “Fire Prevention Inspection Report, Wildland-Urban Interface Area” (Rev. 05/2020) (included in June 1, 2021, Berkeley Fire Department mailing to Berkeley property owners).

¹⁰ According to Chief May of the BFD, “State law technically makes a property owner responsible for providing defensible space on their property out to a distance of 100 ft. from structures. However, the same law allows for varying intensity of vegetation management between 0 ft. – 30 ft. and 30 ft. – 100 ft. from structures. Based on our local lot size and geometry the Berkeley Fire Department is concentrating on the space 0 ft. – 30 ft. from structures as well as within 10 ft. of road and street frontages. There may be some circumstances where [defensible space] greater than 30 ft. is necessary and achievable, but these will be exceptions rather than the rule. There is no requirement to ‘groom hillsides’ (i.e., to cut/trim vegetation just to cut vegetation). Vegetation management is required where conditions in one of the defensible spaces around a structure or other target area require it.” (Response to October 18, 2021, questions posed by DFSC Commissioner Rader.)

¹¹ See CalFire, “Homeowners Checklist” (2009). <https://www.readyforwildfire.org/wp-content/uploads/Homeowners-Checklist.pdf>

include eucalyptus, Monterey pine, juniper and limited other species.^{12,13}

Berkeley has many areas of vegetative fuel build-up that are beyond 30 feet of any structure. Examples of large such areas include numerous concentrations of eucalyptus and other hazardous vegetation that exist throughout Fire Zones 2 and 3, including canyons with creeks, such as Cerritos Creek and Codornices Creek canyons, and areas between homes on the long slopes between tiered streets that are often untended and overgrown. Eucalyptus trees are a particular hazard, due to their high fuel-loading per acre, ease of ignition, fire intensity and flame length.¹⁴

The Hillside Fire Safety Group has identified seven eucalyptus groves of 15 trees or more on 103 private properties and three groves of 15 trees or more in three City parks (Remillard, Cragmont Rock and Glendale-La Loma). Smaller groups or single trees have also been found on 16 private properties and on seven other City properties (Two parks and 5 Right-of-Ways). In total, Eucalyptus trees have been found on approximately 119 private properties and 10 City locations. The 10 groves private and City property account for most of the approximately 717 eucalyptus trees north of the UC Berkeley and Berkeley Lab campuses.¹⁵ When one adds the approximately 415 Eucalyptus trees along the northern boundary of the UC Berkeley and Berkeley Lab campus, the total number of Eucalyptus trees in north Berkeley is 1,132. This does not include the Eucalyptus trees further to the south inside the UC Berkeley and Berkeley Lab campuses.

A significantly smaller number of additional hazardous trees exist in Fire Zone 3 (Panoramic Hill) and in the Fire Zone 2 area south of campus (areas of which burned in the 1991 Tunnel Fire). Many, if not most, of these areas require clean up. Better fuel management can also enable firefighters to assemble and more safely undertake fire suppression activities.¹⁶

The consultant recently hired by the Fire Department to prepare its Community Wildfire Protection Plan (CWPP) has explained the “unparalleled” potential of burning eucalyptus embers to create spot fires, which create some of the most destructive wildfires. The consultant noted that “[p]revention of crown fire in eucalyptus in the Berkeley/Oakland hills, and elsewhere in the East Bay *is of paramount importance to*

¹² See notes 13, 14, 22, and 28 *infra*.

¹³ Flammable vegetation expressly does not include “[s]pecimens of trees, ornamental shrubbery or similar plants which are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.” BFC Sec. 4907.2.

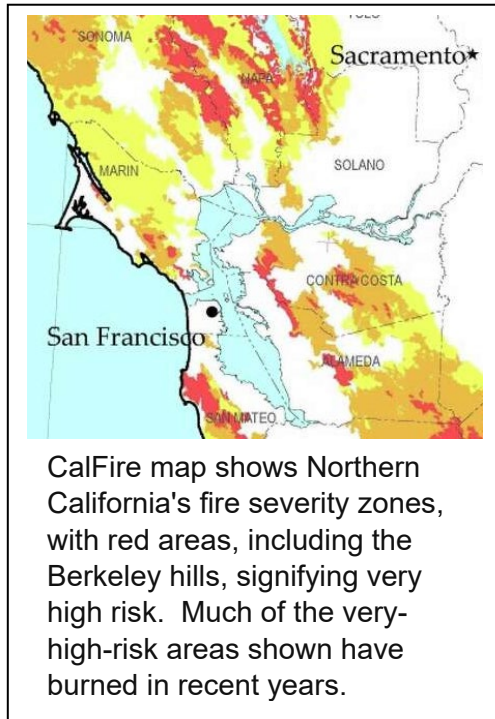
¹⁴ See East Bay Regional Park District, “Blue Gum Eucalyptus: A Wildfire Threat” (<http://www.hillsemergencyforum.org/docs/EucTreatment.pdf>); Russell and McBride, 2002, Agree et al., 1973, and Chenny, 1981, as cited in J.R. McBride’s Fuel Management Proposal for Claremont and Strawberry Canyons, 2019. (Available at <https://www.claremontcanyon.org/fuel-management-proposal>.)

¹⁵ Hillside Fire Safety Group presentation to the DFSC (February 23, 2022), plus Cragmont Rock Park and additional groves and trees in areas north of Marin Avenue.

¹⁶ Note 14 *supra* (McBride 2019).

*the fire safety of a very large population.*¹⁷ For this reason, eucalyptus groves should be prioritized in the City’s inspection program.

It is well understood that ladder fuels can carry fire from ground fuels to tree crowns where it can become a devastating fire that quickly spreads.¹⁸ Within its “State Responsibility Area,” CalFIRE has embarked on many programs to reduce fuel loads and create horizontal and vertical fuel breaks to protect California’s most wildfire-vulnerable communities.¹⁹ CalFIRE is not responsible for densely populated areas, however, which falls to local governments such as Berkeley. (See Figure at right.) While CalFIRE addresses fuel loads in areas near or adjacent to vulnerable urban areas, it is obviously at least equally important to address fuel loads *within* dense urban areas to reduce the likelihood and impacts of catastrophic wildfire.



The California Constitution generally prohibits “gifts of public funds” to any public or private person; however, such gifts are allowed for a public purpose, and that public purpose is to be liberally construed.²⁰ The city and state have numerous programs that spend public funds on private property for the purposes of disaster preparedness and public safety.²¹ Using public funds to reduce fuels that significantly contribute to the risk of

¹⁷ Carol Rice, Wildland Res Mgt, UC Berkeley [Wildland Vegetative Fuel Management Plan](#) at pp. 25-27 (July 2020 Draft). Emphasis added.

¹⁸ See CalFIRE, Fire and Fuels Treatment: <https://www.fire.ca.gov/programs/resource-management/resource-protection-improvement/wildfire-resilience/forest-stewardship/fire-and-fuels-treatment/>.

¹⁹ See, e.g., CalFIRE’s Fuel Reduction Guide (2021) (<https://www.fire.ca.gov/media/4jqerfjh/fuels-reduction-guide-final-2021-interactive.pdf>).

²⁰ See League of California Cities, “Gift of Public Funds (Spoiler Alert: It’s Illegal)” at p. 1. Available at: https://www.cacities.org/Resources-Documents/Member-Engagement/Professional-Departments/City-Attorneys/Library/2016/Annual-2016/10-2016-Annual_Forboth_Gift-of-Public-Funds_Spoile.aspx.

²¹ Several City of Berkeley programs provide public funds for private benefit, including a FEMA-funded seismic retrofit program providing grants of up to \$150,000 (see https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Building_and_Safety/RetrofitGrants_ProgramRules.pdf), and a free fuel chipper and debris bin program, funded through a refuse bill surcharge (see https://www.cityofberkeley.info/fire_fuel_program/). Alameda County offers grants of up to \$10,000 per homeowner to abate lead hazards (see <https://www.achhd.org/programs/leadfunding.htm>).

wildfire would likely be considered a public purpose, particularly given the limited incidental benefits that would accrue to landowners. Berkeley's City Attorney should confirm this view.

ENVIRONMENTAL SUSTAINABILITY

Acting on these recommendations will reduce the likelihood, intensity and severity of a wildfire in the City, potentially avoiding devastating and far-reaching human and environmental impacts in our City. Burnt landscapes can be slow to recover and can lead to polluted water sources, erosion or landslides, and health impacts from airborne ash.²²

The proposed City-run crews would promote the replacement of flammable, non-native tree and shrub species with natural, more fire-resistant native species that provide superior habitat for many insect, avian, and mammal species, compared with eucalyptus.²³ To prevent regrowth of eucalyptus, City crews should rely on non-pesticidal, manual sprouting control for several years following eucalyptus removal, if stumps are not removed. In drafting expanded or clarified portions of the Fire Code, the City should consider requiring property owners to employ manual sprouting control and revegetation with fire-resistant native species that also promote erosion control as necessary. The Hills Emergency Forum, of which the City is a member along with other East Bay authorities, has developed best management practices (BMPs) to reduce potential environmental impacts of fuel reduction projects and to comply with various laws and regulations which may be consulted.²⁴

The revegetation component of the program is expected to partially mitigate the carbon impact of removing hazardous trees. The City could mitigate remaining carbon impacts by using additional Measure FF funds to supplement the City's existing program to plant trees in northwest and southwest Berkeley.²⁵

Permits are not required to prune or remove any tree on private property, with the exception of coast live oak²⁶ (which is not fire-prone).

²² Cartier, K. M. S. (2022), U.S. fires quadrupled in size, tripled in frequency in 20 years, *Eos*, 103, <https://doi.org/10.1029/2022EO220188>. Published on 08 April 2022.

²³ See: California Native Plant Society East Bay (<https://ebcnps.org/conservation/balancing-fire-safety-with-native-ecosystem-protection-2022-02/>); Hills Emergency Forum (<http://www.hillsemergencyforum.org/MgmtRecmdtn.html>); East Bay Regional Park District, "Blue Gum Eucalyptus: A Wildfire Threat" (<http://www.hillsemergencyforum.org/docs/EucTreatment.pdf>);

²⁴ See Hills Emergency Forum, Best Management Practices Working Paper, 10/17/08 (<http://www.hillsemergencyforum.org/docs/BMPs.pdf>).

²⁵ See *Berkeleyside*, "Berkeley residents can request free saplings to combat tree inequity" (March 8, 2022) (<https://www.berkeleyside.org/2022/03/08/trees-make-life-better-berkeley>). Also see: https://www.cityofberkeley.info/tree_planting/.

²⁶ See City of Berkeley, Tree Pruning and Removal (https://www.cityofberkeley.info/pruning_removal/).

Land use projects that require trees to be cut down are often not considered significant environmental effects under the California Environmental Quality Act (CEQA).²⁷ While the City may nevertheless find “detriment” under the City’s zoning ordinance for impacts not considered significant, the environmental and public safety benefits of removing hazardous vegetation more than outweigh any such detriments, particularly given the revegetation element of the program.

RATIONALE FOR RECOMMENDATION

The geography, weather patterns, drought conditions and dense vegetation in the East Bay create ideal conditions for wildfire, which could have devastating consequences to Berkeley. Reducing these fuels wherever they exist has been identified as a high priority in the CWPPs of other East Bay jurisdictions²⁸ that have identified eucalyptus and Monterey pine as a particular hazard “due to their rapid growth, height at maturity, dense foliage, shallow root structure, flammability, breakability or invasiveness.”²⁹ “[E]ucalyptus ... are subject to torching and crown fires with potential high ember flight rates into residential areas.”³⁰

UC Berkeley (UCB) has also recognized the threat, having cleared eucalyptus trees in Claremont Canyon.³¹ UCB is currently in the process of removing eucalyptus and other trees and ladder fuels in the hills behind UCB along the Jordan Fire Trail, as part of a larger plan entailing the widespread removal of eucalyptus trees.³² LBNL is currently seeking \$2.9 million from CalFire to remove all 1,500 eucalyptus trees on its property.³³

The areas containing the greatest mass of hazardous fuel build-up in Berkeley exist on private property beyond 30 feet of any structure (or 100 feet on slopes) and are not currently being routinely addressed by the Fire Department’s residential vegetation

²⁷ See City of Berkeley, General Information on CEQA ([https://www.cityofberkeley.info/Planning_and_Development/Land_Use_Division/Environmental_Review_\(CEQA\).aspx](https://www.cityofberkeley.info/Planning_and_Development/Land_Use_Division/Environmental_Review_(CEQA).aspx)).

²⁸ See the CWPPs of El Cerrito-Kensington, Contra Costa County, Alameda County and others available at the website of the Diablo Firesafe Council, www.diablofiresafe.org. Also see EBRPD, note 5 *supra*.

²⁹ See *El Cerrito - Kensington Wildfire Action Plan*, p. 1.7. Also see *Contra Costa County Community Wildfire Protection Plan Update*, p. 2.5 and *Sunol Wildfire Action Plan* at 4.2.

³⁰ *Ibid*.

³¹ See <https://www.dailycal.org/2021/01/19/uc-berkeley-project-removes-claremont-canyon-trees-for-evacuation-route/#:~:text=In%20a%20project%20spearheaded%20by%20UC%20Berkeley%2C%20eucalyptus.November%202020%2C%20according%20to%20campus%20spokesperson%20Janet%20Gilmore.>

³² See <https://www.berkeleyside.org/2021/09/06/popular-cal-trail-closes-fire-safety-work/>.

³³ Personal correspondence between Jennifer Tang, Director of Community Relations, Lawrence Berkeley National Laboratory and Henry DeNero, Hillside Fire Safety Group, January 2022.

management inspection program. Removal of hazardous vegetation is the most effective and timely means available to the City for reducing the severe risk of wildfire. In addition, tall trees posing public safety hazards have been identified outside of the VHFSZs and should be included in this program if possible.

The City could pattern the program after the Parks & Recreation’s vegetation removal program (or expand the program), where Parks conducts competitive bidding and issues umbrella contracts to several firms that are then called upon for specific jobs. Parks may also have procedures to cost share where private property is involved.

The DFSC estimates that all of Berkeley’s hazardous vegetation could be removed by continuing this program for an additional one to three years beyond FY 24, depending on the rate of homeowner opt-in to the City’s clearance program and compliance failure rates, the actual cost of removing trees and revegetating, and the timeliness of any necessary changes to the Fire Code.

Adopting this recommendation will ensure that the City immediately reduces the extreme risk of wildfire, reduces the likelihood of ignition of homes and other structures in the event of wildfire, and meets the City’s obligations under Measure FF.

ALTERNATIVE ACTIONS CONSIDERED

The DFSC considered and rejected an alternate proposal that would have used Measure FF funds to pay for the removal of hazardous vegetation, rather than requiring property owners to do so at their own expense or via placement of liens.

The Fire Department may have alternative proposed recommendations for the expenditure of Measure FF funds.

CITY MANAGER

The City Manager [TYPE ONE] concurs with / takes no position on the content and recommendations of the Commission’s Report. [OR] Refer to the budget process. **Note: If the City Manager does not (a) concur, (b) takes any other position, or (c) refer to the budget process, a council action report must be prepared. Indicate under the CITY MANAGER heading, “See companion report.” Any time a companion report is submitted, both the commission report AND the companion report are Action reports.**

CONTACT PERSON

[Name], [Title], [Department]

Chin, Khin

From: Marcus von Engel <marcus@berkeleyhillsidefiresafety.org>
Sent: Wednesday, April 13, 2022 8:58 PM
To: Chin, Khin
Cc: Nancy Gillette; Henry DeNero; ada@berkeleyhillsidefiresafety.org
Subject: DFSC Comments - Marcus von Engel and Public Funds for Public Safety Examples
Attachments: DFSC Remarks - Marcus von Engel 2021 04 13.docx; Background Info - Public Funds Use for Public Safety 2022 04 13.docx

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

Khin -

Attached are my comments that were read to the commissioners. I understand that at some point I was accidentally muted.

I also attach for the commissioners benefit the current draft of our research. I would appreciate if you could distribute as initial research, which we will continue to update.

Thank you for your support.

Regards,

Marcus

marcus@berkeleyhillsidefiresafety.org

My name is Marcus von Engel, and I speak to you as a member of the leadership team for the Hillside Fire Safety Group.

We strongly support the proposal from Commissioner Rader, and thank the commissioners for thoughtfully considering it.

For 2022 we have vastly expanded the number of neighbors that are volunteering leading committees, which I would like to highlight to this commission two important committees.

First of all, we have a group dedicated to “myth busting” – to address any misinformation that may be shared with the commissioners. Nancy Gillette’s message is our start of this effort for the benefit of this commission.

Also, upon request from city leaders, we have identified numerous examples of how public funds are used on public and private property for public safety. We quickly identified more than a dozen examples of how public funds were used on private property. We also identified existing programs in the City of Berkeley and Alameda County that allocate public funds for private property owners. We are – of course – happy to share this information with you.

I specifically want to highlight in our findings that public funds – particularly the funds collected from the Measure FF initiative - can be used on public property. I quote:

The California Constitution generally prohibits “gifts of public funds” to any public or private person; however, such gifts are allowed for a public purpose, and that public purpose is to be liberally construed. Using public funds to reduce fuels that significantly contribute to the risk of wildfire would be considered a public purpose, particularly given the limited incidental benefits that would accrue to landowners.

Thank you for your continued efforts!

Marcus von Engel

marcus@berkeleyhillsidefiresafety.org

Background Info - Public Funds Use for Public Safety

There are multiple programs sponsored by cities and counties that allocate public funds to benefit private individuals and private property for the broader benefit of public safety. Examples include:

- Sea water intrusion programs
- Sandbag distributions
- Water resource management for farmers
- Wildfire recovery support
- Nuisance Bee
- Tumbleweed Abatement
- Weed Abatement/Brush Control
- LGBTQ Assistance
- Watershed management for private property owners
- New Business Assistance
- Rodent control services for farmers and ranch owners
- Affordable housing subsidies
- COVID-19 Stipend Programs
- Public defender programs
- Home Maintenance and Minor Repair Services
- Residential Energy/Water Conservation Rebates
- Weatherization Programs
- Feral Swine Damage Management Program

In addition, there are many options for assisting private landowners for conforming to public safety. Many programs are focused on lower-income or mean tested. However, many programs consider the broader benefits for public safety.

Alameda County and City of Berkeley Programs

Some examples of programs in the City of Berkeley and Alameda County include:

| Program | Description | More Info |
|--|---|---|
| Fire Fuel Chipper and Debris Bin Program | The Fire Fuel Chipper and Debris Bin Program is part of the city's Vegetation Management Program. This program, which began in the spring of 1993, provides a brush chipping service and debris bins to Berkeley residents that live in the designated areas. It is funded by a surcharge on the refuse bills residents in the Fire Surcharge Area pay. Only properties that pay the refuse bill surcharge are eligible for using this program. | https://www.cityofberkeley.info/fire_fuel_program/ |
| Vector control service | The Vector Control Program enforces rodent control under Berkeley Municipal Code (Chapter 11.32) by investigating all requests for service concerning rodents and rodent harborage and rendering appropriate services in response. | Link |
| Lead hazard repair | Lead Hazard Repair grants are available for owners of pre-1978 rental and owner-occupied residential properties throughout Alameda County. Pre-1960 housing units are a priority. Service includes free lead testing, up to \$10,000 per unit for lead hazard repairs, and project assistance to help make your | https://www.achhd.org/programs/lead_funding.htm |

| | | |
|----------------|---|---|
| | home or property lead-safe. | |
| Sewer laterals | The City offers a loan program to assist Berkeley low-income property owners to comply with BMC 17.24 requirements for private sewer laterals. The eligible work funded through the PSL Loan Program is limited to repair or replacement of a private sewer lateral with defects or improper connections that were identified by the City's smoke testing program | https://www.cityofberkeley.info/psl/ |

Additional Reference examples

Here are some examples of public funds—city money—being used on private property directly in the City of Berkeley. This shows the range of projects, both large and small, throughout the city.

1. Berkeley Rep has received city money.
2. Also in the downtown “Arts District,” the pedestrian corridor between Center Street & Addison Street, received city funds. Located at the ground level, it connects Center Street and available parking, to Berkeley Rep., the Aurora Theater and the Jazz School.
3. Freight & Salvage. City money was provided for the renovation, remodeling and upgrading of the facility. This building is private property. This is another example of how the city contributes to its “Arts Community.”
4. The Berkeley Animal Care Services center, located at # 1 Bolivar, next to the freeway, is a non-profit that received city money. We believe the funds were used to improve the street level parking improvements.
5. “The bank that became a pizza place”...got city funds for renovation and converting the ground level bank to a pizza restaurant. This might have been a part of an old redevelopment district. Called “Vault Cafe,” it’s located at 3250 Adeline.
6. The Fourth Street shopping district was given funds through tax rebates to create the entire “Fourth Street shopping district” for the City of Berkeley. The city also donated adjacent streets to the shopping district: they closed off cross streets in several locations that became private parking lots. They also gave tax rebates to the developer.
7. The Brower Center,—privately owned, not owned by the city. The city contributed the land for the building: it was formerly a city parking lot.
 - a. This site has two components. The Brower building is owned and managed by a non-profit and provides low rent to various non-profit groups.
 - b. The second component consists of 100% “low-income” residents as well as street level retail shops and one restaurant.

- c. Therefore the owner of the “Housing & Retail Space” building makes money from the rent on both the housing and commercial space.
 - d. In addition to the above mentioned city contributions, the City of Berkeley also donated some funds for the underground parking for low-income residents.
8. At the southern end of Sacramento Street, a retail district that the city wanted to support for the benefit of the neighborhood, received improvements that included facades on the buildings, new awnings and signage for ground floor retail.
 9. The West Berkeley Bowl Project: Funds for paving and creating a parking lot on the former railroad land (at the time owned by the city) that was incorporated into the West Berkeley Bowl Project.
It’s important to understand that the City of Berkeley has for many years (always) looked for an opportunity to include low-income housing in any of the development projects it approves. An example of this is the West Berkeley Bowl Project. The city found a developer of low-income housing who agreed to work with the owners of Berkeley Bowl and the city to create low-income housing on an adjacent parcel. However, they needed parking separate from the grocery store. So, the city donated the former railroad land to the developer who owns this housing & the land, located next to West Berkeley Bowl on Ashby & Heinz. In addition, the city closed streets...they closed public streets to permit the private development of the parking lot for West Berkeley Bowl....a privately held company. (This is an example of a “Double Private Property” beneficiary.)
 10. The building of the Ed Roberts Campus...on the parking lot for patrons of the Ashby BART Station. BART owned the land & the city contributed to the building of the campus. This building is dedicated to & for the disabled community, another public interest the city is supporting: the disabled community.
 11. The YMCA in downtown Berkeley. The program for renovation of the building included city funds used for this non-profit. The Y owns the property....it’s private property. In addition, the city subsidizes “Y membership” for city staff.
 12. The bike parking on private property adjacent to the new downtown BART station. It’s located inside a ground level retail building. This was one of the funding requirements to get the downtown BART station rebuilt. The city encourages & subsidizes non-auto use, such as BART & bikes.
 13. The city provided financial support for the improvements for the Jazz Club inside the Gaia building. Located at the ground level (they also serve food inside the club) the apartment building was developed by Panoramic Interests. Hudson McDonald secured funding for this project and managed the construction for the developer, Panoramic Interests, who currently owns it.
 14. Support for the renovation costs for the University Avenue Movie House into a live performance venue. This is privately owned.

Legal Reference

The California Constitution generally prohibits “gifts of public funds” to any public or private person; however, such gifts are allowed for a public purpose, and that public purpose is to be liberally construed.^[1] The city and state have numerous programs that spend public funds on private property for the purposes of disaster preparedness and public safety.^[2] Using public funds to reduce fuels that significantly contribute to the risk of wildfire would likely be considered a public purpose, particularly given the limited incidental benefits that would accrue to landowners. Berkeley’s City Attorney should confirm this view.

[1] See League of California Cities, “Gift of Public Funds (Spoiler Alert: It’s Illegal)” at p. 1. Available at: https://www.cacities.org/Resources-Documents/Member-Engagement/Professional-Departments/City-Attorneys/Library/2016/Annual-2016/10-2016-Annual_Forboth_Gift-of-Public-Funds_Spoile.aspx.

[1] Several City of Berkeley programs provide public funds for private benefit, including a FEMA-funded seismic retrofit program providing grants of up to \$150,000 (see [Retrofit Grants](#)), and a free fuel chipper and debris bin program, funded through a refuse bill surcharge (see https://www.cityofberkeley.info/fire_fuel_program/). Alameda County offers grants of up to \$10,000 per homeowner to abate lead hazards (see <https://www.achhd.org/programs/leadfunding.htm>).

Additional Civic Reference Sites

- <https://www.211la.org> - identifies support programs for Los Angeles County

Chin, Khin

From: Nancy Gillette <beetlegillette@yahoo.com>
Sent: Wednesday, April 13, 2022 9:23 PM
To: Chin, Khin
Cc: Henry DeNero; Marcus Von Engel
Subject: Fw: Following up on our Zoom meeting: Eucalyptus and fire
Attachments: The Science Behind Fire and Eucalyptus 4_13_2022.pdf

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

Dear Khin,

I'm forwarding to you the bibliography that I prepared to help clarify some of the misinformation surrounding Eucalyptus trees. I would appreciate it if you would send it on to the rest of the commissioners, and if they have questions or comments I'd be pleased to respond. Perhaps it can be entered into the record.

I also wanted to mention that neither the Hillside Fire Safety Group nor Commissioner Rader is advocating the use of any pesticides for vegetation management. Work by Glen Schneider of the California Native Plant Society has shown that resprouting of Eucalyptus can be controlled using manual methods, and that is what HFSG recommends. I believe that's the approach taken in Nancy Rader's proposal too.

I suggest that anyone concerned about the effects of Eucalyptus removal visit Skyline Gardens, a demonstration garden south of Tilden Park's Little Train where Eucalyptus were removed without the use of pesticides. Now, a healthy native wildflower garden is flourishing. It is spectacular right now, and I highly recommend a hike there.

Best regards,
Nancy Gillette

[VOLUNTEER! | skylinegardensebcnps](#)

VOLUNTEER! | skylinegardensebcnps

----- Forwarded Message -----

From: Nancy Gillette <beetlegillette@yahoo.com>
To: Abraham Roman <aroman@cityofberkeley.info>; Chris Pinto <cpinto@cityofberkeley.info>; Steven Riggs <sriggs@cityofberkeley.info>; David A. Sprague <dsprague@cityofberkeley.info>
Cc: Joe R. McBride <jrm2@berkeley.edu>; Henry DeNero <htdenero@gmail.com>; Marcus Von Engel <mvengel@yahoo.com>; Kathleen Kelly <kathleenekelly@yahoo.com>; Alec Dara-Abrams <ada@dara-abrams.com>; Benay Dara-Abrams <benay@dara-abrams.com>; Annie Johnson <annie@aubears.com>
Sent: Wednesday, April 13, 2022, 10:58:04 AM PDT
Subject: Following up on our Zoom meeting: Eucalyptus and fire

Dear Chief Roman and Staff,

I want to thank you all for meeting with the Hillside Fire Safety Group and for considering our approach to reducing wildfire risk in the Berkeley community. We understand what a challenging job you have, and hope that we can assist you in your efforts to keep our community safe.

During that meeting, I indicated to you that there was substantial scientific literature indicating the severe risk of Eucalyptus-fueled wildfires and supporting the use of fuel reduction treatments to minimize that risk. We

understand that there is a great deal of misinformation regarding that risk on the internet, and we wished to provide you with science-based information to counter claims that are not based in sound science.

Attached please find a PDF summarizing the basic science, along with an extensive list of references that support the conclusions in the summary page.

Please let me know if you have questions or comments.

Best regards,

Nancy Gillette, Ph.D.

Retired Forest Service Researcher

HAB/HFSG Board Member

Fire Risks of Tasmanian Blue Gum, *Eucalyptus globulus*

- Tasmanian blue gum, or *Eucalyptus globulus*, was planted here by the millions by speculators at the turn of the 20th century, and it's what foresters call a fire-dependent species. In other words, it enhances wildfire, it survives fire quite well, and fire benefits its regeneration while suppressing native vegetation.
- There is a wellspring of myths regarding the fire risks of Eucalyptus: that they serve as firebreaks, that they're fire-resistant, that they keep soils moist, and that they favor the growth of grasses (lower-fuel) over shrubbery (higher fuel levels). These myths are based on a rejection of mainstream science in both North America and Australia.
- The volatile, flammable oils in its leaves make up as much as 20% of their dry weight. These oils can essentially boil off and ignite, starting a ground or crown fire. The national Park Service estimates that Eucalyptus was responsible for more than 70% of the radiant energy released from vegetation in the 1991 Tunnel Fire.
- Eucalyptus creates its own ladder fuels (through flammable leaves and twigs, peeling ribbons of bark known as "torches," and basket-like branches that trap all that litter; these are held above-ground and are well aerated in the case of an ignition).
- The strips of bark easily become airborne firebrands once they catch fire. These can be blown for miles, especially in Diablo winds, creating new spot fires and vastly complicating the work of fire crews. We saw this in 1991; I spent hours on my own roof then, hosing down Eucalyptus firebrands before being forced to evacuate.
- Besides canopy fuels, blue gum creates a prodigious amount of understory litter that decomposes more slowly and is better aerated than other forest types, also favoring ignition. Studies have shown that Eucalyptus accumulates 30-60 tons of debris per acre... compared to live oaks, which average 11, and grass, 1-4 tons. Most blue gum litter is made up of small twigs, bark, and leaves, known as "fine fuels" which are easily ignited. Once that catches fire, ladder fuels easily spread fire to the crown, where firebrands are carried aloft and start new fires downwind.
- **The clear majority of foresters, both American and Australian, consider this an extremely dangerous tree. To deny this is to reject sound science. Extensive research and experience over two continents reveal the severe risks of unmanaged Eucalyptus groves.**

See accompanying bibliography for scientific articles and publications on Blue Gum Eucalyptus.

Blue Gum Eucalyptus and Fire: Scientific Publications

Nancy Gillette, Ph.D. (UC Berkeley, Forest Entomology)

Comments: Each entry begins with the formal citation (boldface), followed the abstract or other description. Many of these references describe use of prescribed fire to reduce Eucalyptus fuel loads, and they are included because mechanical fuels reduction (removal of understory debris) is often used as a surrogate for prescribed burning because of the risks associated with the latter method. I've also included a few papers dealing with monarch butterfly overwintering sites, because recent research challenges the assumption that Eucalyptus are necessary for overwintering. Yellow highlighting indicates information that I considered most relevant for the DFSC.

Agee, J.K. and C. N. Skinner. 2005. Basic principles of forest fuel reduction treatments. Forest Ecology and Management 211: 83–96.

Abstract: Successful fire exclusion in the 20th century has created severe fire problems across the West. Not every forest is at risk of uncharacteristically severe wildfire, but drier forests are in need of active management to mitigate fire hazard. We summarize a set of simple principles important to address in fuel reduction treatments: reduction of surface fuels, increasing the height to live crown, decreasing crown density, and retaining large trees of fire-resistant species. Thinning and prescribed fire can be useful tools to achieve these objectives. Low thinning will be more effective than crown or selection thinning, and management of surface fuels will increase the likelihood that the stand will survive a wildfire. Five empirical examples of such treatment are discussed: Hayfork fires, California, 1987; Tye fire, Washington, 1994; Megram fire, California, 1999; Hayman fire, Colorado, 2002; and the Cone fire, California, 2002. Applying treatments at an appropriate landscape scale will be critical to the success of fuel reduction treatments in reducing wildfire. [NOTE: WRITTEN FOR WUI]

Agee, J. K., R. H. Wakimoto, E. F. Darley, and H. H. Biswell. 1973. Eucalyptus: fuel dynamics, and fire hazard in Oakland hills. California Agriculture. 27:13-15.

Abstract: This study reports the results of two years of fuel studies in blue gum eucalyptus stands. Fuel weights are related to stand densities, and the dynamics of fuel accumulation are investigated. Techniques for managing fuel loads in eucalyptus stands are discussed. Results of this study indicate that fuel buildup occurs very rapidly in unmanaged eucalyptus stands, and that to maintain low fuel levels, a fuel reduction program is essential. If prescribed fire is used, burning techniques that minimize air pollution must be used.

Anjos, A., Fernandes, P., Marques, C., Borrhalho, N.M.G., Valente, C., Correia, O., Máguas, C., and Chozas, S. 2021. Management and fire, a critical combination for *Eucalyptus globulus* dispersal. *Forest Ecology and Management* Volume 490, 15 June 2021, 119086

Abstract: In a context of growing demands for wood and wood derived products, plantations of exotic tree species have globally increased. Fast growth and high productivity made *Eucalyptus* one of the most successful tree genus around the world. Nevertheless, this genus is often associated with negative ecological impacts on biodiversity and ecosystem functioning and the risk of expansion is considered a major threat. *Eucalyptus globulus* is the most planted tree species in Portugal, but common silvicultural measures, including periodic control of the understory vegetation, have traditionally limited natural regeneration. However, forest fires constitute a main driver of *E. globulus* dispersal and regeneration and, under the current climatic change scenario, the possible extension of the summer fire regime to previous months in spring and/or later months in autumn, may have a profound effect on *E. globulus* dispersal capacity. Moreover, isolated eucalypt trees, seed-trees, are often left uncut and many plantations are poorly managed potentially increasing the risk of *E. globulus* dispersal. To evaluate the impact of both management and fire event dates on *E. globulus* dispersal, we assessed the establishment of saplings beyond plantations and seed-trees surrounding areas in absence of fire and after 2017 June and October fires in managed and unmanaged conditions. Sapling survival was also analyzed two years after fire. Our results point out that sapling establishment in our study area is not a major concern in the absence of fire. Also, our findings showed that *E. globulus* establishment is highly dependent on the time of the year a fire occurs and that pre-fire management practices constrain *E. globulus* dispersal. We also found that seed-trees are high seed dispersers after fire even in managed conditions, deserving great concern. Additionally, sapling survival two years after October fire indicate that out of season fires might constitute an emerging issue regarding *E. globulus* expansion.

Alavalapati, Janaki R.R., Douglas R. Carter, and David H. Newman. 2005. Wildland urban interface: challenges and opportunities. *Forest Policy and Economics*. 7:705-708.

Abstract: The wildland–urban interface (WUI), commonly described as the area where urban areas meet and interact with rural lands (Vince et al., 2005), includes the edges of large cities and small communities, areas where homes and other structures are intermixed with forests and other land uses, and islands of undeveloped lands within urban areas (Alavalapati, 2005; Monroe et al., 2003; SAF, 2004). The interface is particularly characterized by areas of urban sprawl where development pressures are pressed against public and private wildlands. Continuous transition of land-use, primarily from agriculture and forest uses to urban land uses, in the interface raises a myriad of socioeconomic and environmental concerns. A deeper

understanding of these concerns is essential to formulate effective policy solutions. While a household's dream of home ownership and the value placed on private property rights favor urban development (Garkovich, 2000), the moving interface associated with urbanization poses a series of challenges to both rural and urban communities. These include ecosystems fragmentation, increased exposure to invasive species, water and air pollution, wildfires, and loss of habitat for wildlife. These changes affect residents of rural and urban areas, natural resource managers, and business and environmental organizations. For example, management of forests for eco-logical goods and services such as forest products and clean water is affected by people occupying the forests. Many types of land ownerships in the interface bring in new neighbors with a different set of values, lifestyles, and land ethics into the interface; and as a result, conflicts and tensions arise between these new and existing communities and cultures. The changes imparted as the WUI develops are not only significant but are very rapid, much faster than any other processes that impacted land use changes in recent history. For example, Alig et al. (2000) noted that as much as 14million acres of non-industrial forests were lost to urban use between 1952 and 1997. Multiple jurisdictions and scales within a region, that are typical of a WUI, can further complicate efforts to manage and conserve natural resources. Thus, the rapid urban growth in wildland has significant and widespread social, cultural, economic, and environmental implications. Addressing the problems of the WUI to sustain ecologically viable and socio-economically feasible landscapes is a complex task for which neither easy nor perfect solutions exist (Alavalapati, 2005). Planning and managing in a WUI thus invariably involves several disciplines that encompass the natural, socio-economic, and cultural dimensions of the issues.

Barboni T., Cannac, M., Leoni E., and N. Chiaramonti. 2011. Emission of biogenic volatile organic compounds involved in eruptive fire: implications for the safety of firefighters. *International Journal of Wildland Fire* 20(1) 152-161 <https://doi.org/10.1071/WF08122>.

Abstract: Forest fires are can be fatal for firefighters owing to the phenomenon of eruptive fire. The hypothesis of this study is that biogenic volatile organic compounds (BVOCs) accumulate in the vicinity of the fire front. One of the factors required for an eruptive fire to take place is that BVOC concentrations must be between their lower flammable limit and upper flammable limit. When this accumulation of BVOCs is exacerbated by specific geographical zones (e.g. small valleys, thalwegs, canyons), the combination of these two factors can lead to situations with a very high flammability potential, representing a considerable risk for firefighters. In France, 16 firefighters have been fatally injured over the last 15 years. This work was carried out on three species of the Mediterranean basin: *Pinus laricio* Poir., *Pinus pinaster* Ait. and *Cistus monspeliensis* L. The maximum BVOCs emitted as a function of temperature (50–200°C) by

these species were 147.9, 11.6 and 56.0 g m⁻³ respectively. The quantities of BOVCs emitted by *P. laricio* and *C. monspeliensis* were sufficiently high for eruptive fires to occur.

Blonski, K., Miller, C., and Rice, C. L. Managing Fire in the Urban Wildland Interface. 2010. Solano Press Books, Point Arena, California, 396 pp.

Publisher's description: A unique guide to solutions and strategies for managing fire at the urban edge. Offers analytical tools and comprehensive summaries not found in other manuals dealing with fire mitigation. Designed as a reference. Managing Fire in the Urban Wildland Interface provides information on codes and laws and includes case studies, tables, figures, suggested websites, and other source material. Draws on best practices from California, with lessons applicable nationwide.

Equally useful to state, federal, and local agency staff and officials; fire agency staff; attorneys; architects; landscape architects; property owners; developers; insurance company managers; and business and community leaders. *Managing Fire in the Urban Wildland Interface* has been named winner of the 2011 Education Award from the APA (American Planning Association) California Northern Section and 2011 Outstanding Environmental Resource Document Award at the 2011 AEP (Association of Environmental Professionals) Annual Conference

Boer, M. M., R. J. Sadler, R. S. Wittkuhn, L. McCaw, and P. F. Grierson. 2009. Longterm impacts of prescribed burning on regional extent and incidence of wildfires: Evidence from 50 years of active fire management in SW Australian forests. Forest Ecology and Management 259:132-142.

Abstract: Prescribed burning is advocated for the sustainable management of fire-prone ecosystems for its capacity to reduce fuel loads and mitigate large high-intensity wildfires. However, there is a lack of comprehensive field evidence on which to base predictions of the benefits of prescribed burning for meeting either wildfire hazard reduction or conservation goals. Australian eucalypt forests are among the very few forest types in the world where prescribed burning has been practised long enough and at a large enough spatial scale to quantify its effect on the incidence and extent of unplanned fires. Nevertheless even for Australian forests evidence of the effectiveness of prescribed burning remains fragmented and largely unpublished in the scientific literature.

We analysed a 52-year fire history from a eucalypt forest region in south-western Australia to quantify the impact of prescribed burning on the incidence, extent and size distribution of

wildfires. Quantile regression identified the longevity of the influence of prescribed fire treatments on wildfire incidence and extent. Anomalies in the frequency-size distribution of unplanned fires were identified through a relative risk mapping using kernel density estimates. Changes in the spatial distribution of fuel age were quantified using patch metrics, while generalized additive models were applied to estimate effects of fuel age patterns on the incidence and extent of unplanned fire.

Prescribed burning has pronouncedly changed the spatial distribution of fuel age in the study area and has significantly reduced the incidence and extent of unplanned fires. This effect on both the incidence and extent of unplanned fires was minimal for time lags greater than 6 years between fuel treatment and response. When averaged over 6-year periods, the annual extent of prescribed burning explained 24% and 71% of the variation in the mean annual number and extent of unplanned fires, respectively. The incidence of large unplanned fires was significantly less than the long-term average for the region when the annual extent of prescribed fire was at a maximum and significantly more when the annual extent of prescribed fire was at a minimum. Since the 1960s, the length of time sites remain unburned by wildfire has approximately doubled to ~9 years. We found that each unit area reduction in unplanned fire required about four units of prescription fire. These findings concur with the observations of experienced field practitioners who identify the 6-year mark as effective at reducing wildfire hazard. Our findings provide strong empirical evidence of the effectiveness of prescribed burning for mitigating wildfire hazard in SW Australian forests. Ongoing research and development is needed to implement managed fire regimes that integrate wildfire mitigation with conservation of biodiversity and other environmental values.

Botequim, B., J Garcia-Gonzalo, S. Marques, A Ricardo, JG Borges, M Tomé, MM Oliveira.
2013. Developing wildfire risk probability models for *Eucalyptus globulus* stands in Portugal. *iForest - Biogeosciences and Forestry*, Volume 6, Issue 4, Pages 217-227 (2013)

Abstract: This paper presents a model to predict annual wildfire risk in pure and even-aged eucalypt stands in Portugal. Emphasis was in developing a management-oriented model, *i.e.*, a model that might both: (a) help assess wildfire occurrence probability as a function of readily available forest inventory data; and (b) help predict the effects of management options (*e.g.*, silvicultural treatments) on the risk of fire in eucalypt stands. Data from both the 1995/1998 and the 2005/2006 Portuguese National Forest Inventories as well as wildfire perimeters' data were used for modeling purposes. Specifically, this research considered 1122 inventory plots with approximately 1.2 million trees and 85 wildfire perimeters. The model to predict the probability of wildfire occurrence is a logistic function of measurable and controllable biometric and environmental variables. Results showed that wildfire occurrence probability in a stand increases with the ratio basal area/quadratic mean diameter and with the shrubs biomass load,

while it decreases with stand dominant height. They further showed that the probability of wildfire occurrence is higher in stands that are over 1 Km distant from roads. These results are instrumental for assessing the impact of forest management options on wildfire risk levels thus helping forest managers develop plans that may mitigate wildfire impacts.

Boyd, David. 1997. Eucalyptus Removal on Angel Islands. California Exotic Pest Control Symposium Proceedings. 1997. Novato, California.

Abstract: None. Describes the challenges and outcomes of the project.

Butterfield, H. M. 1935. The introduction of Eucalyptus into California. Madroño. 3:149- 154.

Abstract: None.

Calvino-Cansela et al. 2016. Wildfire risk associated with different vegetation types within and outside wildland-urban interfaces. Forest Ecology and Management 372: 1-9

Abstract: Wildland-urban interfaces (WUIs) are areas where urban settlements and wildland vegetation intermingle, making the interaction between human activities and wildlife especially intense. Their relevance is increasing worldwide as they are expanding and are associated with fire risk. The WUI may affect the fire risk associated with the type of vegetation (land cover/land use; LULC), a well-known risk factor, due to differences in the type and intensity of human activities in different LULCs within and outside WUIs. No previous studies analyse this interaction between the effects of the WUI and the LULC, despite its importance for understanding the patterns of fire risk, an essential prerequisite to undertake management decisions that can influence fire regimes.

The aim of this study is to assess the effect of the WUI on fire ignition risk and the area burned, and the interaction between its effect and that of the LULC. We used a database of 26,838 wildfires recorded in 2006–2011 in NW Spain and compared fire patterns in relation to WUI and LULC with a random model, using a Montecarlo approach.

There was a clear effect of the WUI on the risk of both fire ignition and spread (higher ignition risk but lower risk of spread in WUIs). The risk of fire was also affected by LULC and, interestingly, the pattern among LULCs differed between WUI and non-WUI areas. This interaction WUI × LULC was particularly important for forestry plantations, which showed the highest increase in ignition risk in WUI compared to non-WUI areas. Native forests and agricultural areas had the lowest ignition risk. Agricultural areas showed the smallest difference

in fire size between WUI and non-WUI areas, while shrublands showed much larger fires outside WUIs. Deliberate fires were larger in general than those with other causes, especially outside the WUI.

The differences found between LULCs in fire risk, both in WUI and non-WUI areas, have interesting implications for fire management. Promotion of land covers with low fire risk should be considered as a low cost alternative to the usual fire prevention measures based on fuel load reduction, which require the continuous clearing of vegetation. In this regard, the low fire risk in native forests should be taken into account. Native forests naturally colonize many areas in the study region and require low or no management, in contrast with agricultural areas, also with low fire risk but requiring continuous management in order to avoid colonization by natural vegetation.

Cerasoli S., Caldeira , M.C., Perieira, J.S., Caudullo, G., De.Rigo, J. Eucalyptus globulus and other eucalypts in Europe: distribution, habitat, usage and threats. In book: European Atlas of Forest Tree Species, Editors: Jesus San-Miguel-Ayanz, Daniele de Rigo, Giovanni Caudullo, Tracy Houston Durrant, Achille Mauri.

Abstract: The Eucalyptus globulus Labill., commonly named as Tasmanian blue gum, is an evergreen broadleaf tree native to south-eastern Australia. In Europe it is mainly cultivated in the Iberian Peninsula for paper pulp production, managed as short rotation coppice stands. It is appreciated for its adaptation and fast-growing aptitude. Rapid environmental changes in the Mediterranean region menace Tasmanian blue gum trees increasing the risk of fire, drought and the outbreaks of pests and diseases.

Cheney NP, Bary GAV. 1969. The propagation of mass conflagrations in a standing eucalypt forest by the spotting process. In 'Mass Fire Symposium', 10–12 February 1969, Canberra, ACT. Paper A6. (Defence Standards Laboratories: Melbourne)

Abstract: Not available.

Cruz Cruz MG, Sullivan AL, Gould JS, Sims NC, Bannister AJ, Hollis JJ, Hurley RJ. 2012. The anatomy of a catastrophic wildfire: the Black Saturday Kilmore East fire in Victoria, Australia. *Forest Ecology and Management* 284, 269–285. *Forest Ecology and Management* 284: 269-285.

Abstract: The 7 February 2009 wildfires in south-eastern Australia burned over 450,000 ha and resulted in 173 human fatalities. The Kilmore East fire was the most significant of these fires, burning 100,000 ha in less than 12 h and accounting for 70% of the fatalities. We report on the weather conditions, fuels and propagation of this fire to gain insights into the physical processes involved in high intensity fire behaviour in eucalypt forests. Driven by a combination of exceedingly dry fuel and near-gale to gale force winds, the fire developed a dynamic of profuse short range spotting that resulted in rates of fire spread varying between 68 and 153 m min⁻¹ and average fireline intensities up to 88,000 kW m⁻¹. Strong winds aloft and the development of a strong convection plume led to the transport of firebrands over considerable distances causing the ignition of spotfires up to 33 km ahead of the main fire front. The passage of a wind change between 17:30 and 18:30 turned the approximately 55 km long eastern flank of the fire into a headfire. Spotting and mass fire behaviour associated with this wide front resulted in the development of a pyrocumulonimbus cloud that injected smoke and other combustion products into the lower stratosphere. The benchmark data collected in this case study will be invaluable for the evaluation of fire behaviour models. The study is also a source of real world data from which simulation studies investigating the impact of landscape fuel management on the propagation of fire under the most severe burning conditions can be undertaken. Highlights: We describe the propagation of the 2009 Black Saturday Kilmore East Fire, Australia. We provide quantitative data on the behaviour of fires in eucalypt forests under extreme fire weather conditions. Rates of spread and spotting distances up to 150 m min⁻¹ and 33 km respectively were documented. The fire behaviour information is benchmark data from which future fire models can be calibrated and evaluated.

Dicus C. and M.E. Scott. 2006. Reduction of Potential Fire Behavior in Wildland-urban Interface Communities in Southern California: A Collaborative Approach. Published in *Proceedings RMRS-P-41*, March 28, 2006, pages 729-738.

Abstract: This manuscript details a collaborative effort that reduced the risk of wildfire in an affluent, wildland-urban interface community in southern California while simultaneously minimizing the environmental impact to the site. FARSITE simulations illustrated the potential threat to the community of Rancho Santa Fe in San Diego County, California, where multimillion-dollar homes were located immediately above a designated open space area that consisted primarily of 60-year-old, decadent chaparral. Post-treatment fire behavior simulations demonstrated the potential ability to moderate fire behavior. Results of the fire behavior modeling led to a recognition for the need for fuels treatments by both homeowners and regulatory agencies that were originally adverse to any type of treatment. Through a collaborative process, these diverse stakeholders worked to create and maintain an effective fuel treatment that was cost effective and environmentally sound. This shared approach by fire

personnel, homeowners, and regulatory agencies in Rancho Santa Fe is a success story that could be a template for interface communities throughout southern California.

Ellis, P.F. The aerodynamic and combustion characteristics of eucalypt bark: a firebrand study. Ph.D. dissertation, Australian National University, 2000.

Quote from abstract: “Spotting behaviour recorded in Australia is the worst in the world in terms of spotfire distance and concentration and this has been attributed to features of eucalypt bark types.

Ellis PFM (2010) The effect of aerodynamic behaviour of flakes of jarrah and karri bark on their potential behaviour as firebrands. *Journal of the Royal Society of Western Australia* 93, 21–27.

Abstract: Spotting, the process by which new fires are ignited ahead of bushfires by firebrands transported by convection and wind, is a significant problem for fire suppression, and potentially, for fire crew safety. The magnitude of the potential problems caused by spotting is determined by many factors, notably spotting distance and spotfire numbers. This paper explains the notoriety of two Western Australian forest eucalypts, jarrah (*E. marginata*) and karri (*E. diversicolor*), in terms of bark aerodynamic characteristics and likely firebrand yield. Terminal velocity, the equilibrium falling velocity, and potentially, gliding behaviour, determine how high a particle is likely to be lofted for given convection strength, and how far it will travel for a given height and wind conditions. Particles with low terminal velocities can potentially be lofted to greater heights and transported longer distances than those with greater terminal velocities. The gliding and spin behaviour of shed flakes of bark were observed during tower drops, and their terminal velocities derived from fall time. Terminal velocity varied between 2.5 and 8 m s⁻¹ and is shown to be a function of the square root of surface density (mass/projected area) of the sample, the amount of spin during free-fall, and bark shape. Bark flakes which showed rapid spin had terminal velocities up to 18% less than those of non-spinning flakes. The measurements indicate that many of these flakes could be lofted in the convection plumes of low to medium-intensity fires, such as those with fire-front intensities between 0.5 and 2.5 MW m⁻¹. Aerodynamic characteristics which would make these bark flakes effective firebrands appear to be their low terminal velocities, rather than their ability to glide. Observed differences in spotting behaviour between the two species are their spotting densities and maximum spotting distances. These differences are not wholly explained by their measured differences in free-fall behaviour, but will more completely be explained by differences in the numbers of detachable flakes, their ease of ignition and their combustion characteristics during

flight.

Ellis PFM (2011) Fuelbed ignition potential and bark morphology explain the notoriety of the eucalypt messmate 'stringybark' for intense spotting. *International Journal of Wildland Fire* 20, 897–907.

Abstract: In south-eastern Australia, bark of the 'stringybark' eucalypt group, and notably that of messmate (*Eucalyptus obliqua* L'Hér.), is notorious for intense spotting and it is likely that firebrands of this type contribute significantly to loss of life and property during major wildfires. The fuelbed ignition potential by glowing samples was laboratory tested on excised sections of *Pinus radiata* D. Don litterbed at moisture contents between 2 and 8% and for 'no-wind' or for 'wind' of 1 m s^{-1} . Prepared samples of outer bark between 0.5 and 1.6 g were combusted until they attained ~20% of initial mass before placement. For 'no-wind', flaming ignition did not occur and the probability of glowing ignition appeared to depend on the chance of contact with needles. For 'wind', the probability of flaming ignition was a function of sample glowing mass and fuelbed moisture content. Its ignition probability, weight-for-weight, appears to exceed that reported for other forest firebrands, including bark of *E. globulus* Labill. However, it is likely that the notoriety of messmate bark is also due, in part, to its morphology and in-flight behaviour. It is argued that firebrand laboratory tests to date may poorly reflect the ignition potential of similar samples after flight. [Apparently there are even worse *Eucalyptus* species than *E. globulus*.]

Ellis, P.F.M. 2015. The likelihood of ignition of dry-eucalypt forest litter by firebrands. 2015. *International Journal of Wildland Fire* 24(2) 225-235.

Abstract: Ignition probability of litter of dry-eucalypt forest by standard flaming and glowing firebrand samples was tested in a wind tunnel. Standard flaming firebrands were sections of bamboo sate stick 50 mm long, and flamed for ~9 s in still air. Standard glowing samples were sections of shed bark of *Eucalyptus globulus* 50 mm long, 15 mm wide and ~2 mm in thickness. These were burnt at their terminal velocities and at deposition had a mean mass of 0.2 g and would remain glowing for 2.5 min in wind. Ignition was tested using air speeds of zero, 1 and 2 m s^{-1} , and oven-dried fuel moisture contents between 4 and 21%. For flaming samples, ignition probability was insensitive to variation in fuel and airflow characteristics and was a function of wind (no wind or wind) and fuel moisture content. For glowing samples, ignition probability was a function of fuel moisture content and wind speed. The models confirm the dominating influence of fuel moisture, are consistent with expert observations in the field and provide a practical measure of ignition likelihood by firebrands. It is argued that airflow turbulence and relative humidity are potentially significant for ignition by glowing firebrands.

Esser, L.L. 1993. Fire Effects Information System (FEIS), Index of Species Information. *Eucalyptus globulus*.

EXCERPTS: FIRE ECOLOGY OR ADAPTATIONS:

Most eucalyptus communities in Australia have evolved in the presence of periodic fire [3]. Tasmanian bluegum is highly flammable, but is seldom killed by fire. The bark catches fire readily, and deciduous bark streamers and lichen epiphytes tend to carry fire into the canopy and to disseminate fire ahead of the main front [3,7,8,50]. Other features of Tasmanian bluegum that promote fire spread include heavy litter fall, flammable oils in the foliage, and open crowns bearing pendulous branches, which encourages maximum updraft [3,9].

OTHER MANAGEMENT CONSIDERATIONS:

Tasmanian bluegum is highly flammable and should not be planted near homes and other structures [27]. For information regarding the eradication of Tasmanian bluegum, see Fiedler [14], Groenendaal [17], and Rice [38]. The leaves of Tasmanian bluegum release a number of terpenes and phenolic acids. These chemicals may be responsible for the paucity of accompanying vegetation in plantations [4]. Natural fog drip from Tasmanian bluegum inhibits the growth of annual grass seedlings in bioassays, suggesting that such inhibition occurs naturally [10,34]. At least one leaf extract has been shown to strongly inhibit root growth of seedlings of other species [4]. The frass from the chrysomelid beetle, which feeds upon Tasmanian bluegum, is allelopathic to grasses at very low levels [34].

Fernandez, P.M. et al. 2011. Fuels and fire hazard in blue gum (*Eucalyptus globulus*) stands in Portugal. Boletín Informativo CIDEU, ISSN-e 1885-5237, Nº. 10, 2011, págs. 53-61

Abstract: Fast-growing, short-rotation forest plantations in Mediterranean-type ecosystems are vulnerable to wildfire. This study quantifies fuel characteristics over a wide range of stand characteristics in blue gum (*Eucalyptus globulus*) stands in Portugal, namely fuel loading by size class and fuel layer and bulk density. We combined destructive and non-destructive methods to estimate fuel loadings in both natural and activity (logging slash) fuels, and then built fuel models to predict fire behaviour characteristics. Classification of National Forest Inventory blue gum plots by fuel model showed that high-intensity fire threatens approximately half of the plots. Fire modelling indicates that wildfire control operations are made effective by treating hazardous fuels in these plantations, even under extreme weather conditions. Stand management against wildfire can greatly benefit from fuel and fire modelling. [Highlights flammability of blue gum bark.]

Griffiths, J. L. 2014. Monarch Butterfly (*Danaus plexippus*) Tree Preference and Intersite Movement at California Over Wintering Sites. MS Thesis. California Polytechnic State University. San Luis Obispo.

Abstract: Managing Monarch butterfly overwintering groves: making room among the eucalyptus Proper management and conservation of the coastal California overwintering sites used by western Monarch butterflies (*Danaus plexippus* L.) is critical for continued use of these sites by monarchs. Many management efforts are currently concentrating on eucalyptus-only sites because of the prevailing notion that monarchs prefer eucalyptus over native tree species. Yet, whether a preference exists or not has never been tested. Herein, we test the —eucalyptus preference|| hypothesis with data from five overwintering sites comprised of blue gum eucalyptus (*Eucalyptus globulus*) and at least one other native tree species from fall 2009 to spring 2012. We found that when monarchs clustered disproportionately on a tree species relative to its availability, they clustered significantly more than expected on native trees and significantly less than expected on eucalyptus. Also, in years when the overwintering population was highest, monarchs clustered disproportionately on native conifers, and they often switched from clustering on eucalyptus in the early winter to native conifers in the middle or late winter. Our results suggest that overwintering groves should be managed to include a mixture of tree species. We cannot recommend simply planting more eucalyptus. At overwintering sites in central coastal California, native conifers such as Monterey cypress (*Hesperocyparis macrocarpa*) and pitch canker-resistant Monterey pine (*Pinus radiata*) should be planted as replacements for blue gum eucalyptus in areas where trees are likely to fall, and around the perimeter of groves.

Griffiths, J., and F. Villablanca. 2015. Managing monarch butterfly overwintering groves: making room among the eucalyptus. California Fish and Game 101:40–50.

Abstract: Proper management and conservation of the coastal California overwintering sites used by western monarch butterflies (*Danaus plexippus* L.) is critical for continued use of these sites by monarchs. Many management efforts are currently concentrating on eucalyptus-only sites because of the prevailing notion that monarchs “prefer” eucalyptus over native tree species. Herein, we test the “eucalyptus preference” hypothesis with data from five overwintering sites comprised of blue gum eucalyptus (*Eucalyptus globulus*) and at least one other native tree species from fall 2009 to spring 2012. We found that when monarchs clustered disproportionately on a tree species relative to its availability, they clustered significantly more than expected on native trees and significantly less than expected on eucalyptus. Also, in years when the overwintering population was highest, monarchs clustered

disproportionately on native conifers, and they often switched from clustering on eucalyptus in the early winter to native conifers in the middle or late winter. Our results suggest that overwintering groves should be managed to include a mixture of tree species.

Hall, J., PF Ellis, GJ Cary, G Bishop, and AL Sullivan. 2015. Long-distance spotting potential of bark strips of a ribbon gum (*Eucalyptus viminalis*) *International Journal of Wildland Fire* 24(8) 1109-1117

Abstract: Firebrands of ribbon bark eucalypt are notorious for igniting spotfires many kilometres ahead of a bushfire. However, no research to date has demonstrated that this bark type can sustain combustion at its terminal velocity for the travel time required. Fifty samples of shed bark of *Eucalyptus viminalis* of three distinct morphologies were ignited at one end and burned tethered in a vertical wind tunnel at air velocities approximating their terminal velocity. Mean terminal velocity and burnout time for 'flat plates', 'simple cylinders' and 'internally convoluted cylinders' were 5.4 m s^{-1} and 251 s; 5.2 m s^{-1} and 122 s; and 5.8 m s^{-1} and 429 s. The corresponding maximum burnout times were 785 s, 353 s and 1304 s. One internally convoluted cylinder flamed continuously and consumed its length of 368 mm in 271 s. The maximum burnout time for the internally convoluted cylinders is commensurate with a potential spotting distance exceeding 20 km given a mean wind speed during transport of 60 km h^{-1} . This is the first study in which combustion times exceeding a few minutes have been recorded for this bark morphology, and thus provides some corroboration of the notoriety for long-distance spotting.

Hennessy PR. 2012. The History of Social Perceptions of *Eucalyptus Globulus* in the East San Francisco Bay Area. Senior thesis

Abstract: The presence of *Eucalyptus globulus* in the East San Francisco Bay Area has adversely affected the East Bay's native environment and has increased the region's fire hazard potential. Though residents' perceptions of eucalyptus trees differ based on what type of stakeholder that person is, these perceptions have been the driving force of action and policy in the history of the trees in this region. In this study, I identified and analyzed historical and contemporary perceptions of East Bay residents of eucalyptus trees. While eucalyptus' earliest days in the East Bay were met by nearly unchallenged positivity and excitement,

residents grew more anxious about the trees' presence in the 20th century. Most current residents sampled felt that eucalyptus trees are a fire hazard to the East Bay, and that they played a large role in the 1991 Oakland-Berkeley fire. Respondents had varying opinions on the tree's aesthetic value and potential use as a resource, but there was a general consensus that eucalyptus trees will be a part of the East Bay landscape indefinitely. Land management policy that is understood and shaped by the people it is affecting enhances its effectiveness and level of embracement from that community. Thus, East Bay residents and land managers must continue to be aware of the species' presence in the region, and adopt land management policies that are cognizant of the trees' continued existence.

McBride, J. R. and L. Kent. 2018. The failure to address the urban interface and intermix fire- problems in the San Francisco Bay Area. International Journal of Wildland Fire (28) (10 1-3.

Abstract: Post-fire planning following major fires in the San Francisco Bay area has identified problems of wildland fuel management and solutions to these problems; however, the failure to carry out many of the fuel management recommendations has led to increasing fire hazard for the urban interface and urban intermix zones. A proposal for a new state agency to oversee fuel management is presented.

McBride, J. R. 2019. Fuel management and wildfire mitigation proposal for the University of California property on Strawberry and Claremont Canyons.

Abstract (Introduction): Portions of the residential areas of Berkeley and Oakland adjacent to the University of California campus and the Lawrence Berkeley National Laboratory are in a very high fire hazard zone. This situation is due to the vegetation, topography and climatic conditions occurring in the area. These conditions were responsible for the rapid spread of the 1991 Oakland Tunnel Fire that killed 25 people and consumed 3,276 homes and apartments. Little can be done about the topography and climatic conditions of the area, but residential hardening of homes with defensible space in combination with agency fuel management can reduce the heat released by a fire, the rate of fire spread, and the production of embers. Fuel management can also provide space for firefighters to assemble and undertake fire suppression activities.

The purpose of this report is to present a fuel management plan for University of California property located in Strawberry and Claremont canyons. The plan will identify site-specific fuel reduction treatments to reduce the fire hazard present in naturally occurring vegetation types and to convert highly hazardous plantations of eucalyptus and conifer species to less hazardous naturally occurring vegetation types. The plan also will address the question of the safety of evacuation routes in the area during future fires. The following report presents cost estimates for the proposed management activities and evaluates the impact of the plan on rare and endangered species.

Mutch, R.W. Wildland Fires and Ecosystems--A Hypothesis. Ecology 51: 1046-1051.

Abstract: Plant species which have survived fires for tens of thousands of years may not only have selected survival mechanisms, but also inherent flammable properties that contribute to the perpetuation of fire—dependent plant communities. This concept goes beyond the commonly accepted fire climate—fuel moisture basis of wildland fire occurrence. Plant communities may be ignited accidentally or randomly, but the character of burning is not random. The following hypothesis treats this interaction between fire and the ecosystem: Fire—dependent plant communities burn more readily than non-fire—dependent communities because natural selection has favored development of characteristics that make them more flammable. The hypothesis was experimentally derived following laboratory combustion tests with litter of eucalyptus (*Eucalyptus obliqua* L'Herit), ponderosa pine (*Pinus ponderosa* Laws.), and tropical hardwood leaves.

National Park Service. 2006. Eucalyptus, a Complex Challenge: Fire Management, Resource Protection, and the Legacy of Tasmanian Blue Gum.

Abstract: No abstract but provides excellent summary of the risk of blue gum Eucalyptus on NPS lands as well as techniques for fuels treatments.

Nowak, D. J. 1993. Historical vegetation change in Oakland and its implications for urban forest management. Journal of Arboriculture 19:313-319.

Abstract: The history of Oakland, California's urban forest was researched to determine events that could influence future urban forests. Vegetation in Oakland has changed drastically from a preurbanized area with approximately 2% tree cover to a present tree cover of 19%. Species composition of trees was previously dominated by coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), and coast redwood (*Sequoia sempervirens*) and is currently

dominated by blue gum (*Eucalyptus globulus*), Monterey pine (*Pinus radiata*), and coast live oak. Many forces throughout the history of Oakland have shaped the current urban forest structure. These forces include the gold rush of the 1840's, the San Francisco earthquake of 1906, massive afforestation of the early 1900's, and various fires from 1923 to 1991. These historical forces and the impact they had on Oakland's urban forest are explored. Future forces that can alter any urban forest are presented and discussed.

Pagni, P. J. 1993. Causes of the 20 October 1991 Oakland Hills conflagration. Fire Safety Journal 21:331-339.

Abstract: The meteorologic and topologic causes of the 20 October 1991 Oakland Hills conflagration are described here qualitatively. A 3 GW example fire, 100 m in diameter, is used to show the impact of the 10 m/s wind and strong inversion layer at 600 m that existed on 19 October. It is concluded that the dry, high speed NE wind, coupled with the inversion layer and the local topography channeled the hot products of pyrolysis and combustion, along with flaming debris, through a high fuel load region downwind and downslope of the initial fire, thus causing the unusually rapid initial fire spread and consequent conflagration

Rice, C. 1990. Restoration plays an integral role in fire hazard reduction plans for the Berkeley Hills area (California). Restoration and Management Notes 8:2, Winter 1990.

Abstract/excerpt: The University [of California] is quite concerned about wildfire protection due to the Hill Area's well-known history of destructive fires, including the Berkeley Fire of 1923, the most damaging wildfire in California history. More recent fires, in 1970 and 1980, demanded that they take some responsible action. Therefore, in 1987, the University's Office of Environmental Health and Safety began a five-year, cooperative fire hazard reduction program. One interesting facet of their program is its position that the restored historic vegetation is potentially less of a fire hazard than the current vegetation. This view was developed into a directive to maintain and restore the vegetation in much of the Hill Area to a pre-settlement condition by means of natural processes. With this mandate in hand we began to reduce invasive brush, to remove flammable exotics such as eucalyptus (*Eucalyptus globus* and *E. camaldulensis*), to thin the understory, and to restore the native vegetation especially within the parcels that comprise a 120-ha area adjacent to research facilities and homes. We employed a number of techniques in working towards our goal, including the use of prescribed burns and goat grazing, the latter of which we found very effective at reducing heavy brush, including that of poison oak (*Toxicodendron diversiloba*) and french broom (*Cytisus monespessulanus*).

Ritter, M., and J. Yost. 2009. Diversity, reproduction, and potential for invasiveness of Eucalyptus in California. Madroño 56:155-167.

Abstract: In the 150 years since their introduction to the state, species in the genus Eucalyptus have become the most common non-native trees in California. A clearer understanding of the ability of different species to reproduce in the state is important for how we monitor the ecological impact of these abundant non-native trees and for predicting possible future invasions. Here we present current data on the diversity of Eucalyptus in California, which species are spontaneously reproducing, or have the potential to do so, where they can be found, how they can be identified, and our analysis, based on herbarium and field observations, of the potential ecological impacts of various species in the locations where they have been introduced. We also present a new dichotomous identification key, and botanical drawings of all naturalized species. We discuss the degree to which factors such as life history traits, commonness of planting, and native range influence reproductive behaviors of different species.

Rodríguez-Suárez, J., B. Soto, R. Perez, and F. Diaz-Fierros. 2011. Influence of Eucalyptus globulus plantation growth on water table levels and low flows in a small catchment. Journal

Abstract: In a catchment with a shallow water table, switching land use from fodder maize and pasture to Eucalyptus globulus plantation altered dry season hydrology: the water table fell more rapidly each year, and the concomitant decrease in discharge soon led to the stream drying up every year. During the first 3 years of growth, the rate of fall of the water table, S , remained stable in spite of rapid stand growth, which is attributed to transpiration in the catchment being dominated by the background vegetation during this period. Between the third and sixth years, S increased linearly with foliage biomass W_s (calculated with the 3-PG model as a proxy for the transpiration capacity of the stand). Subsequently, the levelling off of W_s , as the result of canopy cover reaching 100% was reflected by similar behaviour of S . The final values of S in the range 4.5-4.9 mm day⁻¹, were just over double the initial values of around 2.2 mm day⁻¹. The influence of plantation with *E. globulus* on water reserves and discharge needs to be taken into account by catchment management.

Russell, W. H., and J. R. McBride. 2003. Landscape scale vegetation-type conversion and fire hazard in the San Francisco bay area open spaces. Landscape and Urban Planning 64:201-208.

Abstract: Successional pressures resulting from fire suppression and reduced grazing have resulted in vegetation-type conversion in the open spaces surrounding the urbanized areas of the San Francisco bay area. Coverage of various vegetation types were sampled on seven sites using a chronosequence of remote images in order to measure change over time. Results suggest a significant conversion of grassland to shrubland dominated by *Baccharis pilularis* on five of the seven sites sampled. An increase in *Pseudotsuga menziesii* coverage was also measured on the sites where it was present. Increases in fuel and fire hazard were determined through field sampling and use of the FARSITE fire area simulator. A significant increase in biomass resulting from succession of grass-dominated to shrub-dominated communities was evident. In addition, results from the FARSITE simulations indicated significantly higher fire-line intensity, and flame length associated with shrublands over all other vegetation types sampled. These results indicate that the replacement of grass dominated with shrub-dominated landscapes has increased the probability of high intensity fires.

Stephens, SL, and LW Ruth. 2005. Federal forest-fire policy in the United States. Ecological Applications. 15:532-542.

Abstract: Forest-fire policy of U.S. federal agencies has evolved from the use of small patrols in newly created National Parks to diverse policy initiatives and institutional arrangements that affect millions of hectares of forests. Even with large expenditures and substantial infrastructure dedicated to fire suppression the annual area burned by wildfire has increased over the last decade. Given the current and future challenges of fire management, and based on analytical research and review of existing policies and their implications, we believe several changes and re-emphases in existing policy are warranted. Most importantly, the actual goal of fuels-management projects should be the reduction of potential fire behavior and effects, not the simple reduction of fuels. To improve safety and economic efficiency, fire-suppression policies should recognize differences in the characteristics of wildfires, and strategies should be tailored to better respond to the unique demands of each fire. **Where forest fires are burning large areas, as in the western United States, reducing the trend of increased amounts of burned area may require a diversity of treatments including prescribed burning, mechanical fuels treatment, and increased use of the Wildland Fire Use Policy.** Assessment of how fire is affecting forests would be enhanced if land-management agencies reported the area burned by low- mixed—and high-severity fire and what proportion is outside the desired trend or range of conditions for each forest type. Congress should provide **an improved budgetary process for fire and fuels management**, with a larger annual federal fire-suppression budget. Additionally, reducing annual area burned will require long-term coordinated efforts by federal and state government, with robust partnerships between land management agencies and the public in collaborative planning and stewardship. Research and adaptive management are essential in

allowing fire-hazard-reduction projects to move forward where proposed projects are met with uncertainty and mistrust. While legislative reform may be desirable, a strategy that is not entirely dependent on new legislation is needed. Building on existing programs that are consistent with a science-based strategy will enable land-management agencies to better utilize information in pursuit of the overall objective of reducing uncharacteristically severe wildfires.

Stock, S. L, Thorngate, N. and J.L. Griffiths. 2015. Monarch butterfly use of eucalyptus and native trees during Monarch butterfly use of eucalyptus and native trees during winter months in central coastal California. Poster presented by the Big Sur Ornithology Lab of Ventana Wilderness Society, Big Sur, California.

Abstract: The Big Sur Ornithology Lab, a program of the Ventana Wilderness Society, has been conducting research on overwintering monarch butterflies (*Danaus plexiippus*) and their winter habitats in central coastal California since November 2001. Overwintering monarchs require specific microhabitat features, such as appropriate roost trees that shield them from inclement weather. To determine the relationship between tree species use by overwintering monarchs and seasonal weather patterns, we conducted weekly monarch surveys at two overwintering sites containing multiple tree species on the central California coast in Monterey County during the winters of 2001--2004. We observed a general shift in cluster formation away from blue gum eucalyptus (*Eucalyptus globulus*) to Monterey pine (*Pinus radiata*), Monterey cypress (*Cupressus macrocarpa*), and/or coast redwood (*Sequoia sempervirens*) following winter storm events, and a dispersal to various tree species, including ornamentals, towards the end of the overwintering season. **These results suggest that native tree species are crucial to the persistence of butterfly populations, even in the presence of eucalyptus trees. We recommend that biologists develop management plans for monarch habitat that are designed to phase out eucalyptus trees while restoring native trees.**

Svihra, Pavel. 1992. The Oakland-Berkeley hills fire: lessons for the arborist. Journal of Arboriculture. 18:257-261.

Abstract: As the pressure of people wishing to live in urban forests continues to grow, the fire problem becomes more serious for these residents. The most recent firestorm in the densely populated Oakland-Berkeley Hills in the San Francisco Bay Area killed 25 people and destroyed 3,011 houses. Damage is currently estimated at 1.5 billion. **Vegetation management is an important factor for fire speed control and a structure's survival. Effective silvicultural and arboricultural practices can change fire hazardous landscapes into safer ones in which flame intensity can be controlled by firefighters and residents have a chance to escape.** For some, the

devastating 1991 Oakland-Berkeley Hills fire was related to poor performance by firefighters, local government's inadequate preparedness, arson, or negligence. Others blamed vegetation that was not resistant to fire. While any of these conditions may contribute to a fire's swift surge, the problem is much more complex. The pressure of people wishing to live in the urban forest is going to grow and the fire problem will become more and more serious if preventive measures are not taken.

Chin, Khin

From: Chin, Khin
Sent: Thursday, April 21, 2022 9:26 AM
To: Chin, Khin
Cc: May, Keith
Subject: Communication to Commission - Berkeley Fire Department Presentation to Council on Standards of Coverage

Hi Commissioners,

Please find below the links to the presentation to Council on Standards of Coverage and Community Risk Assessment Study from the 4/19/22 City Council Meeting.

Presentation Slides

[https://www.cityofberkeley.info/Clerk/City_Council/2022/04_Apr/Documents/2022-04-19_\(WS\)_Supp_2_Reports_Item_1_Rev_Fire_pdf.aspx](https://www.cityofberkeley.info/Clerk/City_Council/2022/04_Apr/Documents/2022-04-19_(WS)_Supp_2_Reports_Item_1_Rev_Fire_pdf.aspx)

Video of Council meeting (presentation begins at about 4 mins into the recording)

http://berkeley.granicus.com/MediaPlayer.php?publish_id=88c435d9-c0d8-11ec-a5da-0050569183fa

Khin Chin
Berkeley Fire Department
510-812-9519

CITY OF BERKELEY FIRE DEPARTMENT

QUARTERLY UPDATES





To: City Manager, Mayor, City Council, Disaster Fire Safety Commission
From: Fire Chief Abe Roman
Date: April 12, 2022
Re: FY22 Updates: Quarters 1, 2 & 3

OFFICE OF THE FIRE CHIEF AND ADMINISTRATION

Berkeley Fire Department's administrative services focus on improving project management, short and long-term planning, capacity building, and service delivery analysis. The office's primary challenge to improving operational and programmatic changes continues to be a staffing shortage secondary to the pandemic.

PROJECT 1: Dispatch Capacity Building

Summary

The Berkeley Emergency Communications Center requires a comprehensive needs assessment to complete Council's request and direction to enhance operations to meet the community's growing needs under the omnibus reimagining package. The analysis will use existing dispatch capabilities and the City's goals to develop a gap analysis and path forward on how to triage calls, divert non-emergency calls—including mental health calls—to appropriate resources, and implement the delivery of emergency medical instructions to callers.

Status

Federal Engineering Inc. consultants initiated Phase 1 on January 20, 2022. Their work will result in a comprehensive plan to adjust operations to align with evolving emergency medical response needs; and include recommendations for a more appropriate staffing model; additional hardware and software; how to implement pre-arrival and emergency medical dispatch systems; how to divert sub-acute calls to the most appropriate resource, an improved training plan for dispatchers; and facility enhancements to the dispatch center over the next 36 months.

Expected Completion (of Phase 1): September 2022

PROJECT 2: Standards of Coverage

Summary

The Department is undergoing an in-depth analysis of fixed and mobile resources to determine if the City is meeting national standards for call processing and response times;



and to determine the best deployment model to achieve more effective responsive, with a focus on efficiency.

Status

The Department provided the consultant with the necessary data to begin the analysis. and the Department will be presenting a mid-project update during a Council work session scheduled for April 19th.

Expected Completion: June 2022

PROJECT 3: Project Management & Subject Matter Expertise

Summary

The Department onboarded a project management team to assist with long-term project planning; provide subject matter experts with specialized knowledge the Department doesn't currently have access to; and to help ensure project goals and objectives consistently meet deadlines.

Status

The contract was executed in September 2021. Project management support is ongoing and has and will continue to be critical to improving organization, efficiency, researching and adopting best practices and creating transparency.

Expected Completion: Ongoing

PROJECT 4: Fire Facilities Master Plan (FMP)

Summary

Several of the Berkeley Fire Department stations are undersized, in poor condition, or in need of remodels or full replacements. The Department initiated a long-term replacement planning process to understand infrastructure needs better. Public Works initiated an evaluation of all fire facilities and identified immediate repair/maintenance needs that will be incorporated into the FMP. This process will provide City leaders with actionable information ahead of future infrastructure bond measures. Read the scope of service [here](#) and the timeline [here](#).

Status

The Department initiated work with Siegel and Strain Architects, who have subject matter expertise in interdisciplinary planning and engineering.

Expected Completion: September 2022



PROJECT 5: Fire Station Solar & Lighting Transition

Summary

The Department is working to transition stations to use renewable energy sources and begin installing infrastructure to support the electrification of the fire department's fleet to be operational off the grid.

Status

The Department is working in collaboration with the City's Office of Energy and Sustainable Development to find ways to install solar and battery storage onto fire stations and the fire warehouse. In addition, staff is working to install LED lighting in fire facilities.

Expected Completion: Ongoing

ADMINISTRATIVE AND FISCAL SERVICES UNIT

The amount and complexity of work have increased over the last several decades for the Administrative and Fiscal Services Unit, and the Division has not increased staffing or examined work practices to find efficiencies. The current staffing model does not allow for redundancy in knowledge and skill, which causes excessive staff overtime (after hours and weekends) for one employee and produces a high-stress work environment, especially for time-sensitive recurring tasks, such as payroll.

PROJECT 6: Implementation of ERMA

Summary

To update the Administrative and Fiscal Services Unit's budgeting and payroll system, the Division has transitioned to working in ERMA.

Status

Administrative and Fiscal Services Unit staff is diligently working to learn how to better use ERMA to avoid payroll errors and develop institutional knowledge. They are currently challenged with day-to-day operations due to the complex transition to ERMA, in addition to the ongoing need for additional staff. The understaffed division is focused on processing normal payroll and has struggled to focus on the correction of payroll errors and responding to employee grievances related to ERMA.

Other staff within the Department have been tasked to divert from their jobs to temporarily assist and the Department was able to hire a temporary employee in March of 2022 that



has begun the process of researching and addressing several hundred reported payroll errors that have been logged by employees since the Fall of 2021.

Expected Completion: Ongoing

PROJECT 7: Right-Sizing Administrative & Fiscal Services Unit

Summary

The Division's urgent business need is to enhance staffing to ensure employees are paid correctly, to see that payroll errors are mitigated in a timely manner, and to ensure the Division is balanced with institutional knowledge and abilities.

Status

Through 2022, we will be working to bring on additional staff to stabilize this Division and ensure it can perform effectively. The Department has hired a temporary payroll support specialist to assist with processing payroll errors. The Department has also submitted a request for additional staff as part of the Department's FY23-24 Budget process.

Expected Completion: Winter 2022

PROJECT 8: Increased Number of Contracts

Summary

To implement many of the exciting projects funded by Measure FF, the Division is processing a much higher volume of new contracts for service and requisitions for purchases. The Department understands the critical need for contractual support to progress, staff is doing their best to keep up with the current workload.

Status

Since July of 2022, in collaboration with Public Works, IT and General Services, the Division has negotiated and processed eleven new contracts with another half dozen or more in development.

Expected Completion: Ongoing

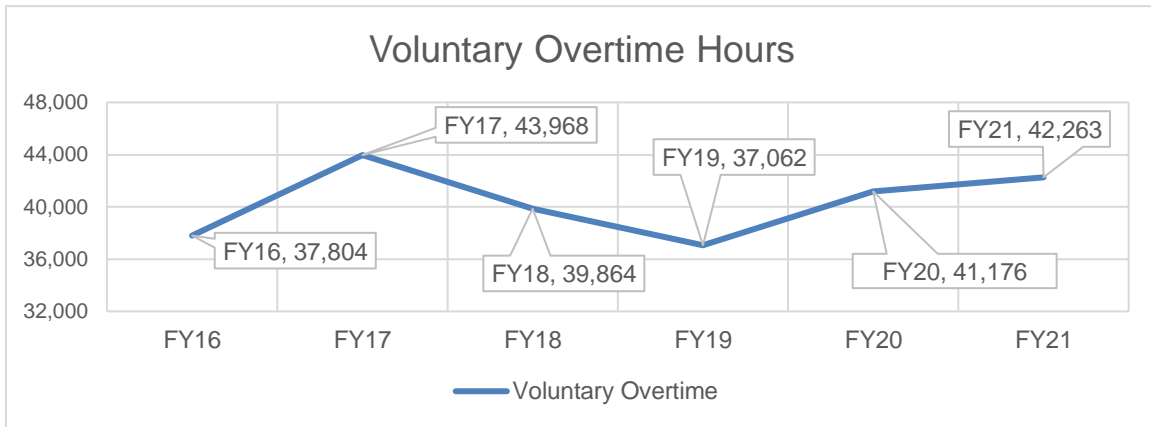
EMERGENCY OPERATIONS DIVISION

The Fire Department has been substantially impacted by COVID-19 beginning in FY21 and continuing through FY22. In addition to continuing to staff all fire stations through the pandemic, deploying extra staff to assist with community testing, mass vaccination, wildfire season deployment, and in-City special events, the Department is working

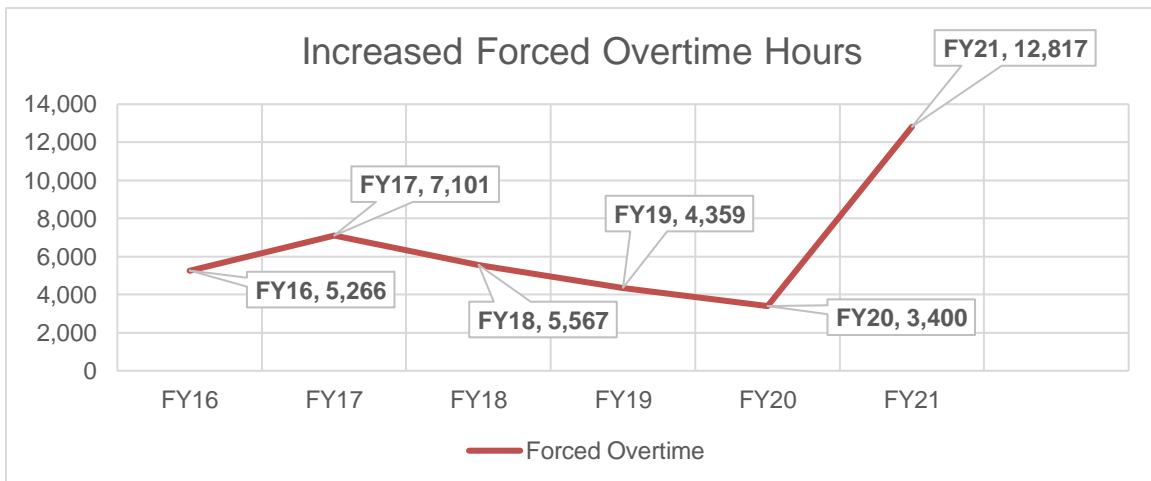


diligently to recover from the staffing crisis and subsequent employee fatigue that has been required through the pandemic.

The Voluntary Overtime/Hours table below displays the total number of overtime hours worked by fiscal year to maintain minimum staffing in the City’s fire stations. The biggest impact to overtime - *is staffing*. The more vacancies that exist within the Department, the more overtime will be generated. In late FY18 and through FY19, the Department reached and was able to maintain full staffing levels, and subsequently, the overtime hours for that FY are substantially lower than in adjacent years (where there were more vacancies).



In situations where there are vacancies that need to be filled to maintain minimum staffing (to keep fire stations open), employees are first provided an opportunity to voluntarily sign up to work extra shifts. When no employees voluntarily sign up for a shift, the Department has a system in place to force employees to work additional overtime. As is evidenced by the Forced Overtime Hours table below, the amount of forced overtime has increased by over 275% since the pandemic began. This is directly related to (1) the increase in vacancies secondary to the hiring freeze, (2) the increased amount of temporary vacancies created by employees that are quarantined from work due to COVID or COVID related leave, and (3) challenges with a fatigued workforce interested in overtime work.





PROJECT 9: Recruiting, Staffing & Controlling Forced Overtime

Summary

The fire service may be facing the greatest recruitment and retention challenge it has seen in over 100 years. For the first time any can recollect, departments are unable to find adequate numbers of qualified firefighters, and permanent employees are moving from department to department on a frequent basis. The investment required to recruit and train a firefighter is substantial and the impact time to replace an employee that leaves is 12+ months. Because of this we are both challenged and provided an opportunity to evaluate our recruitment, training, and retention strategies.

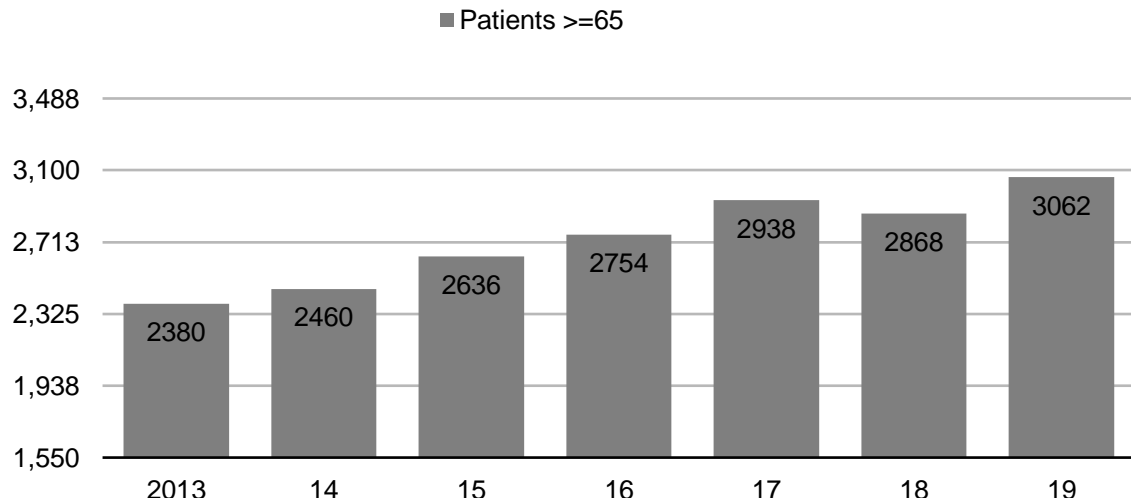
Status

The Department has invested in the creation of professional videos to help share the unique qualities of the City of Berkeley and its fire department with potential applications. The Department also invested in a formal marketing team to help advertise and target ideal candidates and we are working to streamline our recruitment and hiring processes. Staff is examining internal work practices and will work to ensure that the organization is setup for employees to develop and flourish throughout their career.

Expected Completion: Ongoing

EMERGENCY MEDICAL SERVICES (EMS) DIVISION

Both medical and other service calls have consistently increased, likely due to population growth, population aging, and ongoing development within the City. The overall call volume, especially medical calls, will continue to increase with the trend in population growth, aging, and development within the City and the University over the next decade.

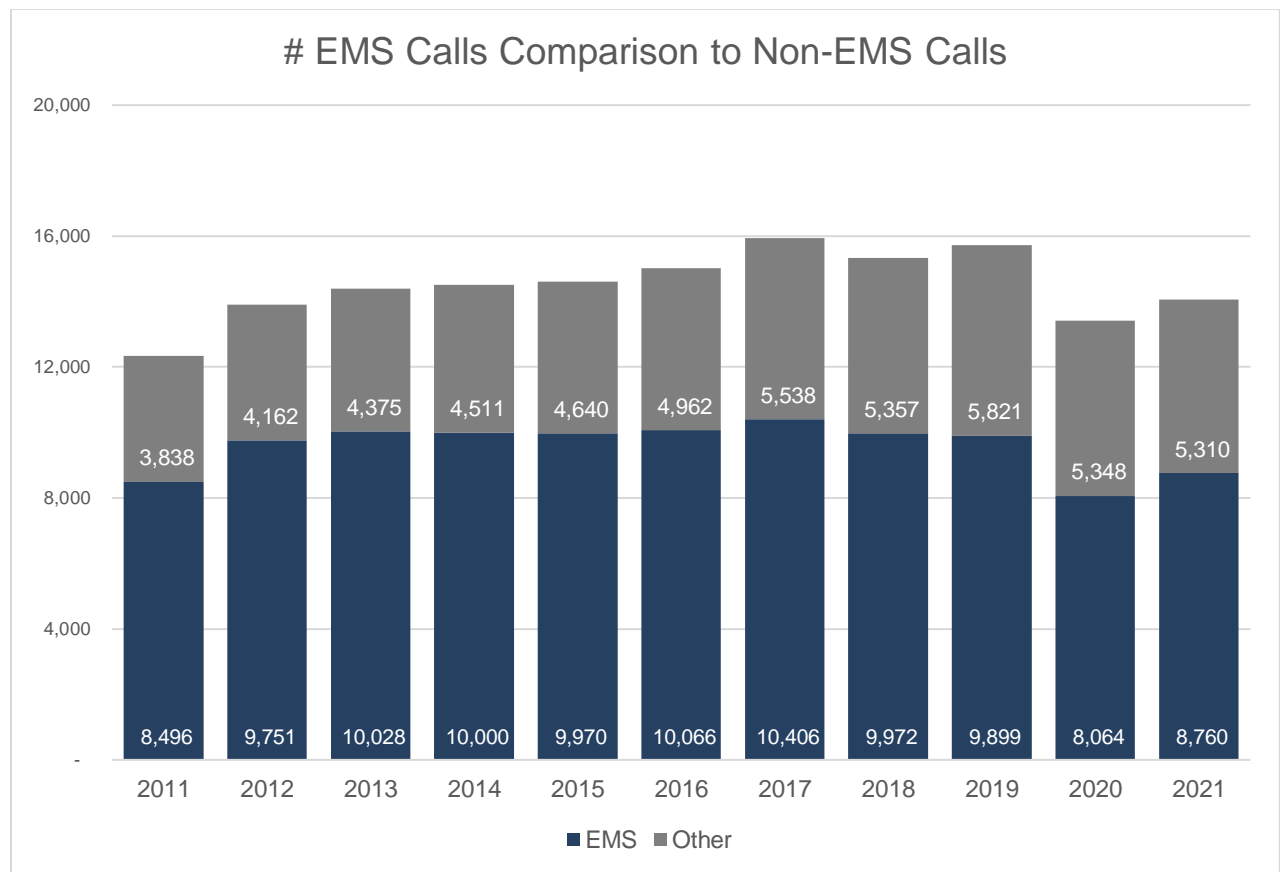




The state of California estimates the number of those over 65 will nearly double by 2030 (according to the California State Department of Finance). When examining the population distribution of Berkeley, there is a significant segment of the population between the ages of 51-65 (about 20%) that will move into the center of the highest demand-for-service group by 2030, give or take.

Patients between the ages of 18-23, and those 65 or older, account for roughly half of all the documented patients in Berkeley. If patients over 50 are included, that total increases to approximately 70%. Typically, the older you are the more likely you are to use an ambulance.

The charts below illustrate a consistent upward trend for medical calls for service over the last decade (2020 & 2021 call volume was lower due to the pandemic). The Department's transition to staffing ambulances with EMTs and Paramedics through FY25 will allow the City to deploy additional ambulances and alternative care resources in the most cost effective and efficient manner.





PROJECT 10: Emergency Medical Services (EMS) Staffing & Deployment Redesign

Summary

A long-planned redesign of EMS staffing aims to better mitigate increasing calls for medical services with appropriate resources. The Department's goal is to hire and staff ambulances with emergency medical technicians (EMTs) and paramedics instead of firefighter paramedics. This will allow the City to add additional ambulances and staff at a lower cost, have more flexibility in its ambulance deployment model, and create entry-level positions, a potential career path for local youth interested in careers in emergency services.

Status

The Department has worked to determine optimal work schedules, purchased the necessary vehicles and equipment, is actively searching for a deployment center, has engaged in detailed and ongoing discussion with the 1227 Executive Board and multiple sub-groups and is developing internal policy, procedure and entry level academy curriculum.

Expected Completion: Ongoing

PROJECT 11: Job Classification Update

Summary

The Department has been working collaboratively with the City Manager's Office, Human Resources, the City Attorney's Office and IAFF Local 1227 to develop new Job Classifications, work schedules, staffing models, recruitment plans, and initial and ongoing curriculum for training and development. The Department's goal is to become a destination for EMS professionals that are just getting started in a career or who desire to have the ability to do their best workday for the balance of a career. The transition to EMTs and Paramedics is expected to begin in FY23.

Status

The Department is deep in planning for the enhancements and has created two new job classifications, obtained salary surveys, designed the recruitment process and is working with HR and the CMO to complete several additional tasks prior to recruitment commencing.

Expected Completion: FY2025



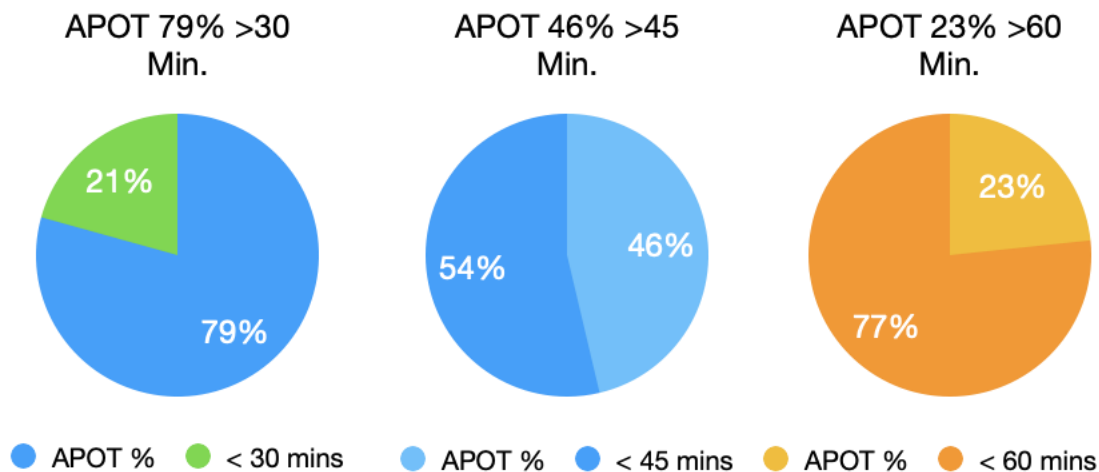
PROJECT 12: Managing Increasing Ambulance Patient Offload Time (APOT)

Summary

One of the major changes that directly affect ambulance Unit Hour Utilization (UHU) is the increase in ambulance patient offload time (APOT) at the hospital. APOT is the actual time ambulance personnel wait at the entrance to the emergency room for a bed to open so they can physically offload the patient from the gurney and return to service. The average time an ambulance spent offloading a patient in 2011 was just under 38 minutes. The average time increased to 47 minutes in 2021. More concerning is that in 23% of calls ambulances are waiting to offload patients greater than 60 minutes.

APOT will rise dramatically if Sutter closes Alta Bates and consolidates to a single facility in Oakland that is anticipated to be undersized and understaffed to handle the increase in patients that will be transported to the facility.

This is a Statewide challenge that is primarily driven by hospitals chronically understaffing both emergency departments and upper acute and sub-acute departments all of which combine to create congestion and a lack of patient thru-put in the emergency department.



Status

The Department is engaged with stakeholders throughout the State to daylight this issue and advocate with hospital administrators and corporations to more appropriately staff their facilities to meet patient demand. As part of the Department's EMS re-design, it will also deploy mobile supervisors. One of their duties will be to respond to hospitals when APOT times jump to over 45 minutes.

Expected Completion: Ongoing



PROJECT 13: Emergency Medical Service (EMS) Coordinator Job Classification

Summary

This classification will manage the Department's Continuous Quality Improvement (CQI) program to include providing a higher level of retrospective call audits, data analysis and employee education. This Job Classification will be a critical component of both the dispatch re-design and the Department ambulance re-design.

Status

To recruit the right person for this critical job, the Department formed a labor management committee to research effective CQI programs throughout the State. The proposed modifications to this Classification include re-naming to Fire Department EMS Coordinator and modifications to the characteristics, duties, knowledge, abilities, minimum qualifications, and pay that align it with comparable classifications in other jurisdictions. The Department anticipates that recruitment for this position will begin in mid-2022.

Expected Completion: Fall 2022

FIRE PREVENTION DIVISION

The complexity and volume of work this Division is responsible for have significantly increased over the past two decades without commensurate increases in staffing. That Department has added two FTE to the Division in FY23 that we hope will provide the necessary staff time to meet current demands for service.

PROJECT 14: Fire Inspector Recruitment

Summary

The Department is working to fill four vacant fire inspector positions after increasing staffing in the Division by adding two additional inspectors.

Status

The Department opened recruitment and has hired three inspectors that began work in early April. Additional inspectors should be coming on board in late 2022 when staffing allows for additional promotions of internally qualified candidates.

Expected Completion: Fall/Winter 2022



PROJECT 15: Structure Fire Inspections

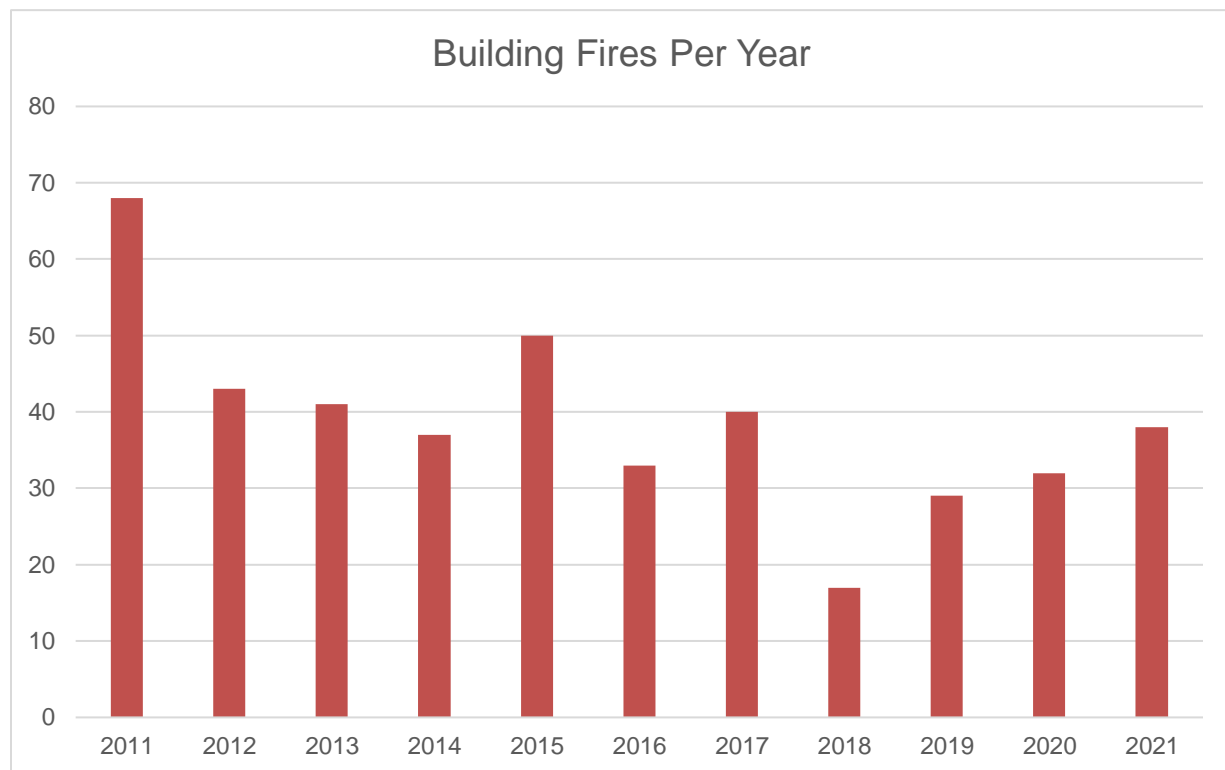
Summary

The volume of structure fires is on an upward trend. This increases fire prevention staff time for on-scene investigations, interviews, follow-up, and report writing, thus decreasing capacity for day-to-day duties (plan reviews and inspections). See the table below for a 10-year look at structure fire trends within the City.

Status

Completing fire inspections is a mandated activity for the Division and it will continue to respond to these calls for service and monitor the trends of these calls within the City.

Expected Completion: Ongoing



WILDLAND URBAN INTERFACE (WUI)

With 30 years of accumulated vegetation overgrowth, and a lack of effective enforcement and mitigation, the City has faced significant challenges and opportunities to become more wildland fire safe. This new Division has hit the ground running—currently staffed solely by retired annuitants due to the Department’s staffing challenges—and identified several wildfire mitigation and prevention projects critical to the safety of the community.



Permanent staff will begin to supplant the retired annuitants as the Department's staffing stabilizes through the end of FY22 and into FY23.

PROJECT 16: Community Wildfire Protection Plan (CWPP)

Summary

The CWPP is a comprehensive risk analysis that addresses local target hazards and includes a community-based action plan to mitigate threats, promote preparedness activities, and ensure resiliency. It will serve as the foundation and roadmap for the Department's work to prevent wildfires and limit the spread when they ignite.

Status

WRM (Wildland Resource Management) is currently under contract. The Department and WRM met to start the planning process on April 5th. During this meeting, a preliminary schedule will be developed to meet the six task segments to bring the CWPP to completion and identify city resources available to support the project.

Expected Completion: December 2022

PROJECT 17: Wildfire Safety Inspections

Summary

The retired annuitants are largely focused on performing vegetation inspections for properties in fire zones 2 and 3. They are also planning to transition the inspection from paper to mobile technology, and to improve the re-inspection process, citation, and violation process.

Per California State regulation, the Department has expanded its traditional hazardous fire area vegetation inspection program to include all properties in fire zones 2 and 3; thus, increasing the number of inspections by 83% (+7,184).

Status

The Department is recruiting for additional personnel to fill positions for fire inspectors.

Expected Completion: Winter 2022

PROJECT 18: Expanding Firewise Programs

Summary

The Wildland Urban Interface (WUI) Division staff are delivering presentations to the community concerning Berkeley's wildland-urban interface, the importance of defensible



space and vegetation management, home hardening, and what it means to be a Firewise group.

Status

Division staff are working to help several neighborhoods to achieve FireWise status. They are navigating conflicting guidelines from the National Fire Protection Association and CalFIRE that have delayed the approval of the groups that have applied.

Expected Completion: Ongoing

TRAINING DIVISION

The scope and complexity of the Department's operations have substantially changed in the last several decades. The majority of incoming technical calls occur less frequently but pose a higher risk to civilians and fire personnel. To adequately meet the national, state, and local mandates for training, and to ensure that fire personnel is ready to mitigate any, and all, calls for service, this Division is undergoing substantial enhancements. This includes adequately staffing the Division, adding funding for external subject matter experts, acquiring an adequately sized and located training facility, and providing the physical resources necessary to conduct hyper-realistic training that simulates the work environment.

PROJECT 19: Partnership with Albany Fire

Summary

The Berkeley and Albany Fire Departments respond to calls in collaboration on a daily basis. In FY22, the Departments initiated a formal training relationship that focused on training staff together.

Status

The pilot project continues and has been mutually beneficial for both the Departments and the communities. The organizations are working on formalizing the partnership through an MOU.

Expected Completion: June 2022

PROJECT 20: Entry Level Firefighter Recruitment

Summary

The Department is recruiting and hiring as many firefighter-paramedics as possible. Staff worked to streamline the recruitment process to reduce it from nine to six months and is



targeting specific qualified employees. As with most industries, fire departments struggle to find qualified employees in the applicant pool. As an example, the Department attempted to hire 16 firefighters but was only able to hire eight in the last recruitment process.

Status

Nine firefighter-paramedics from the 110th Academy began in late May of 2021, graduated on October 1st, 2021, and will complete their probation in May of 2023.

Eight firefighter-paramedics from the 111th Academy began in February of 2022, will graduate in June of 2022 and will then begin their two-year probation.

The Department anticipates beginning recruitment for the 112th academy in May of 2022.

Expected Completion: Ongoing

PROJECT 21: Regional Leadership Academy

Summary

The Department was awarded FEMA's Assistance to Firefighters Grant to design and facilitate a class series for current and prospective leaders throughout all fire departments in the region. These classes are running monthly through August of 2023.

Status

Training Division staff are coordinating these efforts, classes are being held locations throughout Alameda County. The Grant Performance Period is October 2021 through August 2023.

Expected Completion: August 2023

PROJECT 22: Land Acquisition for Regional Training Grounds

Summary

The Department is actively engaged to identify a property that will meet the City's needs for the training and development of its emergency responders and support staff. Due to zoning, the cost of the property, and the proximity of residential neighborhoods, this facility will be outside the City proper. This presents exciting opportunities for regional collaboration with other fire departments and a community college district.

Status



Several potential properties have been identified and were brought to closed session on April 12, 2022. Staff will be working to negotiate lease terms and bring a final version to the City Council.

Expected Completion: Property Acquisition FY22, Development FY26

SPECIAL OPERATIONS (OFFICE OF EMERGENCY SERVICES)

The Fire Department's Office of Emergency Services (OES) coordinates a suite of programs to build disaster resilience in the whole Berkeley community. These programs support personal preparedness, community connections, and government efforts that will help Berkeley respond to and recover from our next earthquake, fire, or other disasters.

Evacuations & Warning Systems

Summary

One of several priority projects for the Disaster Fire Safety Commission and the Council was to purchase and install a city-wide outdoor warning system (OWS). This will aid the City in its emergency messaging and integrate with other software such as Zonehaven and AC Alert.

Status

A contract has been signed with Genasys to install and maintain 15 speaker sites throughout the City of Berkeley. Contracts for the speaker sites are being negotiated with various entities throughout the City and work will begin in FY22 and run into FY23.

Expected Completion: FY23