City of Oakland
Wildfire Prevention Assessment District

2011 - 2014 Vegetation Management Plan
Executive Summary

The East Bay Hills have lost more than 3,542 homes to major wildfires during the past century, almost as many as all of the high risk Southern California Counties combined.

Every summer, the Oakland hills face multiple fires due to our unique weather and geography. Since 1923, the area experienced more than a dozen major wildfires that resulted in extensive damage and loss of life, most notably the 1991 Oakland/Berkeley Firestorm.

This disaster ranks first as the state's largest home loss from a single wildfire; the 1923 Berkeley fire ranked fifth. The 1991 Firestorm, at a cost of $1.7 billion, was one of this nation's most costly catastrophes.

The Oakland Hills area is one of the highest risk areas in the country for devastating Wildland/urban interface fires. This area has a 100+ year history of damaging wildland/urban interface fires, including the 1991 Tunnel Fire which destroyed over 3,400 dwellings, injured more than 150 people, and killed 25 people.

At the end of the century, 39% of the residences destroyed in California's 20 major residential wildfires had been lost in the East Bay Hills.

Key contributors to these fires are the weather, geography and fuel load. Fuel load is the only element that we can alter.
Due to the cancelation of the first Fire Suppression District and the subsequent loss of funding. The City of Oakland allocated $1 million a year from its general fund to support this important function. Economic conditions in the state and city jeopardized Oakland’s ability to maintain the cost of the vegetation management program.

In January, 2004, the residents of the Oakland Hills approved the formation of the Wildfire Prevention Assessment District (WPAD) to provide $1.7 million a year for the next 10 years for Vegetation management, goat grazing, yard waste disposal, community wildfire prevention education, and roving fire patrols to reduce the risk of wildfires in the Oakland Hills.

This Wildfire Prevention Assessment District was approved by 74% of the property owners in 1994 in recognition of the critical need for stable, long-term solutions to avoid the historical pattern of a devastating fire every 20 years.

The WPAD has two functions: it provides education, inspection, and, if necessary, enforcement of non-city owned properties within the WPAD (private, nonprofit, institutional, other agency); and it provides funding for vegetation management on city-owned properties within the WPAD.

The Wildfire Prevention Assessment District (WPAD) is the culmination of over a decade’s work in fire risk reduction planning and design, enhancing the public’s awareness of the fire risk, and building widespread public support for fire risk reduction measures.

The goal of the WPAD is to systematically and permanently reduce and manage vegetative fuel loads to significantly reduce the risk of future major fires.

Mitigation plans call for both vegetation treatment near and around structures, as well as creating and maintaining regional fuel breaks to protect neighborhoods and cities from rapidly moving firestorms. Reducing fuel enhances fuel/fire breaks, provides defensible space, provides space for staging areas, and enhances ingress and egress routes within the project area. The City of Oakland and its affected public are deeply committed to long-term ongoing maintenance of the fire break and vegetation control programs to significantly reduce the threat of major fires along this heavily populated high risk area.

Alternate approaches have been considered regionally but are unacceptable for environmental and political reasons. They include:

- The wholesale elimination of regional parks and wildlife preserves. This would reduce the risk of a wildfire starting in the wildland and traveling into the urban areas.

- To condemn city neighborhoods, but since the land is valued at approximately $1.5 million per acre, not to mention the conflicts that would arise from eminent
domain takings and the displacement of citizens, such a response is untenable.

- No Action. Under this alternative, vegetation management activities would not occur within the WPAD. In absence of these activities, exotic, high-ignition potential vegetation would not be removed, and the existing high-fire hazard would continue.

The District boundaries are the Oakland Hills and the surrounding areas with extreme dense vegetation which puts them at a high risk of loss or damage if a wildland fire were to start and spread. The District runs from the Berkeley border south to the San Leandro border, and from the Contra Costa border on the east too slightly beyond Highways 13 and 580 to the west. (Portions of Council districts 1, 4, 6 & 7 (Appendix 1).

Each year, property owners generously provide a set amount on their property tax that generates approximately $1.7 million dollars in hazardous fuels abatement funding.

<table>
<thead>
<tr>
<th>Developed Land:</th>
<th>Single Family Residential</th>
<th>$65 per parcel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condominium/Townhouse</td>
<td>$48.75 per parcel</td>
<td></td>
</tr>
<tr>
<td>Multi-Family (apartments)</td>
<td>$32.50 per unit</td>
<td></td>
</tr>
<tr>
<td>Commercial, Industrial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public, Institutional,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational, Utility</td>
<td>$274.05 per acre</td>
<td></td>
</tr>
<tr>
<td>Improved Land:</td>
<td>Commercial, Industrial</td>
<td></td>
</tr>
<tr>
<td>Public, Institutional,</td>
<td>$82.49 per acre</td>
<td></td>
</tr>
<tr>
<td>Recreational, Utility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undeveloped Land:</td>
<td>Single Family Residential</td>
<td>$16.25 per parcel</td>
</tr>
<tr>
<td>Commercial, Industrial</td>
<td>Public, Institutional,</td>
<td></td>
</tr>
<tr>
<td>Public, Recreational, Utility,</td>
<td>Multifamily, Mobile Home</td>
<td></td>
</tr>
<tr>
<td>Commercial, Industrial</td>
<td>Public</td>
<td>$34.37 per acre</td>
</tr>
</tbody>
</table>
The high risk fire area comprising the Oakland WPD is shown in the shaded area on the map. Within the WPD there are approximately: 54,000 residents, 22,200 homes, 25,500 parcels, 200 businesses, 30 schools, 20 churches, and 57 parks.

More than 20 FEMA-designated "critical facilities" are located within the project impact area, which substantially increases the risk and costs. These include fire stations, temporary evacuation shelters, transportation and infrastructure facilities, and other emergency response facilities utilized by the entire San Francisco Bay Area region.

Historic/Educational
- Claremont Hotel and Resort
- UC Botanical Garden
- Oakland Zoo
- Chabot Space and Science Center
- Merritt Community College
- Oakland Libraries
- Oakland School District

Program Goals;

To enforce the fire prevention codes and ordinances that pertain to wildland/urban intermix-interface areas of the City of Oakland and to provide educational information to the citizens living in these areas regarding fire prevention practices and procedures.

Create a partnership between the city, homeowners, and other public and private entities will be encouraged in meeting the various aspects of this program.

Additionally, the identification and management of environmental issues must be incorporated to protect various species.

To plan, prepare and respond to wildland/urban fire safety problems in the hills of the City of Oakland through the implementation and continue development of the Wildfire Prevention District program.

- The goal of the 2011-2014 vegetation management program is to continue the process and progress to create fire-resistance Oakland Hills communities and defensible spaces (places that are less prone to burn because of collaborative wildfire defensible space projects). Continue the process to create a strategic fuel break systems that can be used to compartmentalize and dampen fire progression patterns across large expanses of wildland, transforming them into more manageable fire control areas.

- Take on the task of removing the build up of non-native vegetation from the canyons throughout the high fire hazard area. This would be achieved by working collaboratively with other large property stakeholders
like East Bay Regional Parks District, UC Berkeley, P.G. & E, Unified school district, Cal-Trans and East Bay Municipal Utility District.

- The Fire Prevention, Fire Suppression unit shall inspect all buildings and properties in the hill areas to ascertain and correct any hazardous conditions which could cause fire or contribute to the spread of fire, or any violation of the Oakland Fire code and any other law or standard affecting fire and life safety.
Wildfire Prevention Assessment District (WPAD) Advisory Committee

Responsibility for the implementation of the WPAD vegetation is held by the Oakland Fire Department’s Fire Prevention Bureau (FPB), under the supervision of the Fire Marshal’s Office. There are five Vegetation Management Inspectors for the WPAD who are charged with inspections and enforcement of the defensible space requirements in the High Fire Hazard Area.

The legislation forming the WPAD provided for the creation of a Citizens’ Advisory Committee, which provides oversight, develops the WPAD budget and recommends program priorities. Citizens’ Advisory Committee consists of two members appointed by City Council Members in Districts 1, 4, 6, and 7, one member appointed by the Council Member-at-Large, and two members appointed by the Mayor.

Meetings are conducted every third Thursday at the East Bay Regional Park District Trudeau Training Center, 11100 Skyline Blvd.

2010 Wildfire Prevention Assessment District Advisory Committee

Mayor Dellums
Reps: Dee McDonough
Reps: Doug Wong

Councilmember Quan - District 4
Reps: Chris Candell
Reps: Barbara Goldenberg (Chair)

Councilperson Brunner - District 1
Reps: David Kessier
Reps: Barry Pilger

Councilperson Brooks - District 6
Reps: Lilah Greene
Reps: James A. Williams

Councilperson Reid - District 7
Reps: Dinah Benson
Reps: Don Johnson

Councilperson At-Large Kaplan
Reps: Chuck Bowes

In its first year, the Citizens’ Advisory Committee developed a mission statement, a set of ten year goals and recommendations for strategic policies, and programs to support that mission.
Prior to the task of formally prioritizing the work that is undertaken in the WPAD, the FPB and the Citizens’ Advisory Committee agreed on the following components for determining risk assessment and risk management:

- Public safety – protection of lives
- Protection of structures
- Egress and ingress routes
- Slope and terrain
- Diablo wind corridors, natural chimneys
- Fuel load
- Population density
- Social factors and human behaviors

The ten-year goals (2004-2014) of the program set by the Citizens Advisory Committee:

- Establish and implement a strategic, cost-effective, sustainable, environmentally-sensitive fuel management plan
- Have knowledgeable and involved property owners, developers, and the public-at-large in fire safe practices
- Enhance cooperation and communication with the community, City, other agencies, and neighboring districts
- Establish and refine policies, procedures, and regulations that improve fire safety

This plan proposes to collaboratively develop and foster practices and actions which will mitigate these risk factors.

The following actions are recommended:

- Organize community meetings to educate residents about the fire environment in which they reside and measures they can take to minimize their risk and prepare for a fire event.

- Conduct community meetings to explain good practices residents can follow to reduce structural ignitability and limit ignitions.

- Support community meetings and distribute literature that will explain good practices residents can follow to organize evacuation protocols and drills in areas where sudden evacuation could not be performed by emergency responders.

- Conduct workshops which show common architectural features (such as Class A & Class B roofing) and how they respond when ignited.

- Conduct workshops for residents, landscape designers, architects, and contractors on how to provide information about defensible space and fire-resistant landscaping.
When funding is available; projects, workshops, and educational efforts will be awarded based on the following attributes:

Protects life, property and infrastructure in areas of the WPAD where risk of catastrophic wildfire is most severe.

Reduces risk of fire spreading from private lands to city parklands, county, state or federal lands, or areas where significant cultural resources or values are at risk.

Either seeks to create a plan for fire prevention or mitigation in a new area or supports ongoing, previously planned efforts.

Involves stakeholders at all levels, there is strong community support as well as support from all applicable agencies and landowners; intensity of local support will be a significant factor when choosing projects.
Landscape History

Wildfires are part of City of Oakland, Very High Fire Severity Area natural ecosystem. The Mediterranean–like climate, the rugged, wind-conducive topography, and fire-adaptive native vegetation set the stage for periodic burns.

This fire environment is made more dangerous by the abundant hazards and risks associated with a growing population and sprawling pattern of development.

More than 30 severe fires have occurred in the area in the past 80 years, resulting in loss of lives, property, and natural resources. Historically, more frequent wildfires of lesser intensity were common. Drought and human behaviors, particularly in the arenas of land-use and fire-suppression, have had a profound impact on the WPAD fuel complex and fire regime.

Some of the hill regions were set aside and managed as parklands and watersheds. Others were committed to development and opened to subdivision. The development of the hills has resulted in an urban/wildland interface with complex fire problems. Many houses and other structures are adjacent to or mixed in with heavy wildland fuels on steep slopes and dead-end roads.

As a result, the presence and density of these fire-prone structure/vegetation mixes along the urban/wildland interface are capable of producing uncontrollable firestorms (Williams, 1997). Chief among fire hazards is the area weather. Despite efforts to improve neighborhood safety and fire fighting capability, uncontrollable fire storms will occur under the extreme but periodic conditions of "Red Flag" weather days. "Red Flag" warnings are issued by the National Weather Service when weather elements such as low relative humidity, strong winds, or the possibility of dry lightening strikes could lead to rapid increases in wildfire activity.
In the Oakland Hills, "Red Flag" weather can mean the occurrence of strong, hot, and dry offshore Foehn winds. These winds, known locally as "Diablo winds", carry extremely dry air at high velocity. They quickly desiccate vegetation and other flammable materials and can push a fire down or up a slope with amazing speed. These can occur at any time of year, but are especially dangerous in the driest months of summer and fall. During these times, fighting a fire becomes far more difficult.

A consequence of this change in vegetation is the increased fire hazard. To further complicate the situation, traditional periodic burning practices (which would reduce the fuel load) carried out by the ecosystem-aware indigenous peoples had ceased leading to increased scrubland.

Until recently, the hills have been dominated by high-ignition-potential vegetation, such as senescent Monterey pines (*Pinus radiata*), Tasmanian blue gums (*Eucalyptus globulus*), red gums (*Eucalyptus carnaldulensis*), French broom (*Genista monspessulans*), and non-native annual grasses, forbs, and shrubs. The change in the native fire-cycle has resulted in an over-accumulation of vegetation in some areas.

The massive fuel load in the area mountains and hills makes fires very difficult to contain. In addition, non-native vegetation has replaced the more fire resistive native species in places, adding to the threat. The growing numbers of homes and other structures also increases the fuel load.

The Alameda County's mountainous topography influences fire behavior, and in many instances intensifies fire effects. Westward facing slopes are more arid (due to long exposure to the afternoon sun) and thus more combustible. The difficulty of building roads in the steep areas makes ingress or egress difficult and delays fire fighter response time.

The Oakland Fire Department in collaboration with city and county agencies has prepared a Fire Weather Operating Plan to define roles and responsibilities during fire weather events.
WPD/OFD Wildfire Prevention Strategy

It has been proven that fire safety is best achieved through rigorous oversight and active management of regional fuel loads. This strategy is supported and recommended in the State Multi-Hazard Mitigation Plan and California Fire Plan. The modification of the fuels is designed to meet the code requirements while maintaining a balance between public safety and ecosystem health. The code requirements are as follows: California State Fire Code (CFC), the Oakland Municipal Code (OMC), and/or the Public Resources Code and Legal Foundations in Ordinances, Resolutions, and Regulations.

These codes can be found at: http://www.Oaklandnet.com/WildfirePrevention/Vegetation.htm. Due to the unpredictable nature of the area’s changing climate and the annual growth of the vegetation, an adaptive approach is required. For example, goat grazing should not commence until the winter rains have subsided. The WPD Program recognizes this and periodically adjusts the flow of the work schedules.

The hazard reduction goals are:
- To contain fire and reduce its spread
- To create and maintain ridge-top firebreaks
- To create and maintain egress and ingress routes
- To create and maintain defensible space for structures and properties
- To improve natural, existent, and contiguous fire breaks
- To have access and thus the ability to fight fire
- To be sensitive to the impact on the environment

The mission of the Wildfire Prevention Assessment District is to reduce the risk of fire in the Oakland Hills. The 10-year goal facing the city is to establish and implement a strategic, cost effective, sustainable, and environmentally-sensitive fuel management plan.

By removing the build-up of non-native vegetation from the critical areas throughout the high fire hazard area, strategic fuel breaks are created. These fuel break systems can be used to compartmentalize and dampen fire progression patterns across large expanses of wildland, thus transforming them into more manageable fire control areas.

The result is the creation of a fire-resistant community and defensible spaces (places that are less prone to burn because of precautions taken ahead of time). Information is provided to the property owners and community, not only on how to abate fire threats on their properties, but how they can landscape for less maintenance and less flammability.
The WPD has two functions:
- Provide education, inspection, and, if necessary, enforcement of non-city owned properties within the WPD (private, nonprofit, institutional, other agency)
- Provide funding for vegetation management on city-owned properties within the WPD

Prior to the task of formally prioritizing the work that is undertaken in the WPD, the FPB and the Citizens' Advisory Committee agreed on the following components for determining risk assessment and risk management:
- Public safety – protection of lives
- Protection of structures
- Egress and ingress routes
- Slope and terrain
- Diablo wind corridors, natural chimneys
- Fuel load
- Population density
- Social factors and human behaviors

HISTORICAL BACKGROUND

Vegetation types and structures on Bay Area landscapes have changed dramatically in the last 200 years. The introduction of livestock in association with Mediterranean annual grasses, has resulted in the almost complete replacement of native perennial bunch grasses by annual grasses in the grasslands, oak woodlands and savannas of the East Bay Hills.

By 1900, land and timber speculators as well as real estate developers, had planted tens of thousands of eucalyptus, Monterey pine and cypress trees, none of which are native to the Bay Area. A consequence of this change in vegetation is the increased fire hazard.

Until recently, the hills have been dominated by high-ignition-potential vegetation, such as senescent Monterey pines (*Pinus radiata*), Tasmanian blue gums (*Eucalyptus globulus*), red gums (*Eucalyptus carnaludensis*), French broom (*Genista monspessulanus*), and non-native annual grasses, forbs, and shrubs.

Some of the hill regions were set aside and managed as parklands and watersheds. Others were committed to development and opened to subdivision. The development of the hills has resulted in an urban/wildland interface with complex fire problems. Many houses and other structures are adjacent to or mixed in with heavy wildland fuels on steep slopes and dead-end roads.

As a result, the presence and density of these fire-prone structure/vegetation mixes along the urban/wildland interface are capable of producing uncontrollable firestorms (Williams, 1997).

The East Bay Hills' combination of hot dry summers, wind-conducive topography, flammable vegetation, dense urban development, limited fire-fighting access, and Diablo winds comprises this continuing substantial regional fire danger. The eucalyptus forests are extremely productive in terms of fuel load, with year-round shedding of leaves, small branches and bark. Hot winds during fire events can carry such material several miles as burning embers, as witnessed in the
1991 Firestorm. Secondary spot fires and roof ignitions from these firebrands substantially increase fire range and risk. It has been proven that fire safety is best achieved through rigorous oversight and active management of regional fuel loads. This strategy is supported and recommended in the State Multi-Hazard Mitigation Plan and California Fire Plan.

In recognition of the critical need for stable, long-term solutions to avoid the historical pattern of a devastating fire every 20 years. Starting in 2004, the early goal of the WPD inspection program was to strengthen and improve the existing process to create fire-resistant communities and defensible spaces.

**Principles of Fuel Management**

Fuel management addresses management of vegetative fuel to reduce fire hazard. Extreme fire behavior is characterized by flame lengths of eight feet or greater, or a high potential for flames to reach into the tops of trees and create what are called "crown fires." These two criteria are nationally recognized as defining behavior resulting in fires that spread rapidly and are difficult to control (Schmidt et al. 2002).

Applying these two initial criteria to the entire WPD, it is unknown how many acres of wild lands may be identified as having the potential for extreme fire behavior. Historically, the social, fiscal, and environmental costs to mitigate such a wide scale of hazardous vegetative fuels have been unacceptably high. Therefore, mitigations have been focused on those areas that have the greatest impact on human safety and property.

**Constraints to and Adaptations of Mitigation by Vegetation Type**

Fuel management, especially of growing vegetation, is an on-going, cyclical process. Given the dynamic nature of vegetation, a single prescription cannot be assigned to any location and be effective in perpetuity. Instead, the WPD’s vegetation management actions allow a choice from a "toolbox" of potential treatment methods that can be further customized for site conditions in order to achieve fuel management goals.

The toolbox is organized by vegetation type. These vegetation types are defined by typical fuel characteristics, desired fire hazard reduction goals, special considerations, treatment standards, and treatment options. The vegetation communities are grouped into six types:

1. Grasslands
2. Brush & Scrub dominant communities
3. Eucalyptus Forests
4. Monterey Pine Forest
5. Mixed Hardwood Woodlands
6. Redwood

Specific treatment goals and their methodologies are available for each vegetation type. In general, treatment actions will manage the vegetation to maintain the existing natural community while mitigating fire hazard characteristics.
The major methodology will be to modify the vegetation's development stage and corresponding fire behavior. The treatment goals can be generalized for all of the fuel types to meet one or all three of these major goals:

1. Reduce overall fuel load to minimize extreme fire behavior. Reduction is achieved by:
   a. Removal of dead material
   b. Thinning or removal of individual specimens to reduce overall density and volume
   c. Favoring species with lower biomass or fuel production

2. Eliminate fire ladders - vertical continuity that can carry fire up into taller adjacent plant materials or structures. Separation between surface fuels (on the ground) and crown fuels (in the tops of shrubs trees) can be achieved by:

3. Reduce the potential for rapid spread of fire by:
   a. Reducing the quantity of fine fuels (natural litter, duff such as pine needles, leaves, loose bark)
   b. Disrupting horizontal continuity by breaking up solid dense stands of shrubs or trees into clumps or "islands"

Immediate full-scale conversions to other vegetation types are not proposed in the WPD, at this time. Over the long-term, the WPD may choose a series of actions to manage vegetative fuels that lead to vegetation type conversion – to meet goals such as restoration of oak woodland by eradication of weedy exotics (French broom, acacia, pampas grass, etc.), or replacement of aged Monterey pine or second growth eucalyptus. Currently the management actions on city-owned property are limited to the actions allowed within the existing categorical exemption. Decisions for long-term conversion should work towards fulfilling other goals in addition to fire hazard mitigation.

The limits of the treatments are related to a variety of site conditions. Vegetation type, vegetation development stage, slope, and proximity and relationship of adjacent houses or egress routes to each treatment area—and anticipated fire behavior of the treated area—combine to dictate the width, shape, and size of treatment areas.

Recommended treatment standards have been adopted for each vegetation type and vary in width from as little as ten feet in grasslands along roadsides, to as much as the entire stand of a second-growth eucalyptus forest where crown fires are a concern. These recommendations shall be adapted for the actual site conditions as the treatment is assigned to each parcel.

**Fuel Management Standard Methods**

Fuel management methods, treatment prescriptions, and regional treatment standards (HEF, 1995) are identified by vegetation type. Four methods are available:
1. Hand labor
2. Selective cutting of hazardous trees
3. Mechanical treatments
4. Grazing

The Oakland Vegetation Management Plan projects will be divided into segments and performed over the course of 4 years (pending receipt of NEPA environmental clearance and CEQA review). The incremental pace is useful for several reasons:

It allows adaptive management processes time to adjust methods to avoid large scale problems; it allows the community time to get used to the change in the landscape; it allows a more regular financing scheme, avoiding debt expenses, it allows certain portions of the work to be timed to avoid adverse impacts to species of concern.

In general, work will be conducted outside of avian nesting and fledging season (March 15 – July 30) and outside of the wet season (Nov. 15 – April 15) unless a compelling reason or opportunity indicates otherwise. For trees nearest the known habitat of the Alameda Whip snake, the avoidance strategy will involve hand felling the trees during the winter when the snakes are hibernating underground.
Benefits to the Wildfire Prevention District

The funding created by the WPD support the program mission and goal through the following programs;

Goat Grazing –
The WPAD utilizes herds of goats to clear the excess brush that allows fires to spread rapidly. The goats remove vegetation from the large public open space areas within the assessment district boundaries. The WPD utilizes goats to consume the finer brush and grass that allow fires to spread rapidly. The goats (approximately 3,000) remove the vegetation from the large public open space areas within the district boundaries.

Desirable plant species such as young oaks are wrapped to protect them from being eaten by the goats. They are able to clear areas that are inaccessible to the tiger mower or too steep for the crews. Areas such as steep bare hillsides that are prone to erosion are avoided. As with any method, goat grazing has its pros and cons.

For the 2011/2014 Vegetation Management Plan, 3,000 goats will be used to reduce fuel load on 682 acres on City of Oakland open space lands. Goats are used on large swaths of grassy fields and low shrubs where manual labor would be cost prohibitive. Goats are normally employed between May and August.

Fire Prevention Bureau and Parks and Recreation staff in collaboration with the Friends of Suasal Creek has developed a goat grazing plan for Joaquin Miller Park to allow for the re-emergence of native plants in the park areas after the goat grazing has reduced the number of invasive non-native species. Grazing dates and areas are as follow;
<table>
<thead>
<tr>
<th>Location</th>
<th>Acres</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Approx)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>King Estates</td>
<td>88</td>
<td>May 8 - May 3</td>
</tr>
<tr>
<td>Joaquin Miller Park</td>
<td>150</td>
<td>June 6 - July 5</td>
</tr>
<tr>
<td>Knowland Park</td>
<td>350</td>
<td>June 20 - July 15</td>
</tr>
<tr>
<td>Dunsmuir</td>
<td>75</td>
<td>June 20 - July 4</td>
</tr>
<tr>
<td>Shepherd Canyon</td>
<td>9</td>
<td>July 5 - July 10</td>
</tr>
<tr>
<td>London Road</td>
<td>10</td>
<td>July 11 - July 18</td>
</tr>
<tr>
<td><strong>Total Acres:</strong></td>
<td>682</td>
<td></td>
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### Grazing Areas, 2008-2012

#### Grazed Yearly

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<tr>
<th>ID</th>
<th>Acres</th>
<th>Location</th>
<th>Grazing Frequency</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tbody>
<tr>
<td>1-buff</td>
<td>9.29</td>
<td>Sidewalk-edge buffer, Butter's Drive</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>1.64</td>
<td>Between Tot Lot and Sanborn</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>7.48</td>
<td>Around and behind JM Abbey (may be 2 areas, split at Bishop's Walk)</td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>4</td>
<td>3.70</td>
<td>Near Ferry Field along JM Road</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>0.62</td>
<td>Nursery</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>6</td>
<td>1.16</td>
<td>Interior of Sanborn 1-way loop; west end</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>7</td>
<td>0.47</td>
<td>Between Sanborn and theater, picnic area</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>8</td>
<td>2.95</td>
<td>Between Sanborn and theater driveway, picnic area</td>
<td>Yearly</td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>9</td>
<td>3.56</td>
<td>Theater parking area/dog park</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>10</td>
<td>0.47</td>
<td>Buffer below Sunset Trail</td>
<td>Yearly</td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>11</td>
<td>4.16</td>
<td>Upper Sunset Grassland, west end of Sunset Trail to West Trail</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>12</td>
<td>1.05</td>
<td>Along Castle Park and West Trails</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>13</td>
<td>3.84</td>
<td>Between Castle Park Trail and Skyline</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>14</td>
<td>3.01</td>
<td>Above Skyline to trail</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>15</td>
<td>6.21</td>
<td>Along Skyline, from trail to Moon Gate</td>
<td>Yearly</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

#### Grazed Less Frequently

<table>
<thead>
<tr>
<th>ID</th>
<th>Acres</th>
<th>Location</th>
<th>Grazing Frequency</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-all</td>
<td>3.50</td>
<td>Butter's Drive, near Fire Station</td>
<td>Yearly on edges, 3-5 years for rest</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>7.85</td>
<td>From Funeral Pyre to Cascades, below nursery</td>
<td>2 years</td>
<td>no</td>
</tr>
<tr>
<td>3</td>
<td>1.05</td>
<td>Interior of Sanborn 1-way loop, center</td>
<td>2 years</td>
<td>no</td>
</tr>
<tr>
<td>4</td>
<td>1.48</td>
<td>Interior of Sanborn 1-way loop, east end</td>
<td>3 years</td>
<td>no</td>
</tr>
<tr>
<td>5</td>
<td>1.39</td>
<td>North of Sanborn by fire gate, picnic area</td>
<td>2 years</td>
<td>no</td>
</tr>
<tr>
<td>6</td>
<td>1.65</td>
<td>North of Sanborn, past trail</td>
<td>2 years</td>
<td>no</td>
</tr>
<tr>
<td>7</td>
<td>2.02</td>
<td>Browning Monument area</td>
<td>3-4 years</td>
<td>no</td>
</tr>
<tr>
<td>8</td>
<td>1.02</td>
<td>Along Shiver Loop Trail, the clover meadow</td>
<td>3-4 years</td>
<td>no</td>
</tr>
</tbody>
</table>

18°
Vegetation Management – Private contractors and city crews implement the vegetation reduction and management programs throughout the district. This includes open space and canyon hill parcels, firebreaks and roadside clearance along public streets and evacuation routes within the district. Additionally, fire companies and vegetation management inspectors annually inspect district properties to identify those that are in violation of the Oakland Fire Code. The Inspectors notify non-compliant property owners. If the properties are still non-compliant during the re-inspection, the property owners will be charged the cost of having the property being brought back into compliance by contractors.

Property Owner Chipping Services – This program assists private property owners by providing a convenient way to dispose of tree branches, brush and other yard waste that can fuel fires. The district provides crews to process private property owners’ yard waste into wood chips or mulch for the owners' use, or provide other means of disposal.

Fire Prevention Education & Training – Public Outreach staff provides special training to District neighborhoods and schools to assist in preventing fires, defensible space planning and planning safe evacuation routes in the event of a fire.

Roving Fire Patrols – This program provides additional fire patrols to monitor properties within the boundaries of the assessment district during high fire hazard days to monitor, correct and report potential fire hazards to the Fire Department.

Vegetation Management - Property Inspection Program

The Oakland Fire Department’s Fire Prevention Bureau (FPB) conducts approximately 26,000 public and private property inspections annually in the high fire hazard area. Inspections are mandated by City of Oakland Ordinance No. 11640 and 12556 C. M. S. and the State of California. Currently, the WPD is divided into four districts (these are different than City Council Districts), with each having an inspector.

On city-owned and private lots, fire companies and vegetation management inspectors annually inspect properties to identify those that are out of compliance and need a reminder and/or consultation. If this notice is ignored, repeated visits are made until the property is brought to compliance standards. The overall compliance rate for residents and public entities is above 90% annually. Rarely does a property reach the level where the work is put out to bid for an independent vendor to complete the work.

Year-round fire hazard abatement requirements:

Developed Lots (lots with a house or other structures):
- Keep a 30-foot minimum defensible space around all buildings (grass, weeds, brush to 6 inches or less).
- Keep 10-foot minimum clearances next to the roadside including street right-of-ways.
- Remove all portions of trees within ten feet of chimneys or stovepipe outlets.
- Keep roof and gutters free of leaves, needles, or other dead/dying wood.
- Install a spark arrestor on chimneys or stovepipe outlets.
- Remove all tree limbs within six feet of the ground so as not to create fuel ladders.
- Remove dead/dying vegetation from the property.
• All landscaping should be maintained and irrigated so they are green.

_Vacant Lots_ (if ½ acre or less, clear the entire property of flammable vegetation in accordance with fire hazard abatement requirements below. If greater than ½ acre, clear the perimeter with a minimum width of 30 feet around the property line or to the exterior boundary of the property):

• Clear entire lot of dry grass, weeds, and brush to a height of 6 inches or less.
• Maintain perimeter clearance of 30 feet within the property line to the exterior boundary.
• Provide a firebreak of 100 feet along the perimeter of property adjacent to neighboring structures.
• Maintain a 10-foot minimum clearance next to the roadside including street right-of-ways.
• Remove dead/dying vegetation from the property.
• Remove all tree limbs within six feet of the ground so as not to create fuel ladders.

_Roadside Treatment_

Roadside clearance of vegetation (10 to 30 feet depending on area) is completed along key egress and high traffic streets across the WPD. This work has been done by a piece of equipment called the tiger mower with the assistance of crews from hand crews.

Roadsides are of concern because wildfires are generally started by human activity. This includes the possibility of ignition from sparks, catalytic converters, tossed cigarettes, and fireworks. Other benefits are the increased visibility for cyclists, joggers, and motorists, as well as providing greater egress and ingress in the event of an emergency.

_East Bay Hills Roadside Standards_

_The California Fire Code, Suppression and Control of Hazardous Fire Areas provide for Clearance of Brush or Vegetative Growth from Roadways in Section 17:_

“The Fire Chief may remove and clear within 10 feet on each side of roadway all flammable vegetation or other growth. May enter upon private property to clear. Does not apply to single specimens of trees, ornamental shrubbery, or cultivated groundcovers provided that they do not form a means of readily transmitting fire. ‘Roadway’ applies to portion of highway or private street improved or ordinarily used for vehicular traffic. This section also enables the Chief to require reasonable alternative measures.”
**Chipping Program**

Private property owners in the WPD have a convenient way to dispose of tree branches that are too large for green debris pick-up (see section below). The WPD provides crews to process yard waste into wood chips for the owners’ use or it is hauled away and added to existing soil amendment programs. This free curbside service is offered year round.

Property owners need to call in advance for pick-up (510) 238-7388. The following specifications apply:

- Leave branches no greater than 4” in diameter
- Stack branches in piles that are 4’ x 4’
- No more than two stacks per pick-up

**Green Debris Disposal**

City wide service:

- Weekly collection
- “Unlimited” quantity: residents may set out additional, properly prepared* material that is generated on property
- Food scraps and food-soiled papers may be added to yard trimmings

*In addition to the 64-gallon cart, residents may set out paper bags full of clippings, in their own container (up to 35 gallons) of clippings and/or bundled branches less than 4’ in length and less than 6” diameter.

All material from this program is sent to commercial composting facilities where it is processed into soil amendment products and sold to agricultural and horticultural markets. Oakland residents recycled an average of 25,000 tons per year of yard trimmings through this program in 2000 to 2004. In 2005, they recycled 33,500 tons, a 33% increase over the 2000-2004 average. Although this data is not tracked by parcel, vegetation from the WPD residential properties is most likely the biggest source of increased volume. Find complete program info at the Public Works Agency recycling home page at http://www.OaklandRecycles.com and click on the picture of the green cart.
Public Outreach and Wildfire Prevention Education

A Fire Safety Education Coordinator has been added to the staff to enhance education materials and conduct outreach efforts to District neighborhoods on fire prevention and defensible space. This is an ongoing effort with an emphasis placed on voluntary citizen effort. Since 1991 there has been approximately a 75% turnover of new homeownership in the Oakland hills (County Assessor’s Office). Therefore many residents lack the direct experience of a Firestorm, which can lead to a relaxed approach on the part of the individual.

The goal is to educate the public with long-term strategies for creating and maintaining fire-resistant communities. The education materials are designed to encourage participation as opposed to alarm from flyers of homes engulfed in flames.

Ongoing activities include:

- Monthly public meetings of the WPD Citizens’ Advisory Committee the third Thursday of each month from 7-9 p.m.- check website for meeting date
- Presentations to neighborhood and homeowner associations and schools
- Information booths at fairs and farmers’ markets
- Wildfire Day Proclamation and associated events

- Website http://www.Oaklandnet.com/WildfirePrevention
- Email: WildfirePrevention@Oaklandnet.com
- “Magic Help Desk” at (510) 238-7388 for all requests and concerns.
The Citizens of Oakland Respond to Emergencies (CORE) is a Fire Department program that includes emergency planning and public safety education information.

Neighborhood Watch Groups are another outreach mechanism organized throughout the city of Oakland, partnering with the Neighborhood Crime Prevention Council of the Police Department and the City Administrator's Office. They are small, local neighborhood groups organized around safety and preparedness issues. In 2007 the WPD began to develop and offer a small course module specifically focused on safety in the high fire risk area to include in their training. It will address vegetation management, how to create defensible safe and evacuation planning.

**Roving Fire Patrol**

Additional fire patrols survey properties within the boundaries of the District during high fire hazard days to monitor, correct, and report potential fire hazards to the Fire Department. In addition the Roving patrol enforces all parking restrictions in the Oakland Hills. This ensures that streets are open in case of the need for emergency vehicles and/or evacuation in the event of a wildfire.
Prioritized Fuel Reduction Treatments

Fuel Management

Fuel management is the practice of removing or modifying vegetation in order to reduce wildfire ignitions, rate of spread, and intensity. Fuel management requirements depend on the vegetation type, location, condition, and configuration. Given the dynamic nature of these fuels, a single treatment type or prescription is typically not effective. Rigorous oversight, active management, and an adaptive approach are required to achieve fuel management goals.

Generally, three fuel management methods are available and used within the WPAD:

1. Manual (e.g., hand labor such as pulling or cutting)
2. Mechanical treatments (e.g., mowing, selective cutting of trees, masticating)
3. Prescribed herbivore / grazing (targeted grazing by goats)

Specific fuel management treatment goals and methods are addressed more fully in the Best Management Practices Guide section of this document [Appendix 2].

Fuel Reduction Treatment Priorities

The Fire Prevention Bureau, Vegetation Management Unit establishes fuel reduction treatment priorities on a regular basis. Typically, fuel treatment is done immediately around structure, by roadways, and in areas of extreme fire behavior. Fuel reduction priorities are organized by zone as follows:

From the Home: 0-30', 30-100'.
Critical Infrastructure: 0-300'.
Emergency Access Roads: 0-30', 30-100'.
Community Protection: 100-300'.
A list of current priority projects have been defined in the 2011 - 2014 Vegetation Management Plan. An intended outcome of the WPAD process is for this list to be updated annually to ensure that efforts are coordinated whenever possible.

- When funding is available, fuel reduction treatment projects with the following attributes should be given the highest priority:

  - Project reduces hazardous fuels that, if left untreated, would generate high intensity burning adjacent to structures or communities at risk, or produce large quantities of airborne burning embers that would carry into communities or other important resources.

  - Project reduces hazards along strategic emergency access and evacuation routes., or other critical infrastructure;

  - Project includes vegetation modification treatments that will reduce the threat of unacceptable impacts of high intensity fire to high value ecosystems, sensitive watersheds and high concentration recreation areas, including city parklands and county, state or federal lands.

Mitigation plans call for both vegetation treatment near and around structures, as well as creating and maintaining regional fuel breaks to protect neighborhoods and cities from rapidly moving firestorms. Reducing fuel enhances fuel/fire breaks, provides defensible space, provides space for staging areas, and enhances ingress and egress routes within the project area. The City of Oakland and its affected public are deeply committed to long-term ongoing maintenance of the fire break and vegetation control programs to significantly reduce the threat of major fires along this heavily populated high risk area.

Types of fuels that need to be managed within the WPD;

- **Grasslands** - this type is dominated by exotic species that lose their greenness and go to seed early in the season.

- **Brush and Scrub Dominated Communities**
  - North Mixed Chaparral occurs in the very small quantities but is the most hazardous from a fire behavior standpoint.
  - North Coastal Scrub consists of those communities found on dry sites, common throughout the hills, and the less common mesic or wet sites. The communities on wetter sites are less hazardous unless filled with old dead materials.
  - Successional Scrub describes the stage of natural succession between scrub land and one of the woodland vegetation types.
- Exotic Shrubs and Perennials are found intermixed with many of the vegetation types. French broom in particular spreads rapidly from a seed base and presents a fire danger due to its propensity to grow densely.

- **Eucalyptus Forests**

  - Mature eucalyptus forests are the stands that have never been cut. They have a poorly developed under story consisting mainly of young eucalyptus, with annual grasses and other introduced species such as acacia and Monterey pine at the forest edge. As eucalyptus approaches 100 years it is considered mature. As it ages past 150 years the chance for problems due to disease increases. This includes the dropping of limbs and whole tree failure.

  - Second Growth Eucalyptus. Approximately 60% of the eucalyptuses in the hills were cut in the last 25 years for firewood or the removal of freeze damage. Subsequently these trees have resprouted or "coppiced" and now appear as mature trees with a multiple stems from a single specimen and form a major fire concern.

  - 1 to 5-Year Eucalyptus resulting from recent treatment of eucalyptus.

- **Monterey Pine Forests** - they occur as mature groves, in dense plantations and are often mixed with eucalyptus or Monterey cypress. Open stands tend to have a well-developed under story of oaks, bays, poison oak, and blackberry. Much of the species' population is aged and is showing signs of decline as they approach the end of their natural life cycle. For Monterey pine this is 125-150 years under optimal conditions. This means it is more prone to disease and chance of failing increases. This being said, it readily sprouts from seed when provided sufficient light and fertile ground, such has occurred in areas after the Oakland Firestorm.
• **Mixed Hardwood Woodlands & Forests** - this vegetation type includes a mix of native tree species such as coast live oak, California bay, buckeye, black oak, and madrone.
  - Woodlands have 30 to 70% shrub under story and include many of the species categorized as Successional Scrub.
  - Forests include little under story and have a greater than 70% canopy closure.

• **Redwood Forest and Riparian Forests** - both vegetation types represent relatively low fire hazards.
DESCRIPTION OF TREATMENTS TO REDUCE FIRE HAZARD

Identifying and comparing treatments to reduce fire hazard is critical to minimizing impacts of actions to reduce damage from wildland fire. Specific techniques, personnel and equipment requirements, application, timing, limiting factors, and special considerations and best management practices (BMPs) are described for each of the following reduction methods: Hand Labor; Mechanical Treatment; Chemical Treatment, Prescribed Burning, and Grazing.

This section also offers guidelines on the selection of an appropriate method based on the fuel to be managed and the timing of treatments. Selection of a qualified contractor, appropriate training, scheduling, and supervision to carry out prescribed fuel treatments and any associated BMPs are also key components of an effective fuel reduction strategy.

HAND LABOR

Hand labor treatments involve pruning, cutting or removal of trees, shrubs, and grasses by hand or using hand-held equipment; other hand labor methods involve bark pulling, removing dead wood and litter, mulching, and establishing new fire-resistant or low-risk plants. This process allows for selective removal of targeted species and has little impact beyond the removal of these targeted plants, leaving native species or other desirable vegetation in place, and is often used in conjunction with other treatments. Fuel management treatments that use hand labor are typically used for spot application on small areas or areas with difficult access, where heavy equipment move-in costs may be high, or areas with sensitive environmental concerns. Hand labor may be dangerous for workers when use of sharp tools is required on steep and/or slippery terrain, or where poisonous plants are abundant. Hand labor is most commonly used by residents to reduce fire hazard on private lands and by publicly-funded crews (e.g., Civiccorps, California Conservation Corps, and California Department of Corrections and Rehabilitation crews).

Hand labor generates debris when pulling, pruning, and cutting vegetation; this debris is not always removed from the site due to the additional cost of removal and disposal. When neither hauling nor burning are feasible for debris removal and the resulting fuel load is acceptable, materials can be re-cut to reduce their size and scattered or packed in depressions away from tree canopies. Debris can also be woven into small check dams or used as mats to reduce surface water flow in locations where soil erosion is evident. Requirements for cutting materials into
smaller size or piling for burns, does add additional time (and therefore costs) to hand labor hazard reduction efforts. Hand labor techniques typically have minimal environmental effects although large volumes of foot traffic, specifically in areas of steep slopes, can result in surface soil erosion or compaction and, as such, care should be taken to mitigate these effects.

Hand labor is a treatment technique in which volunteers can assist in hazard reduction activities; required expertise and manual skills vary, however, depending upon the materials treated and equipment required, and appropriate supervision and adequate training is always necessary to ensure desired results. Hand tools include shovels, Pulaski hoes, McLeod fire tools, weed whips (potentially using different blades according to materials being treated) and "weed wrenches" (tools that pull both shrub and root system out), chain saws, hand saws, machetes, pruning shears, and loppers. Personal protection equipment typically includes long pants and long-sleeved shirts, gloves, safety goggles, hard hats, and sturdy boots. Chippers are often used in conjunction with hand labor to process cut materials into mulch for onsite disposal.

Hand labor can be the preferred fuel reduction method for over story removal, where the entire stand of trees comprising the over story is felled to create a fuel break or reduce fuel hazards along roadways. Hand labor can also be used for stand density reduction to remove selected trees and reduce the overall number of trees in a forest stand, useful where the existing density of trees creates the potential for canopy fires or where vertical continuity of fuels is created by the clumped arrangement of different sizes of trees. In many of these cases, the felled trees are split into sections less than eight inches in diameter for collection and sale as firewood. Cutting these trees into firewood, collecting the pieces, and stacking them by hand eliminate the need for heavy equipment, thereby reducing additional impacts from equipment location and use. However, tree removal typically cannot be performed at a significant scale via hand labor because of the slow pace of the operation.

Hand Labor Techniques

Hand labor techniques vary significantly, from creating bare strips of ground by grubbing out plants, pulling weeds and shrubs from the under-story and cutting saplings and chaparral with machetes, to vista pruning and mosaic thinning which entail the removal of fuels within specific physical spaces to inhibit wildfires from torching trees. More common hand labor techniques to reduce fuel loads are described below.

Cutting Line, Creating Firebreaks

Manual labor is sometimes used to create strips of bare soil through cutting at the soil surface or grubbing out plants. Hoeing and grubbing out plant tops is most suited where soil types allow for complete removal of plant material. This technique is used to install control lines for prescribed burns where mechanical equipment cannot be used, around structures, and in areas that are inaccessible to vehicles.
Weed Whipping
This technique uses a hand-held tool (normally gas-powered) that cuts grass and very small shrubs with a plastic line or cutting blade. Weed whipping is typically used annually after grasses have dried or cured so that the grass does not grow back. This technique reduces the height of the fuel, but does not create areas of bare soil, as the vegetation is not completely removed. However, while most large woody stems are not cut by the treatment (which limits its application on vines such as vinca, ivy, and Himalayan blackberry) seedlings can be severely damaged by the cutting line. Weed whipping is often the only type of "mowing" treatment possible in steep wooded areas or landscaped slopes. Heavier weed-whipping machines can be fitted with plastic or steel knives or serrated saw blades, such as brush cutters or brush saws. Utilizing a cutting blade enables the mulching of cuttings in a single process and allows treatment of woody stems, but this option is limited to pieces under one inch diameter in size.

Chaparral Branch Removal
Hand labor can also involve the use of machetes, chainsaws, and other instruments to masticate or chop off chaparral branches and break apart brittle materials that can act as ladder fuels. Fallen branches and material cut from chaparral can then be further broken into compact mulch and distributed across the site or removed for disposal. While the use of machetes and other tools can be a time-efficient option for fuel reduction, pointed stems and branches left behind as a result of tool use may be unsafe in more heavily trafficked areas.

Hand-Pulling
Pulling weeds by hand offers the greatest amount of control among hand labor techniques, but is also very time-intensive. Typically any weed pulled three years in a row will be generally controlled in an area because of the repeated deletion of propagules from the site. While foot traffic could cause surface soil compaction or erosion in areas with steep slopes, generally hand-pulling weeds results in few impacts if hand-pullers are knowledgeable regarding which plants are those targeted for removal. Most weeds pulled can be left onsite as mulch; however larger weeds, such as French broom, should be removed. To limit the spread of seeds, care should be taken to bag weeds securely if viable seeds are present.

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1 Danielsen, Charli, 2005. Vegetation Almanac of the East Bay Hills; and personal communication with Carol Rice of Wildland Resources Management, 2008.
**Vista Pruning**

Vista pruning entails removing under-story shrubs, small trees, and small lower limbs (typically less than three inches in diameter) of trees to a height of 8-10 feet to create a vertical separation (i.e., discontinuity) between surface fuels and the tree canopy overhead. Pruning lower branches of trees can be done with a hand-held pole saw, which can also be fitted with a motorized chain saw. Lower branches on shorter trees can be pruned with loppers. To promote stronger trunks, a six-inch stub from the branch is typically left following pruning in order to strengthen the main stem. It is recommended that a Certified Arborist conduct all pruning, especially on oaks. Vista pruning lowers ignitability, decreases available fuel, decreases the potential for spotting, and reduces heat output from under-story fires, which in turn reduces the potential for fires to move from the ground to the tree crown. Rates of treatment via vista pruning can vary greatly according to type and amount of material being treated. Maintenance is usually minimal because trees generally grow from the top.

**Mosaic Thinning and Drip-line Thinning**

Mosaic thinning is a hand removal technique for fuel reduction where retained trees are variably distributed throughout the treatment area; rather than removing saplings, shrubs, and grasses evenly across an area. Tree “clumps” alternately thinned to varying degrees to create a mosaic of plantings.

Drip-line thinning is a technique that involves removing shrubs and smaller trees that exist within the drip lines of overhead trees to prevent torching. In both cases removing smaller trees and shrubs, such as poison oak or coyote bush, is usually done with a hand-held chain saw; trees smaller than 3 inches in diameter may be removed with loppers as well. Because the material removed during these operations typically consists of smaller trees and shrubs that result in larger debris sizes, chipping or offsite hauling is usually required.

**Black Plastic Coverage**

As an alternative to herbicide application, securing black plastic over cut or treated tree stumps can prevent sprouting. In this treatment a five-millimeter or thicker plastic is fixed to the top and sides of a cut stump to prevent photosynthesis, which in turn prevents new sprouts from forming. The plastic can be installed as late as two weeks after the tree is cut and needs to be removed before it decomposes (approximately two years after application). If the plastic is cut or otherwise torn, thereby allowing light to reach the stump, re-installation or other repair and maintenance may be necessary.

Black plastic can also be placed over surface areas to prevent germination of weeds; however, this technique also prevents germination of native groundcover vegetation. To prevent weed growth, the plastic should be applied prior to active growth, but can be installed after germination. The plastic should be removed in the summer to avoid excess heat and mold or bacterial buildup on the underlying surface soil. This treatment is highly selective and has no side effects other than a visual impact and the potential for plastic to tear free and become litter.
Mulch Application
The application of mulch, such as wood chips from pruning operations, can slow the growth of grasses, shrubs, and saplings for up to one full season and acts as an effective temporary fuel reduction method. Mulch at depths of two inches or more increases the growth necessary for plants to reach the sunlight, thereby suppressing the number of plants that actually reach the surface.

Protective masks and gloves should be worn in distributing wood chips because fungus is typically present. In particular, a type of pathogen that causes disease in oak trees may be present in wood chips (sudden oak death disease), and the potential for this fungus to spread to nearby oaks should be considered prior to mulch application. Spreading native or desired plant species seeds in mulch may be beneficial, but care should be taken to ensure that any mulch taken from weedy areas does not spread seeds from undesirable vegetation. Also, although mulches can inhibit under story plant growth following their application, in the event of a wildfire mulches burn slowly and produce low flame lengths but burn for a long time in any one place. This condition transfers considerable heat into the soil and can have longer-term detrimental effects to the area as a result.

MECHANICAL TREATMENT
Mechanical treatment involves cutting grasses and removing weeds, shrubs, and trees up to 24 inches in diameter through the use of a tractor or other machinery, including such operations as grading, mowing, disking, and crushing.

Heavy machinery is often used where terrain and the presence of numerous trees do not prohibit travel. Heavy machinery can be used where shrubby vegetation is quite dense. Generally, using heavy machinery for mechanical treatment is faster than hand labor and relatively inexpensive. There is, however, limited control over which plants are cut during mowing or disking operations; but machines can be guided around isolated areas of concern. Additionally, collateral impacts to small vegetation can also occur when machinery operates on top of these plants. Heavy machinery can also create excessive disturbances to surface soils when the ground is soft, leaving ruts and bared soil.

This technique can be used almost any time of year when the top soil is dry, but is faster when done in the summer or fall when brush is brittle and grass has cured. Because mechanical treatment methods almost always utilize equipment with metal blades, combustion engines, and corollary fuels, they should be used with special precautions during high fire danger periods as the machines themselves (and metal blades striking rocks) can inadvertently start fires. Also, vehicles and equipment undercarriages should be cleaned prior to removal from the work site to reduce the risk of transferring unwanted material, disease (such as sudden oak death), or seeds to other areas.
Mechanical treatments need to be selected according to a site's topography, access, vegetation type, and potential for negative environmental impacts. These treatment techniques are often used in combination with other fuel management methods, particularly hand labor (prior to mechanical treatment) and prescribed burning (following mechanical treatment.) As noted below within the description of individual mechanical treatment techniques, the appropriate timing of the treatments plays a large part in determining the success and longevity.

This technique requires supervision and specialized training to ensure the desired results and minimize negative impacts. Several agencies own specialized equipment and have staff trained in its operation. Chippers, mowers, brush cutters, grinders, roller-cutters, feller-bunchers, tub grinders, hauling trucks, and yarders with a grappling hook are all types of equipment that can be specified for mechanical treatment techniques, as needed. As with hand labor, personal protection equipment is required and includes long pants and long-sleeved shirts, gloves, safety goggles, approved hearing protection, hard hats, and sturdy boots.

**Mechanical Treatment Techniques**

Mechanical treatments tear or cut vegetation, rearranging the fuel's structure and compacting the debris that is left behind. Specific techniques, such as those described below, can break apart or cut up vegetation into small pieces, tear up and bury the resulting debris, or remove plants entirely and pile the debris for burning or removal.

**Grading**

This technique is often used to maintain fire trails through the wildlands, creating a strip of land absent of fuel. A tractor with an attached blade can effectively produce a firebreak 8 to 12 feet wide with one to two passes of the vehicle. Treatment is usually done in the spring after the ground is fairly dry but before grass is entirely cured (so that a fire cannot occur before the scraping is done).

Removal of all vegetation in the area disturbs water drainage patterns where the side banks of the graded land interrupt cross-slope water travel, and may also accelerate water travel inside the graded lane. Timing of grading is critical, as annual mid-summer scraping tends to sow weed seeds of species that may result in fire hazards. The disturbance created by annually graded fire trails can result in excellent establishment sites for weed species, which also should be taken into consideration when considering this technique.

**Mowing**

Mowing tools, such as rotary mowers on wheeled tractors or other equipment, or straight-edged cutter bar mowers, or flails, can be used to cut herbaceous and woody vegetation above the ground, often along roadways. Mowing reduces fuel height which in turn reduces the flame length and possibly the rate of spread in a grass fire. Under ideal conditions, approximately 5 acres per day can be mowed, depending on surface topography and slope of the site. Timing of mowing has an impact on the type of grasses promoted; late mowing after annual grasses have
cured enhances growing conditions for perennial native grasses, provided mowing does not occur during seed production. Mowing at the appropriate time to a height of approximately 4 inches minimizes weed and brush encroachment and reduces the amount of manual work needed to maintain the site, but should be avoided when birds are actively ground nesting in the area. Mowing of weeds is typically required annually. Mowing may be used in conjunction with other techniques, such as disking, to require a thinner strip of disked area.

**Disking**

Disking is a fuel reduction technique where plant material is cut and mixed with surface soil to create a barrier of discontinuous fuel and bare earth to stop fire spread. This practice is typically used along the perimeter of open spaces, ranches, and roadways; a tractor with disk attachment can typically cultivate an area 15 feet wide in a single pass, and the treatment rate can reach 2 acres per day. Disking is normally performed annually once grass has cured so that grass will not grow back that season. Disked areas create an uneven surface that reduces water flow across the surface. While this treatment is an effective barrier to surface fire spread, it also creates an ideal disturbed area with prime growing conditions for weeds and distribution of their seeds. Surface erosion can be significant in areas prone to this process.

**Over story Removal**

This technique includes removing trees from a forest stand to break up the stands over story. Over story removal is appropriate where a fuel break needs to be established, along roadside clearance, or where an invasive or otherwise exotic species is removed to restore the natural ecosystem. This technique is typically performed using tractors, yarders and log trucks, or feller-bunchers.

Feller-bunchers are used to harvest or remove trees in a short period of time. Because they tend to be less selective in their application, they are typically not used in areas where desirable species are interspersed with those identified for removal. While feller-bunchers typically have a 24- to 30-inch diameter limit for the size of trees that they can remove and can create a large amount of debris requiring removal or further treatment, they generally reduce the amount of skidding and onsite surface disturbance. Following mechanical treatment, additional treatment is typically performed using hand labor techniques.

**Use of Landings**

In order to implement the thinning of tree stands, an area will be needed to sort, store, and load logs onto trucks or to chip them into mulch and remove the material. A flat landing area is typically used for yarding operations, temporary stacking, loading, and trucking cut logs off the treated site.
Tractor-Based Yarding
Tractor-based yarding includes using tractors to pull logs off steeper slopes to a landing area where they can be reduced to debris and distributed, or sorted, stacked, and hauled away as logs or chips. Tractor-based yarding on steep slopes can leave significant scars where chains and logs drag along the ground, increasing the danger of erosion and requiring additional treatment to fill ground surfaces. While tractor-based yarding can be used in conjunction with and aid other fuel reduction methods, the sedimentation can result from this technique, particularly if BMPs are not implemented. Tractor-based yarding is best suited for flatter areas that are less likely to be impacted by erosion and sedimentation that can occur from such practices. The use of a feller-buncher in combination with tractor yarding may be appropriate in larger treatment actions; as with any machinery, however, the move-in cost of such equipment may preclude its use in projects under 5 acres.

Cable Yarding
A cable yarding system constitutes an excellent choice for tree removal where slopes are steep (greater than 35 percent). Other than helicopter yarding, this system tends to have fewer ground impact. By locating equipment on flat, stable areas above steep slopes, erosion is limited and fewer long-term scars are likely to result. In all yarding operations, skidding trails must be identified to minimize damage to ground surfaces.

The technical layout and machinery used in cable yarding often has a sizable effect on the system capabilities. The yarder used should have drums and an interlock system, and should include a mechanical slack pulling carriage, where feasible. These are means by which good control of the logs can be gained. Tractor systems, such as that described below, may be needed to reduce potential ground disturbance where deflection is insufficient. While compaction and ground disturbance overall should be minimal when using a cable yarding system, there may be spots requiring post-treatment follow-up to fill in cuts and gouges in the ground surface to prevent potential erosion.

Helicopter Yarding
Helicopter yarding is a very high-production system which uses helicopters to lift and remove trees from forest stands, carrying them to an open landing area where logs can be loaded onto trucks and hauled offsite for reuse or disposal. Helicopter yarding allows for increased selectivity of targeted materials as ground-based crews select which trees are removed. This technique works well on areas with significant slopes. Helicopter yarding requires very large landing areas and equipment and personnel costs can be expensive; there is also resulting noise pollution.
However, this yarding method has proven economical and feasible in high recreation use areas, such as Lake Tahoe, where a high volume of trees are selected for removal.²

**Mechanical Cutting, Crushing, or Removal of Dead Material Only**

A tractor or similar equipment can be used to crush fuel materials using a blade that is kept slightly off the ground. A variety of attachments include rollers (e.g., brush hog), a horizontal cutting blade (which operates similar to a large mower), or a set of chains to flail the material being treated. The blade cuts or breaks off the brush top, knocks down the larger shrubs, and compacts the material, which is left to dry so that it can be subsequently scattered, burned in piles in a prescribed fire. The brush that is older or dead is more brittle and breaks more easily than the thin, young stems which are easily bent. The soil surface is disturbed slightly where the tractor travels and where some shrubs are uprooted; however, the surface is not scraped. Mowers typically consist of tractors with affixed or towed mowing heads; these heads cut or flail small diameter material, especially grasses. Many have an articulated arm or boom that can reach 10-15 feet from the vehicle; this type of machinery is often road-based. (Tiger mower trials in Oakland have shown chaparral removal at a rate of 12 hours per acre.)³

Masticating equipment installed on Bobcats, wheeled or crawler-type tractors, excavators, or other specialized vehicles, is used to cut shrubs and trees into small pieces that are scattered across the ground, where they act as mulch. Shrubs and sapling-size trees are typically masticated with Bobcats and crawler-type tractors, while excavators are often used when larger trees are removed. Bobcats generally operate on slopes less than 20% while excavators and tractors can operate on slopes up to 45%.

Other attachments to tractors and equipment have been developed that use a gravity roller to crush and chop vegetation into mulch. The attachment is held by cables that can be rolled down and winched up the hillside, allowing for some degree of directional aiming through the use of the cables at each end. The gravity roller is filled with water to provide the weight necessary to cut the brush; cutting surfaces are arranged on the roller to resemble tire tread. The Brontosaurus is a type of grinding machine with an articulated arm that tends to grind off woody material, and in some cases shattering roots of shrubs, more than cutting them.

Tractors and yarders, along with trucks that carry large loads, can effectively remove large volumes of dead material, often with large pieces of material still intact. This removal method is particularly applicable in areas of dense trees or in burned areas. Hand labor may be used to

move smaller material to staging areas where a loader can feed the truck to haul the material away.

Chipping or Mulching
This mechanical technique sometimes is used subsequent to other removal techniques and reduces the size of materials by passing them through a series of high-speed blades. The smaller-sized materials produced may then be removed from the site or redistributed as mulch, although mulch layers should be kept to less than 4 inches deep. Natural compaction of this layer presents a fuel structure that is less likely to ignite. Larger grinders, such as tub grinders, can chip logs up to 24 inches in diameter. Logs greater than 4 inches may be cut for firewood or other commercial use and hauled away.

CHEMICAL TREATMENT
Using herbicides to control invasive plant species that exacerbate wildfire risk is an efficient and cost-effective method when used as part of an IPM program and in combination with other treatment measures (e.g., mowing, burning and hand removal). Based on ongoing tests and studies of other plant control methods conducted from 2005 through 2008, the Marin Municipal Water District (MMWD) has determined that none of the other available alternatives are as effective in killing weeds as chemical treatments.

Chemical treatments, which most often include the use of herbicides to kill plants or prevent their growth, are typically considered only when in concert with other types of fuel reduction treatments. Application of herbicides immediately following some other treatment method whereby plants are cut or broken inhibits the damaged plants from sprouting again. Herbicides can also be used to kill herbaceous plants in exposed areas, such as roadside grass and weeds, and are typically applied while the grasses and weeds are still actively growing. Application following another treatment method in which plants are trimmed or shortened can increase the effectiveness of the chemical treatment. Foliar treatments are generally not applied within seven days of significant rain because the herbicide may be washed off before it is effective, and not on windy days because of concerns for spray drift.

Herbicides do not remove any vegetation from an area’s fuel load; the dead plant matter continues to exist at the site and could continue to be a fire hazard if not collected and disposed. Health, safety and environmental concerns have limited the widespread use of chemicals over the

4 The MMWD Board of Directors suspended the use of herbicides on their lands in August 2005. Since that time, the watershed staff has been "losing the battle against these non-native plants that exacerbate wildfire risk." MMWD estimates that 1,000 acres representing 5 percent of their watershed is seriously infested with invasive plants, primarily broom (www.marinwater.org). The other alternative methods tested by MMWD include: mechanical removal, hand removal, controlled burning, grazing, high intensity heat/flare, biological control, and water or foam (soap-based).
past 20 years, and repeated use of chemicals is not preferred due to the prevalence of unwanted species building resistance to herbicides. Additionally, concerns regarding water quality and other potential environmental impacts that may occur with prolonged use of and exposure to herbicides and other chemical applications further limit their frequent or widespread use as a treatment. Application of herbicides and other chemicals is typically performed by hand, and can include sponging, spraying, or dusting chemicals onto unwanted plants. Hand application provides flexibility in application and is ideally suited for small treatment areas. Roadside application of herbicides may employ a boom affixed to or towed behind a vehicle.

Herbicide application requires specific storage, training and licensing to ensure proper and safe use, handling, and storage. Only personnel with the appropriate license are allowed to use chemicals to treat vegetation. Herbicide application is also only applied per a prescription prepared by a Pesticide Advisor licensed in that county. Personal protection equipment is essential to limit personnel exposure to chemicals, and includes long pants and long-sleeved shirts, gloves, safety goggles, hard hats, sturdy boots, face masks and, in some instances, respirators.

Chemical Treatment Techniques

Chemicals that prevent seed germination (i.e., pre-emergence chemicals) and kill sprouted plants (post-emergence chemicals) can be used to establish firebreaks and in roadside treatments. For example, the use of Garlon 4 Ultra herbicide can be used to treat areas of eucalyptus resprouting, removing the need to completely uproot or grind down the eucalyptus stump. The chemical moves down the stem and roots to control re-growth from underground reproductive parts. Foliar application of Roundup to French broom and eucalyptus resprouts is another typical, successful chemical treatment, and can be used to eliminate small-diameter fuels in areas of high ignition risk. The use of a thistle-specific herbicide, Transline, is effective in controlling the spread of yellow star thistle, artichoke thistle, and bull thistle.

PRESCRIBED BURNING

Prescribed burning reintroduces fire into the ecosystem as a more naturally-occurring treatment and can closely approximate the forces that have shaped the natural vegetation. Controlled burns reduce the volume of fuel through combustion; fires are conducted under specific regulations when conditions permit both adequate combustion and proper control. This technique can be used to burn piles of cut brush (pile burns), or over a designated prepared area (broadcast burn) and is the only treatment method that both reduces seeds of non-native weeds and promotes germination of native seeds. Both broadcast and pile burning are often used in conjunction with hand labor and mechanical treatment methods as a means of removing excess debris, or in advance of an herbicide treatment to enhance the effectiveness of the application.
Prescribed fires can be classified into various types. Broadcast burns are usually done in larger areas where a maximum amount of fuel reduction can take place through the fire. Broadcast burns take place 1) in shrub lands to improve browse or forage for wildlife or domestic stock or to create fuel breaks, 2) to improve grassland forage production, 3) to control invasive and noxious weeds, or 4) to treat slash in areas cleared of dead and/or live trees. A variation on this technique is to underburn forested areas to reduce surface or ladder fuels in shaded fuel breaks or to manage under story vegetation for wildlife habitat improvement or for production of cultural plants important to Native Americans. “Jackpot” burning is sometimes done where concentrations of surface fuels in forest under stories are a fire hazard. This technique involves igniting the concentrations and containing the fire to those concentrations. Burning of slash piles created by either tractors or by hand is a common method for treating vegetation where there are constraints that limit other types of burning.

Treatment boundaries are often road and trail crossings, which reduces the number of fire breaks that need to be created by fire personnel, thereby reducing labor costs and time needed to prepare for the burn as well as minimizing the amount of surface soil disturbance and potential for soil erosion. Prescribed burns are most effective in vegetation types such as grasslands, eucalyptus groves, pine stands, chaparral, or oak woodland where it can simulate natural fires and where the prescribed burn can be effectively controlled.

Prescribed burning can be a cost-effective way to quickly reduce the large volume of woody material that remains after other fuel reduction operations. A broadcast burn produces more uniform removal and minimizes areas of great burn intensity. Alternatively, tractors or hand crews can create piles of material on flat or gently-sloping ground that can be burned during very wet conditions, although the volume of fuel in the piles can produce localized heat which tends to sterilize the ground under the burned areas. One prescription entails having leftover material placed into a burning pile as a means for greater control of the prescribed burn’s fire behavior.

Broadcast burning may occur throughout the year; however, it is usually conducted during late spring when the ground is still wet or during fall or winter after plants have completed their yearly growth cycle and their moisture content has declined. Spring burns are preferred by some fire staff to ensure a greater measure of public safety, however, there may be impacts to animal and plant reproduction activities. Fall burns are more closely aligned with the natural fire cycle found in California. Some broadcast burning in grasslands may be done in May, after the annual grasses have cured. Piles of vegetation may be burned anytime after the vegetation has dried. “Cool” burn prescriptions, using techniques such as backfiring, chevron burning, and flank firing, as well as timing the fires during periods of high humidity and high fuel moisture content, would be expected to result in partial removal of understory or groundcover vegetation. The existing groundcover vegetation would be partially retained in a mosaic in forest and shrub communities.
Hand held tools, such as drip torches, propane torches, diesel flame-throwers, and fuses (flares), may be used to ignite the prescribed fire. Mass ignition techniques include terra-torches and heli-torches. These types of ignition devices release an ignited gelled fuel mixture onto the area to be treated. Helicopters may also be used to drop hollow polystyrene spheres containing potassium permanganate that are injected with ethylene glycol immediately before ignition. The sphere ignition method is best used for spot-firing projects in light fuels.

Prescribed burns must be conducted by trained fire protection personnel only. Utilizing personnel and equipment from neighboring fire districts provides the added benefit of joint training under controlled rather than emergency conditions. If the Landowner wishes to benefit from cost-sharing aspects of Cal Fire's Vegetation Management Program, CalFire must conduct the prescribed burn. Timing is critical to the use of this treatment method because of variances in weather conditions as well as wildlife and botanical considerations. Fuel moisture content must be determined to assess if the targeted area is safe to burn, and periods of increased wildlife and botanical activity need to be avoided to limit potential negative impacts to these resources. There is typically more permissive burn days available in the spring and early summer when there is a greater chance of atmospheric conditions conducive to smoke dilution and dispersion.

Prescribed burning requires the development and approval of a prescription or burn plan, which is typically developed by the local fire protection district in consideration of fuel reduction requirements, local weather conditions, and available resources for fire management. Some Landowners have an active prescribed burning program in which it conducts burns using its personnel and equipment with support and cooperation from other fire protection agencies.

Prescribed Burning Tasks

The following describes the steps that must be completed prior to initiating a prescribed burn.

Develop a Pre-burn Plan or Prescriptions

Working with a fire management specialist, a site-specific prescription is developed that establishes goals and procedures for the burn. This plan takes into account the site characteristics and the likely behavior of the fire, including the heat output, length of burn, best ignition sources and points, and optimal fire control methods. Each characteristic is closely tied to the type, age, density, and condition of onsite vegetation; the site's topography; solar exposure; and local and prevailing wind patterns. The prescription identifies the limits of the burn area, locations of control lines, acceptable fuel moisture ranges and weather conditions, and required personnel and equipment.

Local and regional regulating agencies need to review the pre-burn plan to identify potential site-specific environmental impacts and develop mitigation measures, as required, to reduce impacts on soil erosion, plants, wildlife, air, and water quality as well as any cultural or paleontological resources that may exist within the area to be burned. The Bay Area Air Quality Management

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District (BAAQMD) also requires preparation of a smoke management plan detailing the location of sensitive sites and actions to be taken to maximize smoke dilution and minimize smoke production.

**Obtain a Burn Permit from the BAAQMD**

Current air quality regulations limit open burning; however, burning to reduce fire hazards, for management of forest and rangelands, and to train fire protection personnel receives special accommodation under these regulations. In addition to the preparation and approval of a smoke management plan, the BAAQMD requires notification of the burn and that burning is conducted on a permissive burn day. The BAAQMD selects these burn days based on air quality, weather conditions, and wind patterns, provides the burn’s acreage allocation the morning of the burn, and must give their “all clear” designation prior to initiation of the burn.

**Pre-Burn Site Preparation**

Hand labor or mechanical treatment methods are often required prior to initiation of a prescribed burn to remove trees and reduce the stand to a safe burning density, as well as to knock down tall brush, prune the lower branches of trees, and clean out fuels that could result in unwanted crown fires. Site preparation also includes the establishment of fire lines needed to control the fire if they do not already exist. These fire lines are typically constructed using bulldozers or by hand using scraping tools; occasionally they are “burned in” with a strip of fire under conditions that limit fire spread.

**Burn Notification**

Notifying the local or surrounding communities, local fire departments, the media, and the BAAQMD is essential to avoid potential misinterpretation of the prescribed burn as a wildfire. Notification of interested and affected parties and the media are also repeated the day of the prescribed burn. Printed materials or interpretive signs are made available at the site and distributed to neighboring communities explaining the reason for the prescribed burn, the type of burn being conducted, and the intended result of the prescribed burn. Prescribed fires generate high levels of public safety concerns over the chance of the fire’s escape from control lines, and the rapid distribution rate of smoke, ash, and particulate matter may raise additional concerns from the general public many miles downwind from the actual site of the prescribed burn.

**Post Burn Follow-up and Evaluation**

Following completion of the prescribed burn, the results are evaluated to determine if the need exists for additional treatment based on aesthetics and established goals. Additional treatment methods may include hand labor or mechanical removal of unburned or partially burned

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materials, and follow-up activities may take place over the following year or two years to reduce potential erosion impacts, improve aesthetics, or resolve outstanding fuel reduction concerns.

GRAZING

This treatment method involves using grazing animals to consume vegetation in order to reduce the amount or density of fuels and is most effective in grasslands (cattle or sheep) or shrublands (goats). While livestock do not effectively create fuelbreaks, they can be used to maintain these features by shortening grasses and shrubs and removing vegetation debris, and can be used to do the same to the understorey of tree stands. This method is particularly effective where the plants are palatable to the animals selected. As a fuel reduction technique, grazing does not need to be conducted each year if the intent is to control shrubs or maintain understorey fuels; if the intent is to reduce grassland fuels in highly ignitable locations, grazing should be used annually. Historically, cattle have grazed the East Bay Hills, although goats are now often used for fuel management.

Grazing can be a relatively inexpensive treatment method and can even generate revenue when cattle grazing is contracted for large areas. Control of livestock movements and prevention of the impacts of overgrazing, including increased erosion from plant loss, is critical for successful use of this treatment method. Using professional herders or portable fences may be an alternative to fixed fencing where the treatment is ephemeral. Additional controls are also needed for protection of selected plant materials and riparian zones, and to prevent erosion or other undesirable environmental impacts.

In addition to the benefits of livestock grazing to reduce small diameter fuels and discourage invasion of grasslands by coyote brush, a recently-published guide for resource managers in coastal California and other sources cite beneficial impacts of livestock grazing for native grassland and wildflower restoration, weed management, and wildlife management (including endangered and otherwise protected species). Livestock exclusion tends to convert grasslands to a dominance of tall non-native annual grasses such as soft chess, ripgut brome, and wild oats. Annual ryegrass commonly becomes a problem grass when not grazed, building up particularly thick thatch layers. This grass is also becoming more abundant in grassland habitats subject to


excessive nitrogen deposition associated with air pollution plumes near highways and downwind of urban and industrial areas.\textsuperscript{9,10} These tall, fast-growing grasses shade out native grasses and forbs (typically wildflowers) with thatch. Grazing or other removal of plant material reduces the accumulation of dead residual matter in the dry seasons and increases nutrient recycling. Opening up the herbaceous canopy increases light penetration and limited disruption of the soil surface by ungulate hooves allows for improved soil-seed contact which, in turn, increases seed germination and seedling establishment. It also enhances habitat for wildlife which prefer short grasses, such as ground squirrels, and provides aestivation burrows for amphibians such as the California red-legged frog and California tiger salamander, which are both listed as threatened species. The reduction of thatch may also help movement of these amphibians from aquatic to upland habitat. Appropriately-timed grazing or other methods of vegetation removal can also be used to promote increases in native perennial grass populations and to reduce the proportion of nonnative annual grasses.\textsuperscript{11}

**Grazing Treatments**

Although the concept of grazing is the same regardless of which type of animal is used, how each animal type conducts its grazing varies significantly. As a result, not all animals will be ideally suited for grazing treatments in all areas.

The role of grazing monitoring program is to identify resource and fuel management goals, and to ensure that livestock are removed when management goals are met. The grazing management plan should specify management goals, stocking rate and use levels, grazing seasons, monitoring techniques and performance criteria. Stocking rates are determined by a range analysis, which calculates the number of goats required for a given period to attain the desired use level, typically measured in pounds per acre of residual dry matter (RDM). Standards for RDM levels generally range between 600 and 1,000 pounds per acre depending on site-specific goals and conditions.

The availability of alternative pastures on public open space or private property in the vicinity of treatment areas where livestock can be moved following attainment of target use levels is critical to reducing potential adverse impacts. Fencing must be used to prohibit grazing animals from venturing into areas outside the treatment area. However, fencing is typically the major expense in utilizing livestock for fuel management. As a result, rangers and others supplying grazing


animals are typically asked to provide and repair fencing during treatment. Additionally, water sources are required for animals and need to be provided if an insufficient number are already available at the treatment site. Exclusion fencing to prevent livestock from gaining access to riparian zones and wetlands may be necessary to prevent degradation of water quality and habitat.

**Goats**

Conversely to cattle and horses, goats prefer to “browse” on woody vegetation (e.g., tree leaves, twigs, vines, and shrubs) and will eat materials up to 6 feet above the ground. This grazing pattern creates a desirable vertical separation between the canopy and ground cover, but is best used in areas with low numbers of plants intended for retention, since goats will indiscriminately damage most plants. Portable electric fences are commonly used to help control the herd and the outcome of their grazing. Measures must also be taken to prevent girdling of trees that can result from the goats browsing on tree bark. A herd of 200-300 goats can graze up to 1 acre per day. Herd movement has the advantage of breaking off dead material in a stand as well as punching a humus layer into the soil (if the ground is somewhat moist) and thereby removing available fuel. This plan should include goals and implementation actions to ensure that timing of grazing treatment is optimal to prevent the spread of seeds from invasive and other targeted species and to maximize fuel reduction. The plan should also provide a range analysis to determine the optimum stocking rate and duration. Monitoring should be conducted by qualified personnel to determine when utilization and fuel load objectives are attained so that grazing animals are removed in a timely manner.

SELECTING THE APPROPRIATE METHOD

Because changes in weather and topography (the two other major factors that influence the behavior and intensity of a wildfire) are for the most part beyond human control, regulating the types and amounts of available fuel are keys to reducing wildfire hazards. In this case, “fuel” includes anything that can burn – fallen leaves, branches, and trees; grasses; shrubs and standing trees; houses and other structures; and materials within these structures. In the East Bay Hills, dense plantings, overgrowth of under-story plants and grasses, and brush encroachment on buildings increase available fuel loads in the area and exacerbate wildfire potential.

Which method is selected is dependent on whether the prescription focuses on the strata of vegetation to be treated. Treatment may focus on understory vegetation, such as grasses, flowering plants, and shrubs, or on the mid-story strata, which would entail sapling removal or pruning lower branches of trees. Over story treatments would remove entire trees; the correct choice and execution of the tree removal system can help to enhance the forest and its subsequent growth, or it can cause damage and scars that will last for decades, and therefore selection of treatments should be carefully considered prior to application.
TIMING CONSIDERATIONS FOR FUEL REDUCTION TREATMENTS

The timing of the initial or consecutive treatments is important to achieve the desired fuel management performance standards and resource management objectives. Given the variable nature of fuels through changes in weather and season over time, the schedule of the treatment may often be just as important as the type of treatment selected. For example, treatments in grasslands typically take place when grass cures or dries out. Cutting grass too early will be ineffective as the grass will usually grow back, effectively negating the treatment. Conversely, cutting grass too late will leave the grass in a hazardous condition during periods of high fire danger. Fuel treatments also need to be conducted when the weather is not too dry or windy, as some treatment types - especially mechanical treatments - may inadvertently start fires.

Timing the treatment methods appropriate can reduce potential impacts to special-status species or sensitive wildlife species. It is likely that there will be some months of the year when particular practices need to be implemented (e.g., pre-treatment nesting surveys or avoidance of breeding habitat) to avoid adverse affects to special-status species.

Timing treatments to either control or avoid the spread of invasive plant species or insect pests is also critical. For example, treatments performed when plants have set or are setting seed will spread the seed whether it is a native plant or invasive weed. Treatments should therefore take advantage of differences in the timing of seeding of native plant species and avoid periods when invasive species are in seed. Pruning of pines and eucalyptus should be done when insect pests are not flying to minimize the associated spread and damage from these insects. Pruning should take place from November to April to minimize the susceptibility to bark beetles or red turpentine beetles. In most cases, the timing and method of treatment can be modified to accommodate local habitat needs and still reduce fire hazard to an acceptable level.
Creek Protection, Stormwater Management and Discharge Control

Oakland’s creeks are a valuable resource. They remove water pollutants, improve water quality, provide flood control, stormwater drainage, wildlife habitat, and improve the quality of life. The City’s Stormwater Ordinance includes creek protection measures. The ordinance includes permitting guidelines for development and construction projects taking place in or near creeks. This includes the clearing of vegetation for wildfire prevention. Work that includes clearing in a creek bed or within 20 feet of banks requires a permit. The intent is to assure that work done will avoid or limit, to the extent feasible, having a negative impact to the creek at both the time of action and in the future.

To see the entire ordinance, visit the Watershed Improvement Program website at www.oaklandpw.com/creeks or call (510) 238-6600 for more information.

Wildfire prevention efforts are inextricably tied to the landscape. A basic organizational point lies at the watershed level. Watersheds play an important role in many branches of ecology, and are of great importance in fire ecology as well. Sometimes called a drainage basin, a watershed is a region of land where water from rain drains to a single outlet into a larger body of water.

In the case of the WPD, the watersheds originate in the hills, with the creeks draining into San Francisco Bay. In addition to drainage patterns, the topography of the canyons and ridges of the watersheds establish wind patterns and the soil, slope, aspect, and hydrology determine vegetation patterns. Wildfire suppression efforts such as fuel breaks are usually placed along the ridgelines which are at the boundaries of these drainage basins. Activities occurring within the upper regions of the watershed affect the ecosystem below.

Watersheds
  - Temescal Creek, incl. Harwood Creek
  - Glen Echo
  - Trestle Glen
  - Sausal Creek
  - Peralta
  - Lion Creek
  - Arroyo Viejo
  - San Leandro
Protected Trees Ordinance

Property owners wishing to remove large limbs or an entire tree as part of their vegetation management effort or over hazard concerns may need to apply for a tree removal permit. The Protected Tree Ordinance is designed to protect the health of specific tree species.

A protected tree is a coast live oak four inches or larger in diameter, measured four and a half feet above the ground, or any other species nine inches in diameter or larger, except eucalyptus and Monterey pines.

Another situation that can warrant removal is a hazardous tree. Trees are subject to natural forces that can cause entire trees or individual branches to fall. These include: the weakened condition of overly mature or diseased trees, high winds, and heavy soil saturation during and after rainstorms. In order to be declared a hazard, the City’s tree expert comes to make the determination. If a tree is determined a hazard on public property then the City will remove it for the safety of the public and private property. Hazard trees mean any tree which poses an imminent threat to life or property, as determined by inspection using the criteria established by Section 12.40.030 of the Oakland Municipal Code.

Contact the Tree Section at (510) 615-5850 for more information about the Protected Trees Ordinance. Chapter 12.36 of the Oakland Municipal Code is found at http://www.oaklandnet.com/wildfirePrevention/Compliance.htm

These ordinances are in place because the City recognizes the value of the urban forest. As increasing population drives urban growth, the urban forest works to mitigate adverse effects associated with the built environment.
In 2006 the WPD created the Ad Hoc Committee on Endangered Plants. The purpose of this committee is to recommend ways to combine fire safety with the protection of native plants. The short-term goal is to recommend steps that will protect the highest priority native plants (Presidio clarkia, Tiburon buckwheat, jewel flower, and Pallid Manzanita), which are protected by environmental law, from possible destructive impacts that could result from vegetation management activities. The long-term goal is to recommend ways to coordinate the protection of native plant species, legally protected by the California Environmental Quality Act, with vegetation management activities.

Seven main tasks include:

- Identifying a list of property owners that have potential habitat for the four high-priority plant species.
- Contract with an on-call botanist.
- Maintain a system of in-field protocol monitoring by trained personnel (inspectors) to ensure that contractors are complying with plant protection guidelines.
- Maintain an informational notice to inform property owners of the potential for these species to be on their property – both public and private.
- Create both general notice and targeted notices as a package of materials to be used as needed, including the information on our web.
- Annually conduct a series of four to six plant identification workshops in the field for the four endangered plant species for all contractors and public agency staff responsible for vegetation management.

The Sausal Creek Watershed contains the only pallid manzanitas (*Arctostaphylos pallida*) plants in the Oakland Wildfire District. The Oakland Fire Department and the Friends of Sausal Creek have made a commitment to preserving these plants. This manzanita is federally listed as threatened and state listed as endangered, and is therefore covered by CEQA. All pallid manzanitas occur in the East Bay Hills, with the largest population at Huckleberry Regional Preserve.
Proposed Protected Plant Markers

City of Oakland
Wildfire Prevention Assessment District

NOTICE: THIS AREA PROPERTY OF THE CITY OF OAKLAND
IT HAS BEEN MARKED FOR
PROTECTION OF HABITAT OF ENDANGERED PLANT SPECIES:

PALLID MANZANITA
PRESIDIO CLARKIA
MOST BEAUTIFUL JEWELFLOWER
DO NOT DISTURB OR DISRUPT THIS AREA IN ANY WAY.

YOU ARE REQUIRED TO CALL OAKLAND FIRE DEPARTMENT -
VEGETATION MANAGEMENT UNIT AT (510) 238-7388
BEFORE DOING ANY TYPE OF WORK ON THIS AREA
Treatment of Structural Ignitability

Structural Ignitibility Factors

The presence of structures within the WPD exposes both the natural and developed environment to increased risk of destruction by wildfire. In areas where the accumulation of flammable vegetation coexists with residential development, an ignition can lead to catastrophic fire. Mitigation of hazards that contribute to structural ignitibility can reduce the potential of fire loss. The keys to ignition resistance are the design of the structure, the materials used in its construction, and the presence of defensible space. Recent studies point to basic factors that affect the risk of a structure burning in a wildfire. A weakness in any of these areas can lead to a similar result – a destroyed or severely damaged home or building. These factors include:

Flammability of the roof
At a minimum, a home should have a Class A-rated, fire-resistant roof cover or assembly, and preferably one that is self-extinguishing once a falling ember burns out. Self-extinguishing means that the firebrand will not burn through to the roof deck and flames will not spread to other parts of the roof. Without a fire-resistant roof, other approaches toward mitigation will fall short of protecting the home.

Overhanging Structures
Eaves, alcoves, entry ways, patio covers, decks, porches, and exterior stairways all have the potential to "trap" heat under them or create areas where burning embers can accumulate.

Structural Openings
Areas where there are direct pathways to the attic, house or crawl space provide an easy entry point for embers and flames. This can include vents, soffits or windows prone to breaking when exposed to wildfire conditions (usually unprotected, single-pane windows). Window fans, pet doors, fireplaces, and chimneys can allow firebrands to enter if left open or unscreened.
**Fuel Hazards**

Any fuel sources that will bring flames close to the structure can be a hazard. Examples of fuel hazards include flammable plants close to a wall, dead foliage that builds up underneath succulents or other normally fire-resistant plants, certain types of mulch or a combustible fence located close enough to allow flames to contact the overhanging roof above.

Fuel sources within the "defensible space" area that support a high intensity spot fire are especially problematic. These include any trees that can quickly become a fire torch, such as an untrimmed palm tree, a wooden trellis made of common lumber sizes, playground equipment made with wooden pieces or a pile or rack of firewood on the ground or in a wheelbarrow.

**Access to the property**

If firefighters and their equipment cannot gain access to the property and a water source, there is little chance they can protect the home. Access also affects the ability of the homeowner to evacuate the site should the need arise.

**Improving the Survivability of Structures within the WPD**

Protecting structures exposed to wildfires is not a simple matter. Structures can ignite due to direct exposure to flames, from radiated heat, or from firebrands. All three sources must be addressed in order to improve the survivability of structures within the WPD. It is recommended that the following measures be taken:

Reduce the amount of heat the structure will be exposed to through managing vegetation, creating defensible space, and construction design.

Limit the time the structure is exposed to heat through vegetation management and construction design.

Use fire resistant building materials and construction methods.

Remove combustible materials stored near structures.

Creating an effective defensible space around the structure and maintaining a fire safe landscape are critical to minimizing the threat of ignition. All WPD properties are subject to fire safety regulations that require compliance with defensible space and weed abatement standards.
The selection of a building's site and materials has a direct relationship to its survivability. Structures need to be sited to reduce their exposure to the most intense part of a wildfire that might sweep across the location. There are many noncombustible and fire resistive materials and treatments available to better protect structures and inhibit fire spread.

The City of Oakland has adopted fire and building codes as an essential part of managing the risk within the WPD. The California Building Code (CBC) requires clearance around structures as well as adherence to construction methods and ignition standards designed to help structures survive wildfire events. The standards also provide working space and safer conditions for firefighters to defend structures from wildfire.

This Standard has been developed pursuant to article 86 CFR and Chapter 47 of the California Fire Code, adopted by local Ordinance and Section 4290 and 4291 of the Public Resources Code. The standard shall apply to all new houses, subdivisions and those buildings which fall under the substantial remodel provision of Oakland Fire Code ordinance and other properties that are within an urban wildland interface area as define by the Chief.

Clearance distances, type of vegetation and topographic features influence factors in determining adequate green belts and fire fuel breaks around structures. This methodology is implemented for the primary purpose of providing time for fire suppression personnel and equipment to respond and establish operational tactics and strategies during an ensuing wildland fire.

**GENERAL**

The Vegetation Management Plan referred to hereinafter as the VMP shall be submitted to the Fire Marshal for review prior to implementation. The VMP shall be submitted in two forms, blue line drawings and text format describing specific and applicable contributing factors in the selection and design of the plan.

**VPM Content**

The VPM shall include at the minimum:

1. The entire “plan content” elements described in narrative form.
2. Not less than three (3) complete plan sets should be submitted to the Fire District for review.
3. The Hazard Assessment Matrix
4. The list of plants to be used and materials consisted with the approved plant list.
5. 3 sets of blue prints showing the house, zone, plant type and spacing.
6. An OFD permit application with permit fee deposit.

Note: Landscape plans will be rejected unless they include a specific outline of the information required by this Standard.
Determining Risk

A. Using the Hazard Assessment Matrix of this standard, determine the hazard points of the specific property.

B. Aspect. This is the direction in which the face of the slope is situated.

C. Slope. This is the most predominant angle of the hillside measured in % of slope, on the site that the structure is located on or to be placed.

D. Fuel zone- 0-30 feet. Identify from the fuel type list on the hazard assessment matrix what vegetation is mostly represented in the 0 to 30 ft. zone from the proposed structure.

E. Fuel zone- 31-100 feet. Identify the fuel type list on the hazard assessment matrix what vegetation type is most represented in the 31 to 100 ft. zone from the proposed structure.

F. Total the hazard assessment points for each category. This will provide a set of distances that clearance is required around the proposed structure.

Plant List and Selection within the Zone

A. The entire defensible space zone (see figure II) shall be planted and irrigated if necessary. Native grasses are not allowed within this zone. Annual cutting is not permitted.

B. By using the Firescape Plant selection list on the University of California Cooperative Extension Phyrophytic vs. Fire Resistant Plants brochure, select use of native, domestic or combination thereof that best suits the architectural and planning design of the proposed project. Slope, soil type, drought resistance should be considered when selecting plant types.

Plant Spacing and Crown Separation

A. Regardless of plant selection, shrubs should be spaced so that no continuity exists between the ground fuels and tree crowns.

B. Tree crowns should be separated by at least 10 feet. Add an additional five feet for every ten (10%) percent increases in slope.

C. Separate individual shrub crowns by at least two times the height or clump shrubs into islands of no greater than 18-ft. diameter. Separate the islands by a distance of no less than two times the canopy height.
D. Chipped wood and mulch can provide an excellent thermal barrier, which will help prevent lost moisture in ground fuels. **However, shredded bark, sometimes referred to as “monkey hair” is prohibited from use because its high flammability and fire spread characteristics.**

![Figure I](image)

### HAZARD ASSESSMENT MATRIX

<table>
<thead>
<tr>
<th>Hazard Points</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect</td>
<td>NE</td>
<td>NW</td>
<td>W</td>
<td>SE</td>
<td>SW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope</td>
<td>0-10</td>
<td>11-20</td>
<td>21-30</td>
<td>31+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel 0-30</td>
<td>Specimen Garden</td>
<td>Hardwood</td>
<td>Grass</td>
<td>Mostly Grass</td>
<td>Mostly Brush</td>
<td>Pyrophoric Hardwoods Chaparral</td>
<td>Conifer</td>
<td>Conifer w/brush under story</td>
<td></td>
</tr>
<tr>
<td>Fuel 31-100</td>
<td>Mostly Grass</td>
<td>Mostly</td>
<td>Pyrophoric Hardwoods Chaparral</td>
<td>Conifer with brush under story</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Hazard Points**

Minimum Horizontal Clearance Requirement in feet

<table>
<thead>
<tr>
<th>Hazard Points:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24</td>
</tr>
<tr>
<td>30x30x30 ft</td>
</tr>
</tbody>
</table>

**Fuel Types:**

A. Specimen Garden: a well-maintained ornamental garden, usually irrigated. Trees and shrubs are well spaced or clustered, thinned and free of deadwood. The lawn is mowed and clean. No pyrophytic plants within 10 ft. of house.

B. Hardwood (Model 9): Broadleaf (non-pyrophytic) trees such as oaks, maples, ash, etc.

C. Grass (Model 1): Wild field grass dominates; trees and shrubs occupy less than 1/3 of the area.
D. Mostly Grass (Model 2): Brush and tree reproduction occupy more than 1/3 and less than 2/3 of the area.

E. Mostly Brush (Model 5): Brush and tree reproduction occupies 2/3 of the area. Includes young chaparral, coastal scrub and broom stands.

F. Pyrophytic Hardwoods (Model 12): Broadleaf trees that is high in volatile oils, which produce heavy debris and burn intensely. May have some conifers mixed in but the flammable hardwoods dominate the fire behavior.

G. Chaparral (Model 4): Six foot and taller old, pyrophytic brush with excessive deadwood. Includes mixed chaparral of Manzanita, scrub oak, chaparral pea, tall ceanothus, chamise, etc. Often has some young Douglas fir or pines.

H. Conifer (Model 8): Needleleaf trees typically with heavy litter, low branches and plentiful deadwood. Often mixed with some hardwoods or even pyrophytic hardwoods, but conifers dominated and carry the fire.

I. Conifer with Brush Understory (Model 10): Pine and Douglas Fir with heavy brush and down & dead branches and suppressed trees in the understory.

Slope Influence on Minimum Defensible Space Clearances

Increasing slopes require increased defensible space clearances to be equally effective. For example, to be equally effective upslope, cross slope, and down slope, clearances around each structure must be increased as the percentage of slope increases when compared to level terrain.

Rate of spread, flame length, convective and radiant heat increase in relation to fuel type, aspect, and percentage of slope factors. Increased defensible space zone radiuses in relation to slope are required around structures through fuel modification and reduction.

Below are the listed Minimum required cross slopes, down slope, and up slope zones measured in feet. Specific terrain may require adjustment:
It is also important to incorporate fire safety in the general plan and safety elements in each jurisdiction.

*No fire department can be expected to prevent all home losses in a WUI setting.*

The potential for a wildfire to outpace suppression efforts means that all homeowners in WPAD areas accept a high degree of risk as well as responsibility.
Parking and Emergency Vehicle Access Enforcement

The OFD Fire Prevention Bureau empowers its Fire Inspectors with the authority to issue Citations per California Penal Code sections 830.37(b) & 836.5(c). Fire Inspectors shall issue Citations for observed violations of the Oakland Municipal Code (OMC) and the California Vehicle Code (CVC) under their authority as Public/Peace Officers when on active duty and while in the performance of their regularly performed inspection activities. The issuance of citations by Fire Inspectors is at the discretion of the individual Inspector based on the immediate threat to public safety.

This policy for Fire Inspectors is in addition to the agencies having the primary responsibility of issuing traffic citations such as the Oakland Police Department (OPD) and the Parking Enforcement Division of the Finance and Management Agency. OPD issues citations via regular sworn patrol officers, the Traffic Division and the Park Rangers. Any citizen can call (510) 238-3099 or log on to the City of Oakland website and click on “Report a Problem”. http://www.Oaklandnet.com
2011 - 2014 ANNUAL GOALS

January
- OFD Vegetation Management Staff Retreat
- Year-End Summary Report
- Annual Audit Begins
- Year Round Public Outreach - Customer Service, Chipping Program, Green Debris Program, Magic Help Desk Hotline, Website
- Citizens' Advisory Committee Meeting - Review of Fire Codes

February
- Year-Round Public Outreach Services - Development of Vegetation Management Plan
- Citizens’ Advisory Committee Meeting – Mid-Cycle/Budget Review

March
- Roadside Clearance Work Schedule Finalized
- Goat Contract and Schedule Finalized
- Civicorps Schools (formally East Bay Conservation Corps) Work Schedule
- Year-Round Public Outreach Services
- Website Update and New Email to WildfirePrevention@Oaklandnet.com
- Environmental Issues and Creeks Training for Staff and Contractors
- Budget – Mid-Year Review/ New Budget Developed – Annual Report to Public Safety and Council

April
- Inspections of Public Entity Properties Begins (April 1 – May 1)
- Work Plans with all Public Entity Property Owners (CAL TRANS, OUSD, PG&E, EBMUD, EBRPD, UCB)
- Inspections of all Large Parcel/Public Entity Property - updated in database and report
- Public Entity Property Holders Meeting and Draft Work Schedules
- Year-Round Public Outreach Services: Annual Vegetation Management Plan
- Presentation to Public Safety Committee (and City Council for Annual Report)
- Public Education/Outreach – Earth Expo and Earth Day

May
- Fire Season Begins (May 1 – November 1)
- Annual Notice to WPD Community: 27,000 mailed May 15
- Inspection Training (improved) occurs for Engine Companies (including environmental component)
- Monthly Inspection Compliance Progress to Date Graph
- Update Inspection Database
- Public Education/Outreach – Articles in Montclarion (and website) to launch season
June

- Improved Private Property Inspections Begin by Companies (June 15 to July 15)
- Unimproved Private Property Inspections Begin by Inspectors (June 15 to July 15)
- FPB Ride Along with Engine Co. Inspections (June 15 to June 30)
- Monthly Inspection Compliance Progress to Date Graph (May 15 to June 15)
- Year-Round Public Outreach Services - including Community Meetings
- Citizens' Advisory Committee Meeting - Terms of Service Reviewed
- Public Education/Outreach - Press Releases for Inspection Season

July

- 2nd/Final Inspections on Improved Property by Companies (July 15 to August 15) - 2nd/Final Inspections on Unimproved Private Property Inspections Begin
- Monthly Inspection Compliance Progress to Date Graph
- Citizens' Advisory Committee Meeting and Public Outreach Meetings with Community

August

- Agency Coordination Meeting for Red Flag Procedures and Fire Weather Watch
- Monthly Inspection Compliance Progress to Date Graph
- Citizens' Advisory Committee Meeting
- Year-Round Public Outreach Services - National Night Out
- Public Education/Outreach - Public Education/Outreach - Article in Montclarion (and website) re: Red Flag Days and High Fire Season, Defensible Space video on KTOP for 3 months

September

- Fire Weather Watch and Red Flag Days - Roving Patrols
- Monthly Inspection Compliance Progress to Date Graph
- Citizens' Advisory Committee Meeting and Annual Strategic Retreat
- Year-Round Public Outreach Services - KTOP PSA for High Fire Danger
- Public Education/Outreach - Creek-to Bay Day

October

- Monthly Inspection Compliance Progress to Date Graph
- Citizens' Advisory Committee Meeting
- Year-Round Public Outreach Services - Anniversary 1991 Firestorm Commemoration
- Public Education/Outreach - Wildfire Prevention Day (10/21/08). Annual Hills Emergency Forum Meeting

November

- Fire Season Ends (depending on weather)
- Citizens' Advisory Committee Meeting
- Annual Audit Begins
- Year-Round Public Outreach Services - Presentation to Diablo Fire Safe Council
- Public Education/Outreach – Re: Close of Fire Season & Statistics

December
- Annual Inspection Compliance Statistics Report
- Citizens’ Advisory Committee Meeting – Meeting Schedule for 2008/2009
- Annual Budget Review: Revisions, Action and Report

Responsibility

To ensure that the funding provided to the WPD is used effectively and the owner of record conducts effective defensible space actions. The FPB has identified ownership of properties within the WPD. The types of ownership dictate who is responsible for maintaining the property and its vegetation:

<table>
<thead>
<tr>
<th>Owner</th>
<th>Responsible Party</th>
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<tbody>
<tr>
<td>Private developed</td>
<td>Property owner</td>
</tr>
<tr>
<td>Private undeveloped (vacant lot)</td>
<td>Property owner</td>
</tr>
<tr>
<td>City-owned parks improved</td>
<td>Public Works Agency</td>
</tr>
<tr>
<td>City-owned parks unimproved</td>
<td>Public Works/Fire Dept.</td>
</tr>
<tr>
<td>City-owned roadsides</td>
<td>Public Works/Fire Dept.</td>
</tr>
<tr>
<td>Other City property: paths, trails, stairs, easements</td>
<td>Public Works/Fire Dept.</td>
</tr>
</tbody>
</table>

(Combined city owned area is 1761 acres)

Large Public entity
- East Bay Regional Park District (776 acres)
- EBMUD (344 acres)
- Caltrans (72 acres)
- Oakland Unified School District (130 acres)
- Peralta Junior College District (123 acres)
- PG&E (49 acres)
- University of California, Berkeley (801 acres)

<table>
<thead>
<tr>
<th>WPD Wildfire Service District</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4/5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Parcels</td>
<td>5,070</td>
<td>5,429</td>
<td>5,217</td>
<td>9,619</td>
<td>25,335</td>
</tr>
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</table>
In 2007, the City of Oakland and its partners University of California, Berkeley and East Bay Regional Parks District was awarded a Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Grant. When completed this project will extend the regional fuel break through forest conversion; the emerging native forest of California bay, oak, maple, buckeye, and hazelnut will be retained and the existing eucalyptus will be removed. The exotic trees will be cut and their remaining stumps will be chemically treated with herbicide (Garlon 4, Stalker, and Roundup) to prevent re-sprouting. Cut material will be either removed or left on site and lopped and scattered or chipped and scattered. Larger logs will be retained as a part of the sediment/erosion control measures and serve as habitat for a variety of wildlife.

The Fire Prevention Bureau will comply with CEQA on this project through the City’s Community and Economic Agency/Planning Division. The project will also comply with additional best management practices and mitigation measures developed during NEPA consultations and review. The project duration is anticipated to be 36 months, with 25 to 40 weeks of removal work. Follow-up treatments will occur at least quarterly, as an ongoing maintenance operation beyond the scope of the project. The total FEMA funding for the City of Oakland portion including labor and chemical treatment is $1,170,402.
Work Areas:

City of Oakland

North Hills – Skyline Project & Caldecott Tunnel Project The long range goal is to eradicate French broom, eucalyptus and Monterey pines across the entire ridgeline and to convert brush to grassland at Grizzly Flats to establish an emergency helicopter landing site.

University of California, Berkeley

The 84 acre site was logged in 1974-75, after the eucalyptus trees were damaged by a freeze in the winter of 1972-73, but has resprouted.

East Bay Regional Parks District

Tilden - Grizzly Peak Blvd Project The long range goal for this 60 acre site is to eradicate eucalyptus and Monterey pines across the entire ridgeline and to convert brush to grassland at Grizzly Flats to establish an emergency helicopter landing site.

Sibley - Triangle and Island Project This 42 acre site straddles Skyline Blvd in the East Bay Regional Park District’s Sibley Preserve. Hazardous fuel reduction on this site is critical because of its steep terrain and proximity to Oakland residences.

Claremont Canyon - Stonewall Project

This 17 acre site is in the East Bay Regional Park District’s Claremont Canyon Preserve. Hazardous fuel reduction on this site is critical because of its steep terrain and proximity to Oakland and Berkeley residences and UC Berkeley. The project will expand the eucalyptus thinning and removal that started on District land adjacent to the EBMUD water tank near Stonewall Road.
The project area is located on Shepherd Canyon Road on five City parcels next to the Municipal Corporation yard and Oakland Fire Department Station 24. The understory is a rich assembly of native trees and shrubs growing under a canopy of resprouted eucalyptus and non-native pine trees, totaling approximately 12,000 stems. A small percentage of the site has exotic acacia species, which also spread rapidly and produce flammable litter. The management strategy promotes forest conversion: from the existing eucalyptus-dominated canopy forest to an emerging native forest of California bay, oak, maple, buckeye, and hazelnut. Eucalyptus has demonstrated its vast casting ability as well as its ability to resprout from a stump. If left untreated, within 2 years sprouts can reach a height of 20 feet or more.

There is only a short-lived gain without chemical treatment. Felled logs of eucalyptus, pine and acacia will be either removed —chipped or scattered or lopped and scattered.

Larger logs will be used as a component of the sediment/erosion control measures and serve as habitat supporting a variety of wildlife.

The herbicide prescription will be written by a Certified Pesticide Applicator and the application will follow the label directions.

The herbicide solution will be applied to the cambium layer of the freshly cut tree stump within a few minutes of felling. The herbicide mixture will likely consist of a combination of Garlon® 4 (triclopyr) and Stalker® (imazapyr) in a solution of esterified seed oil, water, and marking dye. A typical tree requires 1 to 2 ounces of diluted solution. [0.5 ounces solution per lineal foot of cambium]. All cut tree stumps shall receive semi - annual follow-up treatment of herbicides (Garlon 4, Stalker, Roundup) on any emerging stump sprouts, to ensure the permanent elimination of eucalyptus from the project area.

Follow up treatment of sprouts will be conducted until 100% removal is obtained.

Protection of the native species and ongoing management after project completion will ensure a successful conversion that is protective of natural and recreational resource values. This includes but is not limited to habitat, hydrology, soils, geology, and air quality.
Community Wildfire Prevention District Partnership Projects

The Community WPD joint fuels management project approach focuses on the implementation of small scales fire management projects within the WPD. The Fire Department working in collaboration with community and neighborhood associations would conduct vegetation management activities that would promote fire safety and native plant protection and restoration on open space lands near residential structures. WPD contractors and the neighborhood residents conduct joint projects to remove invasive plants and create a fire perimeter clearance that would provide fire protection for residents located up-slope from the project sites.

Projects proposed for 2011 – 2014

Garber Park Council District 1
Chabot Golf Course / Council District 7
Wildland Urban – Interface Data Collection Project

The proposed project is to conduct an assessment of the Wildfire Prevention Assessment District in order to determine the wildfire risk and the development of a long range fuels management plan. OFD Vegetation Management Program Fire Risk Assessment approach focuses on applying advanced remote sensing and GIS technology in an effort to improve interactive engagement across the community. This approach was developed to assist Vegetation Management Program in addressing the three key factors that can contribute to the success or failure of community-wide mitigation programs:

- Developing and maintaining a common view of the environment.
- Increasing the speed of information update.
- Maintaining a consistent level of accuracy across the community.

WPD Fire Risk Model

The heart of these projects is a community-vetted Wildland Urban Interface Fire Risk Model that combines core environmental and social inputs regarding properties in the WPD and develops a parcel-based assessment of wildland fire risk. Science-based models include tailored weighting factors developed through interaction between WPD and their communities. The common classes of attributes include:

- Fire Behavior (fuels, slope, aspect)
- Landscape (veg density, defensible space)
- Water (hydrant, sources)
- Access (response time, road conditions)
- Construction (roof, siding, utilities)

Collection Strategy

Data Collection and Analysis

Once the collection strategy is completed, the project team will use it to determine specific sensor and analysis required. The specific attributes include: roof types, vegetation density, permeable surfaces, road materials, wildland fire fuels, water bodies and invasive species.

GIS Implementation

The ability of today's GIS systems to synthesize and depict large amounts of data is tremendous. The key GIS tasks for the City of Oakland, WPD include:
- Assembling all attributes within single GIS system.
- Combining the attributes within the Risk Model to assess each parcel.
- Displaying the results on a Web-based GIS system and generating maps for community interaction.

Finally, these projects start by inviting the entire community to engage in wildfire risk mitigation. As a result, they initiate a process which must be sustained by the Fire Department. The model will be updated anytime the environment changes based on fire, weather, or large or individual projects such as roof changes.
At this time the WPD has been working towards its two primary functions:
- Providing education, inspection, and, if necessary, enforcement of non-city owned properties within the WPD (private, nonprofit, institutional, other agency)
- Providing funding for vegetation management on city-owned properties within the WPD

Both internally in its operations and externally with its results, the WPD is an emerging model for other regions. Through the process of this report, recommendations from a variety of sources are highlighted. It will be up to the Citizens' Advisory Committee and the FPB to see determine which of these priorities will be addressed in the coming years.

This will aid in the prioritization of work and the planning process.

- Maps of the service districts need to be reviewed and the maps stabilized
- Update resource inventory to reflect current vegetation
- Combine logical and appropriate city-owned parcels into polygons based on terrain, vegetation types, and treatment prescription to be undertaken
- Rethink the service districts into manageable units that correspond to the landscape and resources

By conducting an inventory of existing resources, the path is set for clearer prioritizing and decision making. This will allow for fewer, larger contracts – which reduce administrative time and effort, and more importantly, will allow for more than “maintenance” in future years, especially for those contracts which can span several years.

- Address current inconsistencies that currently arise between State law compliance requirements and the Creek Ordinance

By discussing this issue, a clearer uniform message will be presented to all property owners. This will reduce confusion and produce more effective vegetation management that addresses the needs of wildfire prevention and soil stability.

- Use small demonstration sites to refine treatment prescriptions and contract scope language
- Explore new treatment technologies

Operating within the constraints of the categorical exemption, the WPD can work towards refining scoping language. Since this is an adaptive process, a multi-year commitment towards monitoring and consistency is needed.
CONCLUSION

The common goal of reducing the threat of large damaging wildfires is achieved through a combined effort — a partnership between government and citizens. The intent is to support the fuel reduction efforts of all those involved, aiming for year-round compliance. The program’s accomplishments are to be noted: it has stayed under budget, has had no major fires, has an active and responsible Citizens’ Advisory Committee, and dedicated FPB staff. The program has completed 80% of its 10-year goals and objectives. The vision of the WPD is large within its limited funds. Its activities have occurred within the Safety Element of the 2004 General Plan.

The Oakland Fire Department would like to thank all of the Community and city agencies that assisted in the development of this Plan.