SHADED FUEL BREAK

Purpose/Overview

The purpose of the development, implementation and maintenance of a project such as fuel modification can be considered a fire prevention/management tool that may promote awareness, mitigation, and assist in fire suppression activities in the event of a wildland fire situation in Interface Lands. The objective is to reduce, modify, and manage fuels within designated areas that may enhance mitigation efforts in the event of a wildland fire situation. The Shaded Fuel Break is an identified key component of any project:

> is a strategic location along a ridge, access road, or other location where fuels have been modified. The width of the fuel break is usually 100 to 300 feet depending on the site. This is a carefully planned thinning of dense vegetation, so fire does not easily move form the ground into the overhead tree canopy. A shaded fuel break is not the removal of all vegetation in a given area. Fire suppression resources can utilize this location to suppress wildland fires due to the modification of fuels of which may increase the probability of success during fire suppression activities. Any fuel break by itself will not stop a wildland fire.

The Shaded Fuel Break is a recommended guideline for fuel management within identified Interface Lands.

The goal is to protect human life and both public and private resources by reducing the risk and potential hazard of wildland fire by practicing management strategies that promote the preservation and restoration of natural resources and protection of cultural resources.

Objectives are mitigation of fire dangers in an effort to: Enhance public safety; Protect natural and cultural resources; Provide for recreational opportunities; Conduct cost effective maintenance of features and facilities.

SHADED FUEL BREAK PRESCRIPTION

This is a defensible location to be used by fire suppression resources to reduce the hazard of wildland fires. Any fuel break by itself will **NOT** stop a wildland fire. It is a location where the fuel has been modified to increase the probability of success for fire suppression activities. Ground resources can use the location for direct attack. Air resources may use the location for fire retardant drops.

Prescription

The intent of the fuel break is to create a fuel model or vegetative arrangement where wildfire reduces intensity as it burns into the fuel break. A ground fire, burning grass and leaf duff is the desired fire behavior. An arrangement which, provides the desired fire behavior effects, involves an area where ladder fuels are removed and tree or brush canopies will not sustain fire, and where the contiguous fuels arrangement is interrupted.

This general arrangement allows fire and resource managers to retain a species diversity of individual younger, middle aged and older plants, which allows the opportunity for an uneven aged vegetative type, without compromising the project objectives. For example, young saplings of individual oaks or conifers may be retained, although, they may be under the desired diameter, they may not contribute to undesired fire behavior effects. Additionally, it may be necessary to cull a few trees in a thick stand of conifers over the desired diameter in order to improve forest health. It is important to remember that this prescription is a guide, not an absolute. Site specific prescriptions may be developed later for individual projects which, all will be in accordance with the project objectives.

Implementation consists of removing or pruning trees, shrubs, brush, and other vegetative growth on the project area as prescribed. All work will be accomplished by use of hand crews, biological treatment or mechanical equipment; supported by chippers and/or burning as determined appropriate on a case-by-case basis. The preferred width of a shaded fuel break along a ridge top or adjacent to one is approximately 300 feet

Trees up to the 6-inch diameter at breast height (dbh) class are eligible for removal under this prescription. However, larger hazardous snags may be removed. Due to operational needs, it may be necessary to remove an occasional tree with a dbh larger than 6 inches based on forest health and project objectives. Individual trees under 6-inch dbh may be retained for diversity and if they do not disrupt project objectives. This will only be done on a case-by-case basis after proper review by all agencies.

Threatened and endangered plant and animal species, such as elderberry and other sensitive species, shall not be removed or treated, or otherwise adversely affected, within any shaded fuel break.

Cultural resources are a major resource and will be protected.

1. Understory fuels:

Understory fuels over 1 foot in height are to be removed in order to develop vertical separation and low horizontal continuity of fuels. Individual plants or pairs of plants may be retained provided there is a horizontal separation between plants of 3 to 5 times the height of the residual plants and the residual plants are not within the drip lines of an overstory tree.

2. Mid-story fuels:

Trees up to the 6-inch dbh may be removed. Exception to this size limit shall be trees that have significant defect and/or which do not have a minimum of a 16-foot saw log or trees, such as saplings, that do not present an undesirable effect. Live but defective trees larger than the 6-inch dbh providing cavities for obvious wildlife use will be retained.

Trees shall be removed to create horizontal distances between residual trees from 20 feet between trunks up to 8 to 15 feet between tree crown drip lines. Larger overstory trees (> 6-inches dbh) do count as residual trees and, in order to reduce ladder fuels, shall have vegetation within their drip lines removed. *Prune branches off of all residual trees from 8 to 10 feet off the forest floor, not to reduce the live crown ratio below 1/2 of the height of the tree.*

Criteria for residual trees (up to < 6-inch dbh):

Conifers: Leave trees that have single leaders and thrifty crowns with at least 1/3 live crown ratio.

Conifer leave tree species in descending order:
Sugar pine
Ponderosa pine
Douglas fir
Knob-cone Pine
Gray Pine
White fir
Incense cedar

Intolerant to shade species have a higher preference as leave trees because their seed will be less likely to germinate in the understory.

3. Snags:

Snags are a conduit for fire during a wildland fire. However, they also provide excellent wildlife habitat in their natural state. The following is the criteria of when snags shall be retained:

18-inch diameter class or larger and not more than 30 feet in height which are not capable of reaching a road or structure provided there is a separation of least 100 feet between snags.

Hardwood trees: Leave trees that have vertical leaders and thrifty crowns with at least 1/3 live crown ratio.

Hardwood leave tree species in descending order:
Valley Oak
Big Leaf Maple
Blue Oak
Black Oak
Madrone
Live Oaks

Brush: It is desirable to remove as much brush as possible within the shaded fuel break area. However, if individual plants or pairs of plants are desired to be left, leave plants with the following characteristics: young plants less than 5 feet tall and individual or pairs of plants that are no more that 5 feet wide.

From a fuels management perspective the following are brush leave species in descending order:

Category 1
Dogwood
Redbud

Category 2
Toyon
Buckeye
Coffeeberry
Lemmon Ceanothus
Buck brush (Wedge leaf ceanothus)

Category 3
Whitethorn
Deer brush
Manzanita
Chamise
Yerba Santa
Poison Oak
Scrub Oak

Non-native species (such as olive, fig, etc.) will be considered on a case- by- case basis.

3. Wetlands:

Wetlands and riparian areas will not be adversely affected for treatment and ground operations.

4. Watercourse and Lake Protection Zone (WLPZ):

To provide mitigation for riparian associated species and to reduce the potential risk of habitat fragmentation, the following will apply:

WLPZ widths and operational limitations shall be in conformance and consistent with Title 14, California Code of Regulations, 936.5, Procedures for Determining Watercourse and Lake Protection zone Widths, as approved by the California Board of Forestry.

Class I watercourse (Fish bearing):
Exclude from equipment operations (except on existing roads) and remove one thousand hour and smaller sized dead fuels ($\leq$ 5 inches in diameter).

Class II watercourse (Aquatic habitat for non-fish aquatic species):
No treatment of overstory and the treatment of understory will not reduce vegetative cover below 50%. One thousand-hour and smaller sized dead fuels ($\leq$ 5 inches in diameter) will be removed. Ground based equipment will not operate within the zone except on existing roads. Prune residual trees.

Class III watercourse (No aquatic life present):
Full shaded fuel break prescription will be implemented but no ground-based equipment will operate within exclusion zones except on existing roads.

BRUSH FIELD PRESCRIPTION

Implementation consists of removing or pruning brush, and other vegetative growth on the project area. All work will be accomplished by use of equipment, masticator and/or hand crews supported by chippers and/or burning.

Due to operational needs tree canopies may need to be thinned, pruned or modified as part of the brush field fuel break prescription. This will only be done on a case by case basis after proper review by all involved agencies.

Threatened and endangered plant and animal species, such as elderberry and other sensitive species, shall not be removed or treated, or otherwise adversely affected.

Cultural resources are of a major concern in any area where they may exist. These resources will be protected.

Prescription:

Brush: It is desirable to remove as much brush as possible within the brush field fuel break area. However, if individual plants or pairs of plants are desired to be left, leave plants with the following characteristics: young plants less than 5 feet tall and individual or pairs of plants that are no more that 5 feet wide. The distance between residual plants shall be 3 to 5 times the height of the residual plants. Three (3) times the height distance for slopes less than 30%, five (5) times for slopes equal to or greater than 30%.

The width of the brush field fuel break shall normally be 300 feet.

From a fuels hazard perspective the following are brush leave species in descending order:

Category 1
Dogwood
Redbud

Category 2
Toyon
Buckeye
Coffeeberry
Lemmon Ceanothus
Buck brush (Wedge leaf ceanothus)

Category 3
Whitethorn
Deer brush
Manzanita
Chamise
Yerba Santa

Poison Oak
Scrub Oak

Non-native species (such as olive, fig, etc.) will be considered on a case by case basis.

Wetlands:

Wetlands and riparian areas will not be adversely affected for treatment and ground operations.

Watercourse and Lake Protection Zone (WLPZ):

To provide mitigation for riparian associated species and to reduce the potential risk of habitat fragmentation, the following will apply:

WLPZ widths and operational limitations shall be in conformance and consistent with Title 14, California Code of Regulations, 936.5, Procedures for Determining Watercourse and Lake Protection zone Widths, as approved by the California Board of Forestry.

Class I watercourse (Fish bearing):
Exclude from equipment operations (except on existing roads) and remove one thousand hour and smaller sized dead fuels ($\leq$ 5 inches in diameter).

Class II watercourse (Aquatic habitat for non-fish aquatic species):
No treatment of overstory and the treatment of understory will not reduce vegetative cover below 50%. One thousand-hour and smaller sized dead fuels ($\leq$ 5 inches in diameter) will be removed. Ground based equipment will not operate within the zone except on existing roads. Prune residual trees.

Class III watercourse (No aquatic life present):
Brush field prescription will be implemented but no ground-based equipment will operate within exclusion zones except on existing roads.

GRASS FIELD PRESCRIPTION

Implementation consists of mowing and possibly re-establishing native grass species on the project area. All work will be accomplished by use of heavy equipment, and/or hand crews.

Threatened and endangered plant and animal species, such as elderberry and other sensitive species, shall not be removed or treated, or otherwise adversely affected.

Cultural resources are of a major concern in any area where they may exist. These resources will be protected.

Prescription:

Grass: Grass fuel breaks shall be a minimum of 300 feet wide. All grasses are to be maintained below four (4) inches in height just after the grasses cure cut in early summer.

Wetlands:

Wetlands and riparian areas will not be adversely affected for treatment and ground operations.

Watercourse and Lake Protection Zone (WLPZ):

To provide mitigation for riparian associated species and to reduce the potential risk of habitat fragmentation, the following will apply:

WLPZ widths and operational limitations shall be in conformance and consistent with Title 14, California Code of Regulations, 936.5, Procedures for Determining Watercourse and Lake Protection zone Widths, as approved by the California Board of Forestry.

Class I watercourse (Fish bearing):
Exclude from equipment operations (except on existing roads) and remove one thousand hour and smaller sized dead fuels ($\leq$ 5 inches in diameter).

Class II watercourse (Aquatic habitat for non-fish aquatic species):
No treatment of overstory and the treatment of understory will not reduce vegetative cover below 50%. One thousand-hour and smaller sized dead fuels ($\leq$ 5 inches in diameter) will be removed. Ground based equipment will not operate within the zone except on existing roads. Prune residual trees.

Class III watercourse (No aquatic life present):

Grass field prescription will be implemented but no ground-based equipment will operate within exclusion zones except on existing roads.

916.5, 936.5, 956.5 Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures [All Districts]

TABLE I

Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures[1]								
Water Class Character-istics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present onsite includes habitat to sustain fish migration and spawning.		1) Fish always or seasonally present offsite within 1000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.		No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations.		Man-made watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use.	
Water Class	Class I		Class II		Class III		Class IV	
Slope Class (%)	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure
					[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]		[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]	
<30	75	BDG	50	BEI	See CFH		See CFI	
30-50	100	BDG	75	BEI	See CFH		See CFI	
>50	150[2]	ADG	100[3]	BEI	See CFH		See CFI	

1 – See Section 916.5(e) for letter designations application to this table.
2 – Subtract 50 feet width for cable yarding operations.
3 – Subtract 25 feet width for cable yarding operations.

MAINTENANCE PRESCRIPTIONS

Once fuels have been modified within an area, maintenance activities should be planned and implemented on a regular basis to keep the effectiveness of the original treatment. If no maintenance activities occur, the effectiveness of the original treatment will diminish every year, potentially yielding no net effect within 5 years. The necessary maintenance activities will be minimal if implemented on an annual basis.

The original prescription treatment should be followed for maintenance. Possible fuel reduction techniques to be utilized for maintenance include the following:

Hand Work: Use of hand tools by crews or individuals. This technique is labor intensive and potentially expensive (>$1000 per acre). Impacts to soils are negligible.

Mechanical Work: Use of heavy equipment such as masticators and/or bulldozers. This technique is moderately expensive (as low as $400 per acre) but limited by topography (to slopes less than 50%) and not appropriate for most watercourse and lake-protection zones and excessively wet soils.

Chemical Controls: Use of California registered herbicides. This is the most cost-effective technique. Implementation usually requires one or two individuals for ground application. This technique has negligible soil effects but may not be appropriate for certain areas such as riparian zones, watercourses, and areas of listed plants.

Prescribed Browsing: Use of goats in a controlled setting to browse within appropriate areas to reduce fuel levels. Browsing goats can be an effective tool to control grasses and low growing vegetation, when controlled properly, can have little impact to the environment. Costs may vary.

Prescribed Burning: The use of planned and controlled burning operations to reduce fuel levels. Control lines are established prior to burning. Burning and Air Pollution permits are required to conduct these operations. This technique varies in cost per acre depending on complexity of project. Burning is becoming more difficult to complete due to air regulations.