Project/Treatment Types

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Planning

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Evacuation Fire Plan

Hazard Fuel Reduction

Fuel Reduction

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Break

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Forest Restoration

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Timber Harvest

Prescribed Burn

Pile and Burn

Grapple Pile

Underburn

Jackpot Burn

CFIP (California Forest Improvement Program)

Salvage

Timber Harvest

Firebreak:

A firebreak is an area where all vegetation and organic matter is removed down to mineral soil, thereby re­moving the fuel leg of the fire triangle. The purpose of a firebreak is to deny a fire any combustible mate­rial. Firebreaks are used to prevent advancing surface flames from coming in direct contact with outbuildings or other important resources on your property. A fire­break may be 2 to 15 feet wide. A firebreak should be two to three times as wide as the height of the nearest surface vegetation (fuel), such as grass and shrubs (Fig­ure 13a). Firebreaks may require annual maintenance (removal of invading vegetation). In addition, because mineral soil is exposed, there is a high probability of creating conditions for invasive weeds to establish.

Shaded Fuel Break:

A shaded fuelbreak is a strip of land where fuel has been modified or reduced to limit the fire’s ability to spread rapidly. In addition, shaded fuelbreaks maintain cooler and moister understory conditions and understory veg­etation remains greener longer into the growing season. This helps to reduce fire spread within the fuelbreak. Within the shaded fuelbreak, overstory trees are thinned to reduce crown-to-crown overlap, particu­larly between conifers. Some crown overlap may be acceptable. Thinning can be done just in the fuel­break area or as part of a larger thinning operation in adjacent stands. In the area of the shaded fuel­break (for example, the first 100 feet from the edge. In addition, within the shaded fuelbreak, understory trees and combustible shrubs (e.g., ladder fu­els), heavy ground fuels, and snags should be reduced or removed. Thinning and cutting small trees and shrubs can create a lot of slash, so for an effective shaded fuel­break, remove this fire hazard

Fuel Reduction Treatment Types Treatments for fuels in timbered stands fall into the following broad categories (<https://www.plumasfiresafe.org/uploads/8/1/8/4/81849812/plumascountyhazardousfuelassessmentandstrategy.pdf>)

•Thinning from below (removal of ladder fuels)

Thinning can be accomplished with hand tools, machinery, fire, or combinations of techniques. Most important, the conditions left after treatment and the subsequent development of the forest stands determines the success of thinning in meeting fire hazard reduction objectives

Mechanical Thinning utilizes heavy equipment with large hydraulically-driven saws to cut and remove trees (generally under 24” in diameter). The two major harvesting methods in use are “whole tree removal (WTR)” and “cut-to-length (CTL)”. CTL machines use a “stroke delimber” to remove branches before automatically chopping a log to predetermined lengths. While whole tree removal is preferable from a fuels-reduction standpoint, CTL machines create a mat of slash that they can operate over, reducing impacts to the soil. Mechanical thinning equipment is generally confined to slopes less than 30%. Whole tree removal projects require large landings than can accommodate a skidder operation, a large chipper and Semi-trucks.

Where fuels reduction is the primary purpose, mechanical thinning projects should concentrate on the removal of trees less than 12" in diameter, as well as the disposal of all slash generated by harvesting operations (either by chipping, pileburning, broadcast burning, or a combination of these). If it is necessary to remove overstory trees to reduce canopy closure it is important that all generated slash is disposed of so that the surface fuels are not increased.

•Thinning from above (removal of the canopy overstory – [not necessarily a fuels treatment but rather a reduction of canopy closure]).

•Hand thinning –

Hand thinning and chipping is usually accomplished by a crew of persons using chainsaws and pole saws to thin and clear undesirable vegetation. Hand thinning is conducted with crews of approximately 10 individuals who cut trees with chainsaws. Hand thinning is generally used to cut smaller trees (less than 14 inches in diameter), on steep slopes where machines cannot operate, or in environmentally sensitive areas where machines would have a significant environmental impact. Removal of smaller trees is generally limited to younger stands where the trees are smaller. Because hand thinning can only effectively remove smaller material, silvicultural and fuel management objectives may be more constrained than those achieved with mechanical thinning. Therefore, hand thinning may require more frequent treatments to maintain acceptable fuel loads than mechanical thinning and hand thinning may not be cost effective in forest stands with excessive ground fuel loading where mechanical thinning would remove or compact those fuels. (YUBA CWPP)

•Mechanical Mastication

Mastication treatments utilize machines to grind, rearrange, compact, or otherwise change fire hazard without reducing fuel loads. These treatments tend to be relatively expensive, and are limited to relatively gentle slopes and areas of high values near homes and communities. Rocky sites, sites with heavy down logs, and sites dominated by mainly large trees are difficult places in which to operate mastication equipment. Additionally, sparks from mastication heads have the potential to start fires, and when working on public land, these machines are subject to the same activity-level restrictions that apply to most other logging equipment.

•Prescribed fire

Prescribed burning reduces the loading of fine fuels, duff, large woody fuels, rotten material, shrubs, and other live surface fuels. These changes, together with increased fuel compactness and reduced fuel continuity change the fuel energy stored on the site, reducing potential fire spread rate and intensity. Burning reduces horizontal fuel continuity (shrub, low vegetation, woody fuel strata), which disrupts growth of surface fires, limits buildup of intensity, and reduces spot fire ignition probability (Graham, 2004)

•Biological treatment (grazing)

Using cattle, sheep or goats can be very effective reducing the fuel hazards caused by the growth of the annual grasses and vegetation in and around structure they do have limitations and often do not discriminate what they eat. They are very effective at treating small brush and grasses.

Biomass Removal

In this document the term “Biomass Removal” refers to the removal of conifer trees up to 10.9 inchesdbh. To meet spacing requirements, biomass sized trees further than approximately 25 feet from the bole of any other tree will be left on site and not to be removed, with preference for leaving the largest, defect free, fire tolerant species. Biomass removal uses the same or similar equipment as mechanical removal of larger trees. Often biomass removal occurs concurrently with mechanical removal. In areas without mechanical removal of larger trees, biomass removal may be implemented as the initial treatment. The biomass is either chipped and removed or brought to a landing to burn. Biomass material brought to the landings would be treated by the Landing Pile Burn or Remove Tool described below.

Grapple Pile

Grapple piling is a ground based operation that uses a tracked or wheeled mechanized piece of equipment to lift and/or gather woody biomass material into piles for burning at a later date. One method of grapple piling uses the machinery to “lift” the living vegetation (small trees and shrubs) out of the ground (including roots) and then gathers the material into grapple piles. Pulling shrubs and other vegetation by the roots stops vegetation from re-sprouting. Grapple piles may also include existing dead and downed woody surface fuels. Another manner of grapple piling is completed by hand cutting of vegetation (small trees and shrubs) with chainsaws and then using a tracked or wheeled mechanized piece of equipment to gather this cut material into grapple piles. Small trees (up to 9.9 inches dbh) would be treated with grapple piling. A tree further than approximately 25 feet from the bole of any other tree will be left on site and not to be removed, with preference for leaving the largest, defect free, fire tolerant species. Grapple piling may be a follow-up treatment to mechanical removal, or it may be the initial tool used in an area. Piles created by grapple piling would predominantly be burned as described in the Pile Burn (Grapple or Hand) section below. There is a limited chance that material from grapple piles would be removed (as described in the Landing Pile Burn or Removal section below) versus burned in piles, and removal would remain an option throughout implementation. Piling fuels can be an effective treatment for reducing and removing the amount of surface fuels, breaking up the horizontal continuity of surface fuels across a landscape and increasing the separation between surface and canopy fuels. Burning the piles to remove and reduce the amount of fuels in a stand or across a landscape makes the reintroduction of low-intensity fire by underburning more feasible. There are increased prescribed burning opportunities for the burning of piled material because there is a larger timeframe or burn window available. Grapple piles take a full season to cure before they can be burned and they will not be burned until fall/winter months. Therefore piles will sit for two seasons before they are conducive to burning. After that it will depend on weather and resource availability before they can be burne

Pile Burn (Grapple or Hand)

Residual activity fuels and some naturally occurring fuels would be piled into burn piles by hand or machine, as described above. Pile burning within treatment units is designed to remove surface fuels generated from treatments and existing fuels on the ground. Pile location and size is dictated by existing conditions; however, piles would be preferentially placed outside of sensitive areas such as riparian conservation areas and cultural resource sites. In areas denoted with piling restrictions due to resource protection needs, material would be transported outside of the denoted area in a manner that does not disturb the ground cover, and piled and burned. Piles are typically burned under fall-like conditions, in winter months, or during periods of low fire danger. These conditions help to minimize the amount of mortality of remaining vegetation. There are increased prescribed burning opportunities for the burning of piled material because there is a larger timeframe or “burn window” available. Pile burning can take place in the snow where underburning cannot. Piles take a full season to cure before they can be burned and they would not be burned until fall/winter months. Therefore piles would remain on site for two seasons before they would be conducive to burning. After that, it would depend on weather and resource availability before they could be burned

Underburn

An underburn is a prescribed fire ignited under the forest canopy that focuses on the consumption of surface fuels, but not the overstory vegetation. Underburns are ignited using small strips of fire to burn with low to moderate intensity to mimic a wildfire under controlled conditions in order to reduce downed woody debris, needles and duff, while removing small areas of shrubs and occasional pockets of trees. Widening or narrowing the width between strips increases or decreases fire intensity. Underburning requires the use of firelines to contain the prescribed fire within the targeted areas. Firelines are linear features that are cleared of vegetation and fuels down to mineral soil. Firelines are typically two to three feet wide when constructed by hand, however they can be up to four feet wide when created by small machinery. Existing natural openings, roads or trails are effective firelines and are used whenever possible in lieu of handline construction. The determination of size of underburn units is based on areas that can be easily managed with available resources. Another consideration for the size of an underburn unit is smoke dispersion forecasts. An underburn is the most practical way to reduce accumulations of surface fuels in this project area. However, it is also the most difficult due to the small window of opportunity due to the short burn window for these types of operations. Underburning has been difficult to accomplish in the past.

Treatment Costs and Information Resources

Treatment costs can vary based on size and density of material as well as slope, and overall availability of the equipment. Prescribed fire costs are also affected by the size of the prescribed burn area as well as the close proximity to homes and values at risk. Prescribed fire cost will probably be closer to the higher number due to the communities near the burn areas.

Treatments / Cost per acre

Prescribed Fire / $150 to $700

Mechanical Thinning / $750-$3000

Hand Thinning / $250-$680

Mastication / $450-$650

Treatment Information Resources

Forest Engineering Research Institute http://www.feric.caForest Industry Network http://www.forestind.com

Logging and Sawmilling Journal http://www.forestnet.com

Missoula Technology Development Center USFS Understory Biomass Reduction Methods and Equipment Catalog, 0051-2826-MTDChttp://www.fs.fed.us/vegtools/techniques/mtdc.phpSmall Area Forestry Equipment : http://www.fs.fed.us/eng/techdev/mtdc.htm

Other Resources to look into:

<http://calfire.ca.gov/resource_mgt/resource_mgt_stateforests_carb_protocols>

<http://www.deercreekgis.com/yubacwpp/>

<https://www.plumasfiresafe.org/wildfire-planning-documents.html>