NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

FUEL BREAK

(Ac.)

CODE 383

DEFINITION

A strip or block of land on which the vegetation, debris and detritus have been reduced and/or modified to control or diminish the risk of the spread of fire crossing the strip or block of land.

PURPOSE

Control and reduce the risk of the spread of fire by treating, removing or modifying vegetation, debris and detritus.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all land where protection from wildfire is needed.

CRITERIA

General Criteria Applicable To All Purposes

Fuel breaks will be of sufficient width and length to meet the intended purposes.

Fuel breaks shall be located to minimize risk to the resources and structures being protected.

Thin the overstory stand sufficiently to reduce the tree canopy and the potential of a crown fire.

Maintain vertical separation between fuel layers to remove “ladder” fuels, i.e., lowest layers of flammable vegetation do not connect to upper layers so that a fire cannot “step up” to higher canopies.

Treat or remove slash sufficiently and at a time to minimize fuel loadings to acceptable fire risk levels and reduce incidence of harmful insects and disease. Comply with Forest Slash Treatment - 384.

Manage grasses and forbs to minimize fine fuels

Establish fire-resistant vegetation to further decrease the risk of the spread of fire.

Species selection will be based upon their attributes in retarding fire and ease of maintenance.

Comply with applicable laws and regulations, including the state's Management Measures.

Understory Vegetation

Understory vegetation includes perennial shrubs and trees between 1½ feet and 20 feet in height. The treatments prescribed below are designed to create a horizontal and vertical separation between layers of forest vegetation through which a fire could spread.

Where the overstory is very sparse or non-existent, only horizontal separation of understory vegetation is required.

Where there is an overstory, the overlapping and interlaced branches and limbs (fuel ladder) through which a fire could carry from the understory into the crowns of the overstory trees is reduced or removed to avoid the potential for crown fire.

Horizontal Separation

Remove understory shrubs and trees to create a horizontal spacing between individual plants or groups of plants.

Vertical Separation

Create a vertical separation between understory and overstory vegetation by reducing the vertical continuity of

vegetation. Remove understory vegetation and/or prune tree branches

Pruning

Prune residual trees to create the separation distance between understory and overstory vegetation layers. When pruning to a reasonable level will not attain desired separation, remove understory vegetation.

Existing Surface Fuels

Existing (pre-installation) surface fuels greater than or equal to 2 inches in diameter, including dead and down branches, logs, and shrubs, must be reduced.

CONSIDERATIONS

General

The basic function of a fuel-break is to impose some obstacle to the spread and as a means of access to the fire.

A fuel break is a wide strip of land where most trees and shrubs have been removed. It may have a grass understory to provide soil cover. These are intended to divide large areas of woody fuels into blocks, which allows control of the fire. The trees and shrubs may not survive a wildfire.

Fuel breaks are designed to change the behavior of a wildfire by reducing the quantity, density, and configuration of potential fuels that the fire encounters when it enters the fuel break. The effectiveness of fuel breaks is dependent upon proper location, installation, and maintenance and adequate defense by fire suppression forces.

In general, the wider the fuel break, the easier and safer the job of holding the fire. Generally fuel breaks should be 2 ½ times the height of the tallest vegetation present or a minimum of 200 feet. However, budget and terrain constraints limit the width of most fuel breaks.

Normally, they are constructed in the following sequence. The first fuel breaks are on the ridges separating the major drainages. The next series are on the ridges within the major sub drainages to break the area into smaller units

Breaks are constructed for a number of purposes:

a. To act as a barrier to control the spread of a fire to a particular area or property.
b. To contain the spread of a fire from a fire source.
c. To breakup large fuel areas. Where fire may spread rapidly or be difficult to control, a system of firebreaks is some-times established to aid in confining the fire to a relatively small area.
d. Reduce a crown fire to a fire burning on the ground.

While applicable to most land uses, fuel-break planning should be combined with all woodland/forest land management activities. Forest land improvement, tree planting and access roads provide opportunities to utilize fuel breaks while accomplishing other woodland/forest land objectives.

The installation of fuel breaks is based on the value of the resource, which is susceptible to fire. The costs of installation must be weighed against the benefits received through the reduced fire damage. Fuel breaks should be a planned method that seeks a reasonable level of control based on a determination of what is sufficient to the need. It is not economically feasible to develop a system of fuel-breaks for low site stands, less than site index 70, for species such as ponderosa pine and Douglas fir, etc. Areas with high economic, social, wildlife or watershed values should be protected. These include the higher site index stands, home sites, plantations, significant cultural resources, areas which contain rare and endangered plants and animals, municipal water supply sources and Christmas tree farms.

Select plant species that will enhance the needs of desired wildlife in the area.

Design and layout should include enhancement of multiple uses.

Consider beneficial and other effects of installation of the fuel break on cultural resources and threatened and endangered species, natural areas, and wetlands.

Prescribed grazing may be used as a management tool to reduce understory fine fuels.

Location

Attempt to locate fuel breaks near ridge crests and valley bottoms. If winds are predictable, fuel breaks can be located perpendicular to the wind and on the windward side of the area to be protected.

Fuel breaks are most effectively located in the following areas:

a) along ridges, where fires naturally slow their progress under most conditions;
b) 100 feet to 200 feet around structures, where fires are likely to start;
c) along roads, power lines, and pipelines, where openings already exist;
d) around wet areas, rock outcrops, mined areas, and other topographically strategic locations where fire spread may be reduced;
e) adjacent to areas where fuel reduction treatments, such as thinnings and surface fuel treatments, have already been done, where fire intensity and spread are already reduced;
f) connecting to existing fuel breaks, to expand protected areas in a systematic way;

Existing barriers must be considered. These include rock outcrops, streams, water bodies, swamps, and cover with naturally low flammability, and artificial barriers such as roads and railroads, power, gas, oil and telephone rights-of-way.

Horizontal Separation

Understory shrubs, such as manzanita, *Ceanothus* species, and California coffee-berry, should be separated by specified distances according to the average width of the shrub crown (plant foliage) as measured from the dripline*. Shrub species are a natural component of the ecosystem and single plants or clumps, representative of the pre-treatment stand, should also be retained as spacing goals permit. Hardwood sprout clumps may be considered as shrub species or as tree species according to management goals.

When the overstory is sparse or nonexistent residual vegetation should be left grouped in islands or strips when feasible and compatible with the present vegetation type, with the size of the islands/ strips determined by terrain and types of vegetation. Edges of the fuel break and islands in should be scalloped or free-form for esthetic purposes.

Tree species should be retained across the treatment area in the approximate proportion they represent before treatment.

If the area in which the fuel-break is installed is being managed for production of commercial timber or maintenance of overstory hardwoods, additional trees should be recruited from the understory to eventually grow into the overstory.

As existing overstory trees die, fall over, and/or are harvested, the resulting openings can be occupied by seedlings and saplings of tree species that are retained during maintenance treatments

Pruning

Do not prune trees excessively, so as to reduce the percentage of the bole occupied by live, healthy branches to less than 40%. If retaining 40% of the bole in live crown will result in inadequate clearance between understory and overstory vegetation layers or between surface fuels and understory vegetation, the spacing between understory vegetation and/or overstory trees should be increased by removing the understory vegetation.

Hardwoods

Hardwoods are less flammable and provide valuable wildlife habitat and species diversity. Where hardwoods are present in the pre-treatment stand, provisions should be made for their representation within the fuel break. Fuel break areas with a wildlife habitat emphasis may include a higher proportion of hardwoods than areas where conifer timber production is emphasized.

Slash Treatment

Successful fuel-break installation requires that fuels created by thinning and pruning of vegetation be disposed of or otherwise treated so that the resulting fuel bed will neither initiate a crown fire within the fuel break nor increase the

rate of spread of a fire through the fuel-break during average severe fire weather conditions

Wherever feasible, slash generated by fuel break construction should be disposed of by hauling away, masticating, chipping on site, piling and burning, and/or broadcast or jackpot burning. Slash should be disposed of within four months of the start of operations except when burning is employed.

Lopping and Scattering Exception: On steeper slopes and in some situations on gentle slopes, it may be unnecessary from a fire safety standpoint, or impractical for safety, environmental, or economic reasons, to treat all slash by the above methods. All, or a portion of the slash may then be treated by lopping and scattering, provided that these situations are defined and approved by NRCS staff or a qualified Technical Service Provider prior to installation.

Wildlife Considerations

Fuel break construction may accomplish the intended fuel reduction goals while accommodating wildlife occupancy. The following measures should be included into fuel break installation, as feasible, on a site-specific basis.

a) Retain a maximum of 5-6 logs/acre (either pre-existing or created by treatment) =>10 inches in diameter and =>10 feet long. Logs should be scattered (separated from other logs by at least twice their diameter), situated well away (at least 6 feet horizontally) from the base of trees, and limbed so that no protruding limbs can carry fire into other vegetation.

b) Retain islands of preferred browse plant species (e.g., buckbrush, deerbrush, and mountain mahogany). Separate islands of understory species as per the clump spacing specifications. On average, islands of browse plants should occupy no more than 20% of the fuel break.

c) If heavy equipment is available, create root-sprung stumps by uprooting portions of the stumps, to create ground cavities for burrowing species.

d) Install boxes on trees to maintain habitat for birds and mammals that require cavities for nesting and denning.

e) In mixed conifer-hardwood stands, retain at least 10% of the residual stand in hardwood species.

Snag Treatment

Retention of snags is generally incompatible with fuel break installation; because the dry, dead wood within a snag has the potential to easily ignite. Turbulent air during a fire can then readily transport embers from snags into unburned areas, causing spot fires. However, short snags (under 20' tall), especially large diameter 'soft' (rotten) hardwood snags, pose much less danger of fire spread and may be left.

a) If the fuel break is on a ridge, fell all dead trees (snags) for a distance of 100 feet on either side of the ridge.

b) In other areas, fell all snags that are greater than 20 feet tall within and for a distance of 20 feet on either side of the fuel break. Utilize felled snags as logs for wildlife habitat.

Slash produced in the establishment of a fuel break that is not removed from the site will be treated or arranged to enhance wildlife habitat.

CULTURAL RESOURCES CONSIDERATIONS

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

http://www.nrcs.usda.gov/technical/cultural.html is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

ENDANGERED SPECIES CONSIDERATIONS

If during the Environmental Assessment NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, and narrative statements in the conservation plan, burn plan, or other acceptable documentation.

Specifications for applying fuel-breaks will also include:

For trees and shrubs:
(1) species to be favored;
(2) spacing after thinning or weeding;
(3) methods of removal;
(4) best season for cutting or treating chemically;
(5) disposing of slash;
(6) special treatments, if needed, to forestall the spread of disease, fungi, or insects.

For herbaceous species;
(1) dates of growth periods for effective treatment;
(2) acceptable alternative materials, equipment, and methods;
(3) types of areas, patterns of vegetation, and kinds and amounts that should be favored (left);
(4) maintenance and management needed to follow management treatment.

For biological treatment methods:
(1) kind of biological agent or grazing animal to be used,
(2) timing, duration, and intensity of grazing or browsing,
(3) desired degree of grazing or browsing used for effective control of target species,
(4) maximum allowable degree of use on desirable non-target species,
(5) special precautions or requirements when using insects or plants as control agents.

OPERATION AND MAINTENANCE

A maintenance plan will be prepared which shall list various items that are to be inspected and follow-up work to be conducted.

The more open the overstory is following fuel break construction, the more maintenance will likely be required, because the openings that are created encourage establishment and growth of understory vegetation, compared to more shaded areas.

Fuel breaks should be inspected annually and all downed woody material =>2 inches in diameter must be disposed of or treated.

Repair erosion control measures as necessary to ensure proper function.

Access by vehicles or people will be controlled to prevent damage to the fuel break.

Maintain the functionality of the original design throughout the life of the practice.

Maintenance of the fuel break must be conducted at least every three to five years, to the following specifications:

a) Treat (mow, spray, browse) or graze vegetative fuel breaks to avoid a build-up of excess litter and to control unwanted vegetation.

b) Remove lower tree and/or shrub branches that have died and stumps that pose a fire hazard.

c) Properly dispose of slash created by maintenance.

d) Inspect all fuel breaks for woody materials such as dead limbs or blown down trees and remove them as necessary to maintain the desired level of fire spread risk.