

10. FUELS AND VEGETATION IN RESIDENTIAL DEVELOPMENTS

Major wildland fires do not occur just in large acres of heavy fuels. Major fires and major losses can occur in any fuel type when all of the "right" conditions are present. All vegetation is flammable to some extent. However, the intensity and speed of spreading fire depends upon the time of year, the moisture content of the fuels, the weather, the topography and the size and arrangement of the fuels. Fine fuels such as grass can ignite easily and will burn very fast while generating little heat. Grass fires are generally easy to extinguish. Heavier and larger fuels are hard to ignite and generally burn very hot and slow, are more difficult to distinguish and generate a lot of heat. Fatalities and damage to resources and property can occur under a wide range of conditions and fuels. Treatment of wildland fuels includes modification of the size, arrangement and type of fuel to reduce the probability that a fire will start and reduce the subsequent damage.

10.1 Fire Resistive Landscaping

If enough heat is present, almost any plant will burn. The objective of fire resistive landscaping is to reduce the heat available and reduce the chance of ignition. Fire resistive landscaping combines native or ornamental plants with proper placement and proper maintenance. The key is separating plants vertically and horizontally to prevent fire spread and extension. If proper clearance of flammable vegetation has not occurred or where a fire resistive landscaping has not been planted, some insurance companies add a surcharge to the home insurance policy.



Photograph 10.1.
Fire Safe Landscaping

A listing of information and properties of some common landscaping plants was developed by the University of California Forest Products Laboratory. This *Defensible Space Landscaping in the Urban/Wildland Interface: A Compilation of Fire Performance Ratings of Residential Landscape Plants* is available through the Forest Products Lab and may be viewed on their Web Page <http://www.ucfpl.ucop.edu>. In addition, the Cal Poly, San Luis Obispo Home Page <http://www.calpoly.edu> contains a good reference guide on growing characteristics for a large number of trees, including heights and recommended growing space requirements.

10.1a Climate and Environment

Obviously, some species are better than others. More importantly, some plant species just won't grow in certain climate zones. Consult your local nursery, fire department or CDF for proper selections in your area. Consideration of soil protection and visual impact during fuel modification planning is essential to a successful project. However, inappropriate modification of the native landscape can create serious problems such as slope failures, soil erosion, damaged wildlife habitat and reduced visual quality. Proper planning and consultation with experts can prevent this from happening. Before modifying your landscape, contact your local nurseryman, extension specialist, fire department or CDF.

10.1b Placement

The placement of landscaping plants is a key element of a fire resistive landscape. Large trees should be located away from the house, and large shrubs should not be planted under the eaves, right next to the house. Vary the height of the landscape plants and space them so fire can't travel from one plant to another. Eliminate ladders of fuel from low-growing plants to shrubs to trees that can allow fire to spread into the crowns of nearby trees. Trees over 12 feet tall should have the branches on the lower one-third of the trunk pruned and removed. Trees over 18 feet tall should have all limbs within six feet of the ground removed. As landscaping progresses farther from the house, taller plants can be retained or planted.

10.1c Landscaping Zones

Landscaping zones may protect the surrounding vegetation of damage from a home fire, but does not protect a home from wildfire. Many experts recommend a zone approach to fire-safe landscaping. Where the property is large enough, landscaping close to the house, out to 30 feet, requires irrigated, low-growing plants. The next zone, from 30-70 feet, allows medium-height shrubs and individual trees. The final zone, beyond 70 feet, allows selectively thinned brush and trees, preserving the native, natural landscape look. The distances stated here are only a general guide. Each zone landscaping approach recommends different distances. Contact your local fire department or CDF for site specific information.

10.1d Brush and Timber Stands

Dense stands of brush or timber must be thinned to reduce the volume of fuel and reduce the opportunity for fire to spread from tree crown to tree crown. Separate all trees and individual brush specimens by at least 15 feet horizontally and six feet vertically. Trees should be pruned to at least six feet in height to eliminate "ladders."

10.1e Maintenance

Once a fire resistive landscape is established, it must be maintained. Regularly remove dead branches, litter, needles and leaves and weeds. Keep shrubs and trees neatly pruned. In many locations, burning of debris is not allowed and hauling cut vegetation to the dump is not recommended. Consider chipping material for use as compost to improve watering efficiency. Remember to maintain an appropriate irrigation schedule that is beneficial to the plants selected. Consider drip irrigation to conserve water and reduce growth of weeds.

10.2 Fuel Modifications

Global fuel modification requires two elements, identification and implementation. It is not enough to just identify those areas of extra-hazardous fuels, to delineate areas that need modification or determine where fuel breaks should be constructed to concur with development. Implementation before development occurs is the key. Once development has occurred, land ownership patterns preclude bringing hundreds of owners into a cooperative agreement. Before development begins, the only owner is the developer. Establish the agreements and begin to modify the fuels before development occurs. Locate strategic fuel breaks and secure the rights-of-way authority, establish land conservation zones and open space available for defensible space. Don't forget to ensure that maintenance of these fuel modification zones is applied on a regular basis and that funding is secured. The planning element has already been described in the Strategic Fire Planning section. The identification of a strategic plan should be included in the city or county general plan.

10.2a Objective

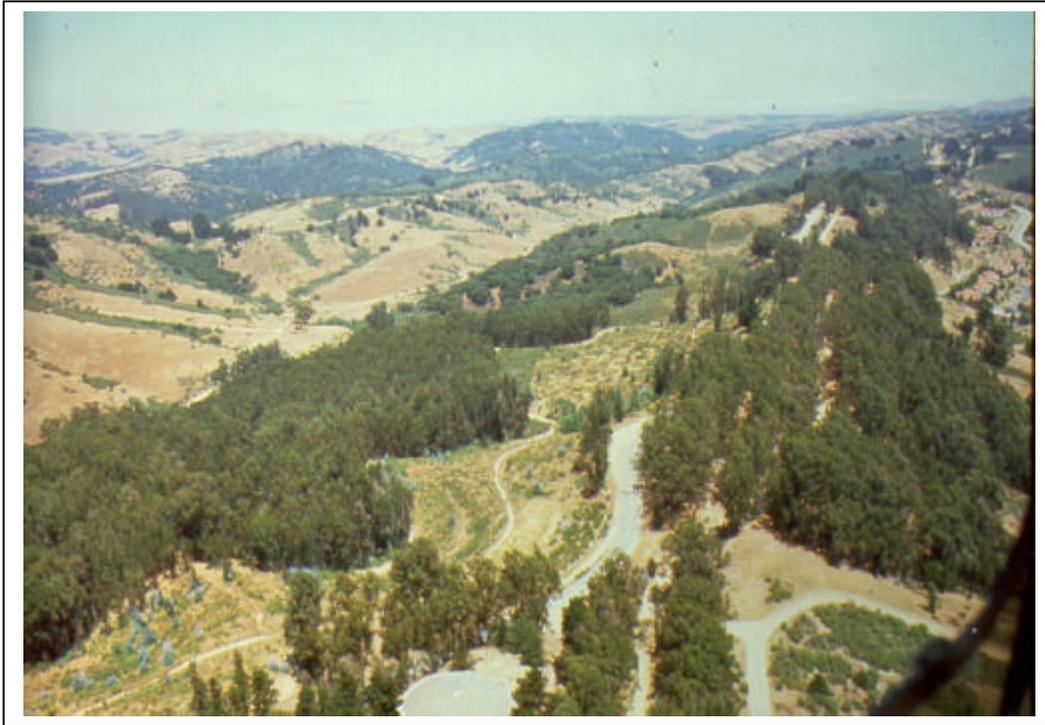
The purposes of strategic fuel modification are to separate communities or groups of structures from the native vegetation and break up large expanses of flammable fuel into smaller blocks, all with the purpose of reducing fire loss and damage.

10.2b Fuel Breaks

A fuel break is a strip or block of land on which the native vegetation has been permanently reduced and/or modified so that fires burning around it can be more readily and safely controlled. Fuel breaks are generally constructed to separate communities and clusters of communities from the native vegetation, in order to protect both the developing area and the adjacent wildlands. They are most commonly found along ridgelines where fire control efforts are focused. The most advantageous location and design must be individually determined after considering fuels, topography, weather, exposures and other constructed or planned improvements.

Fuels within fuel breaks are reduced in volume through thinning or pruning, or are changed to vegetative types which burn with a lower intensity and offer less resistance to fire control efforts. Fuel breaks are not intended to stop a rapidly moving fire, but to correct two conditions that have limited the effectiveness of fire control: the difficulty of quick, safe staffing of critical line locations when needed and the need for widening many fire breaks before they can be used effectively. Fuel breaks are not expected to control a fire in themselves, but provide points of access to facilitate control of the flanks and provide possible backfire action in the face of an advancing fire head. A fuel break system may utilize existing federal, state, county or local road systems. Most fuel breaks include roadways for vehicle access, or other continuous strips cleared to mineral soil, which serve as a barrier to the spread of fire through the fine fuels or as a line from which to backfire.

Obtaining landowner(s) approval and/or cooperation to construct a fuel break on private land can be difficult if there is no plausible benefit to the landowner. Without the landowner's approval and cooperation, the construction of a fuel break may not be feasible. If a landowner does not want to cooperate, there is generally no legal avenue to pursue. Generally a strong, effective community education program will help convince landowners of the need for cooperation. This effort can be greatly enhanced with a coordinated approach from the various entities of government that are, or will be, involved in the planning, construction and maintenance of a fuel break.



Photograph 10.2.
Fuel Break

10.2c Fuel Break Construction

A fuel break is a natural or constructed barrier used to stop or check fires or to provide a control from which to work. A fuel break is normally scraped, dug or bladed to mineral soil. The basic use and purpose of a firebreak is similar to that of a fuel break: to minimize the spread of fire from any of the included occupancies or uses to surrounding wildland areas.

The planned construction of firebreaks is no longer as common as it once was. Firebreaks are not aesthetically pleasing and can often cause serious erosion and soil stability problems. When a firebreak is the desired or required fire defense improvement, adequate environmental protection must be considered. Soil stabilization, erosion prevention measures and long-term maintenance requirements must receive thorough consideration during the planning and construction phase.

10.2d Greenbelts

A greenbelt is an area of green vegetation, usually irrigated and landscaped, used as a buffer zone between developed or developing areas and wildlands. Greenbelts are designed for additional uses such as golf courses, parks and occasionally farmland. Some other greenbelts include parking lots, ball fields and other

areas that may not normally be considered to provide wildland fire prevention.

Greenbelts are similar to fuel breaks and quite often are integrated into a fuel break system. The major difference is that greenbelts are generally irrigated areas that have additional land use functions. Special consideration must be given to visual and environmental impacts during the greenbelt planning phase. Provisions for continued maintenance must also be considered. This provision may require an assessment-fee system to a homeowner's group or to an entity of local government.



Photograph 10.3.
Greenbelt and Fuel Break

10.2e Converting Fire Breaks to Fuel Breaks

An important but often overlooked aspect of the fuel break and greenbelt planning effort is the conversion of a fire break built during the suppression of a wildfire. Often fire breaks constructed by bulldozers to halt the advance of a fire are ideally located for continual maintenance as a fuel break or even a greenbelt. Immediately after a fire of any significance, public awareness and interest is highly focused on the need to prevent similar fires. This public interest should be used to gain property owner concurrence to convert a suppression firebreak into a fuel break or greenbelt. At any rate, firebreaks should be “winterized” to prevent excess erosion during the rainy season by placement of water breaks and scattering of limbs and other woody debris across them to intercept rain.

10.3 Fuels Management

Fuel management is the planned manipulation or reduction of living or dead vegetation to prevent the ignition of wildland fires and to reduce the rate of spread and intensity of any wildfire.

Intensive fire protection provided by CDF and all fire agencies has produced contradictory results. Fire protection has been, for the most part, efficient in safeguarding natural resources, life and property. It has

also been a major contributor, however, to a gradual buildup of living and dead vegetation that, under critical burning conditions, has fed disastrous wildfires.

California's Mediterranean-type climate promotes the rapid growth of natural vegetation. Much of this vegetation dies each year and accumulates on site. Annual plants leave their total volume at the end of each growing season. Perennials renew their parts regularly and continually shed their leaves, twigs and branches. Whole plants die from old age. The result is a natural accumulation of flammable fuel that varies from one-half ton to three tons or more an acre per year.

Natural events can cause even more rapid accumulations of fuel. Drought, blowdown, snowdown, freezing and attacks from animals, insects and diseases can result in a build-up of large quantities of dead vegetation within a short time. Also contributing to the volume of dead fuels are activities such as timber harvesting, road construction and the development of subdivisions.

California's Mediterranean-type climate also discourages rapid decomposition of the dead vegetation, allowing vegetative matter to accumulate year after year. Normally this litter would be removed by nature through periodic fires started by lightning. However, wildfires are no longer permitted to remove or reduce the build-up of fuel as they did before the era of organized fire protection. Consequently, the quantity of fuel continues to increase in California's wildlands.

The inevitable result, especially during critical burning conditions, is a steady number of high-intensity conflagrations each year. These conflagrations are difficult, if not almost impossible to stop, and they often destroy thousands of acres of natural resources, hundreds of homes and other structures. Prescribed fire and controlled burns should be encouraged, under proper conditions, to assist in removing hazardous fuel accumulations and managing the remaining fuels. CDF can provide technical and professional assistance in fuels management.

In relation to this fuel management necessity, research has been conducted by the UCFPL regarding the use and disposal of accumulated fuels, termed biomass. This project is designed to identify the key issues in biomass utilization and to thoroughly describe the raw material potential of the various types of forest-based biomass materials. The results of the project will be directed towards identifying research needs, helping frame the issues at the community and state levels, and disseminating knowledge and technology. For more information on this project, go to <http://www.ucfpl.ucop.edu/biomass/woodybio.htm>.

10.4 Fire Resistive Vegetation

Fire resistive plants are generally low-growing, have a low sap or resin content, grow without accumulating quantities of dead branches, needles or leaves, are easily maintained and pruned and are preferably drought tolerant (low water users). The species may be native or ornamental. However, it has been determined that most publications on fire resistant vegetation have not relied on "actual" tests, but only on intuition or reputation. A list of fire resistive vegetation is available on the Internet at <http://www.ucfpl.ucop.edu>.

10.5 Protecting and Enhancing Native Vegetation During Construction

Many homebuilders elect to retain native vegetation as the predominant landscape plants in their yards. Native vegetation is adapted to the climate and soils and has already established itself. There is no need to wait for plants to grow into their ultimate size to see if they suit the homeowner's vision.

However, it should be recognized that human involvement or interruption of natural processes to build roads and homes could be very threatening to the health of native vegetation. Surface compaction and mechanical injury of the trunk or stem cause much of the damage. The negative effects may become evident immediately or may begin to show over time.

In addition to direct damage and injury, many construction and development activities create conditions that weaken native vegetation or that favor insects, pests and diseases. The result is additional fuels available to wildfire. An excellent reference for the builder or contractor, *Protecting Trees When Building on Forested Land* (leaflet 21348), is available through the University of California, Cooperative Extension. General considerations include:

- Reducing the density of trees so that those remaining will have sufficient light, moisture and nutrients.
- Removing trees that are close to or that will interfere with proposed roads, foundations, septic systems, driveways and utility corridors.
- Selecting remaining trees for health and vigor, aesthetics and the ability to provide appropriate shade and visual and wind screening.
- Avoiding trees that will require roof modifications or decks to be built around them, that are most likely to be damaged during construction and that will have their health compromised due to site changes such as moisture and soil level.
- Maintaining a mixture of ages; allowing older trees to be replaced by younger, healthier trees.
- A tree that is the right size now may be too big in a few years -- plan ahead.
- Select native vegetation that has good vigor. A local nursery and forester can assist in identifying the correct trees and shrubs to keep.
- Fence around trees and shrubs at the drip-line to avoid damage by construction activity and equipment.
- Minimize grading and soil movement.
- Utility trenches should be kept away from "keeper" trees. Tunnel if activities must encroach in their root zone.
- Do not backfill or change the grade immediately around trees. Build a stone or concrete well to protect the original grade around the tree.
- Asphalt and other hard surfaces can prevent or significantly reduce the amount of water reaching the roots of a "keeper" tree.
- DO NOT attach utility wires or lines to trees.
- Frequent watering of lawns and flowerbeds can damage the sensitive root systems of native species.

10.6 Urban Forestry

It may seem strange to see the term urban combined with the practice of forestry. Yet, the urban exodus and rural community growth in California have brought with them many urban environment problems and have created many new ones. Many communities in rural California are now landscaped with urban forests. Urban and formal landscape vegetation is mixed with rural and native plants, and all are intermixed with homes and businesses. Failure to deal with the problems associated with rural growth may create a landscape that is unhealthy, dying, lacks vigor and is aesthetically unpleasant. In addition, conditions may foster and promote an increased fire hazard.

10.7 Project Learning Tree

Education is needed to increase awareness, knowledge, and critical and creative thinking skills. The California Project Learning Tree (PLT) program is part of an international network of parents, educators, resource professionals, members of community and environmental groups, and the forest products industry.

PLT provides educators, working with children in grade preK-12, with an effective environmental education program that uses the forest as a “window” into the natural and built world. In California, PLT is sponsored by CDF and is managed by one State Coordinator and a cadre of volunteer facilitators, supporters and a statewide advisory committee. For more information visit their website at <http://www.plt.org>.

10.8 Weed Abatement Ordinances

The maintenance of defensible space around the home is as important as a fire resistive roof in protecting a home from wildfire. The state law for clearance of flammable vegetation was discussed in an earlier chapter. Many local jurisdictions also require clearance of flammable vegetation. In a community setting, this may take the form of clearance of vacant lots within a subdivision. In a more rural setting, this may be similar to the state clearance law, though most local jurisdictions require clearance well beyond the 30 feet required by state law. In either case, if a landowner fails to provide the required clearance, the jurisdiction has a contractor clear the lot or property and bills the property owner. Failure to pay the bill enables the placement of a lien on the title of the property. You should contact your local fire department for further information. An excellent example of a weed abatement ordinance is the [*Riverside County, Idyllwild Weed Abatement Ordinance*](#).