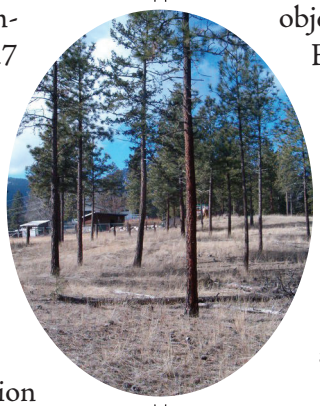
What is Fuel Management?

As a result of past forest management practices and policies, particularly suppressing wildfires, our forest ecosystems have been drastically altered. Many of our current forests have larger continuous tracts of timber with denser canopies, lower canopy base heights, and higher surface fuel loadings. These conditions allow wildfires to burn hotter and spread faster. This can result in a serious wildfire hazard to the public and developments in the Wildland/Urban Interface (WUI), where man-made structures and forests meet.

The Provincial Strategic Risk Analysis completed in 2004, has mapped and identified 1.7 million hectares of forest land in and around B.C. communities that may require treatment to reduce the wildfire hazard, including 460,000 hectares which may be affected by mountain pine beetle. Beetle affected stands within two kilometers of the WUI are the highest priority for assessment and treatment.



Widely spaced and pruned ponderosa pine trees with low surface fuels build up.

Fuel management involves the modification of a forest structure to reduce forest fuel accumulations available to burn in a wildfire. It is also commonly referred to as wildfire hazard reduction or wildfire mitigation. For the Ministry of Forests and Range Protection Branch, the main goal of fuel management is improving public safety through; the reduction of wildfire intensities, the reduction of potential for crown fires, improved wildfire suppression success, improved firefighter safety, and improved forest resilience to wildfires.

Fuel management will not eliminate wildfires. It can reduce their intensity and potential for impacting adjacent communities and can also increase wildfire suppression success as treated areas will be safer to work in, and aerial firefighting tools more effective.

FUEL MANAGEMENT TECHNIQUES

The main techniques used to conduct fuel management include:

Spacing or Thinning

Spacing involves the partial or selected removal of entire trees from the stand. Spacing removes a portion of the forest canopy and lowers canopy closure or crown bulk density (volume of crown material). This reduces the opportunities for crown fires to move quickly and easily from tree to tree, through a stand. The felled trees must be removed from the site or the spacing treatment will not be effective.

There are many types of thinning operations. Thinning from below is the most common treatment for fire hazard reduction. Thinning from below removes intermediate and suppressed trees from the lower crown. This can reduce crown fire initiation and potential wildfire spread through the crowns of the trees. Creating even aged stands should not be the objective or result of spacing as a fuel treatment. Even-aged stands are susceptible to the same forces of nature. One outbreak of a pest or disease could destroy the entire stand. Common spacing standards include reductions to 40% canopy closure, or inter-tree distances of 1.5 times the crown width. Spacing standards will vary with tree species, diameter and height, slope, terrain, aspect and other factors.

Deciduous trees such as aspen, birch and maple are water-based, as opposed to oil-based conifers. These trees are not as flammable as conifers and should be considered the target species for retention during spacing operations in high wildfire hazard areas or as firebreaks in other areas. Converting a coniferous stand into one dominated by deciduous trees, referred to as species conversion, will greatly reduce overall wildfire hazard to an adjacent community, to a watershed and across the landscape.

Pruning

Pruning involves the removal of the lower dead and live branches on trees, often referred to as ladder fuels. Pruning is often conducted after spacing, when the lower branches are too close to the debris accumulated on the ground (surface fuels). Pruning raises the crown base height in a stand, reducing the opportunity for surface fires to move upwards into the tree crowns where they are difficult to control and pose the greatest risk to structures and public safety. Care must be taken not to harm the trees by stem scarring or removing too much of the crown. At least 40% of the live crown should be retained to maintain a healthy, vigorous tree. The prescribed pruning height is site specific and can vary with tree diameter and height, crown closure, surface fuel volumes, and slope.

Surface Fuel Reduction
Reducing the amount and organization of the surface fuels can reduce wildfire intensities and the fire rate of spread. The finer, dry fuels such as needles, twigs, cured grasses and brush, and spacing and pruning debris should be targeted for surface fuel treatments. These are the fuels that ignite easily and burn readily, allowing wildfires to spread. Reduced surface fuel can be accomplished by many means, including prescribed fire, mechanical piling and burning, mulching, chipping and hauling, or a combination of these methods.

Some larger downed material, called coarse woody debris (CWD), should be retained. CWD provides nutrients, wildlife values and diversity to a site, without contributing significantly to wildfire rate of spread. Retained CWD should be well spaced out, not left in piles, criss-crossed or elevated.

Timber Harvesting
Harvesting of timber has a practical use as a method for reducing crown closure and volume of timber in the Wildland/Urban Interface. It is very effective in areas of dead trees, such as those attacked by beetles and multi-aged stands. Thorough site assessments, strict harvesting prescriptions and close supervision are necessary to ensure success. Site impacts can be severe on sensitive soils, near riparian areas, or landing locations where the timber is decked before removal. In multi-aged stands, harvesting should target the intermediate aged trees, leaving the veterans and healthy regeneration. In even-aged stands, or those prone to windthrow or root rots, patch cuts are an effective method of timber removal. Harvesting is the only fuel management treatment that provides some potential for cost recovery.

Fuel management is almost always a combination of treatments. Surface fuel reduction has been found to be the single most effective fuel management technique. Maintenance of fuel management treatment areas is required. The amount of maintenance will depend on the intensity of the treatment and the standards established for maintenance. All treatments should be designed to exceed the established maintenance standards so that further treatments can be delayed for a number of years. Surface fuel treatments typically require the most maintenance.

Not All Fuel Treatments Reduce Wildfire Hazard
Conducting fuel management treatments can have favourable or adverse effects on a forest stand. Not all fuel treatments reduce wildfire hazard. By completing spacing, pruning and surface fuel treatments a stand is opened up to wind and sun. The forest stand can now be drier for longer periods, have more grasses and other surface fuels, and have more wind reaching the surface. This can create conditions where a potential hot, intense, fast-moving crown fire is replaced with a less intense, but still fast-moving surface fire. A surface fire is safer and easier to suppress, but can still be a threat to adjacent homes and structures. The effectiveness of all fuel treatments can also be reduced by steep slopes and extreme winds.

There is no one fuel management treatment, or combination of treatments, that will be successful in all forest stands. Each forest is a unique ecosystem with its own forest health, past forest management, and fuel loading issues. Many stands may require multiple entries, years apart, to achieve the desired wildfire hazard reduction results and minimize site damage from wind, snow and other environmental impacts. There are many other considerations for fuel management planning and implementation. These may include water quality, soil conservation, site stability, cultural issues, wildlife habitat, species at risk, forest health, aesthetics and timber production.

Fuel management planning and implementation must be ecosystem based, be tailored to each unique forest stand, and be implemented by highly-trained and supervised equipment operators and crews. Fuel treatments in the Wildland Urban Interface will be held to the highest standard possible by the public and community minded groups.

For More Information
www.ground.hpr.for.gov.bc.ca/

UNION OF BRITISH COLUMBIA MUNICIPALITIES

FOREST SERVICE BRITISH COLUMBIA

Prepared by Bruce Morrow, R.P.F., — a forest consultant from Kamloops, B.C. specializing in Wildfire and Fuel Management. March 2007