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Silvicultural Decisions XI: Can Fire Hazard Reduction Treatments Help Achieve Other Silvicultural Objectives?

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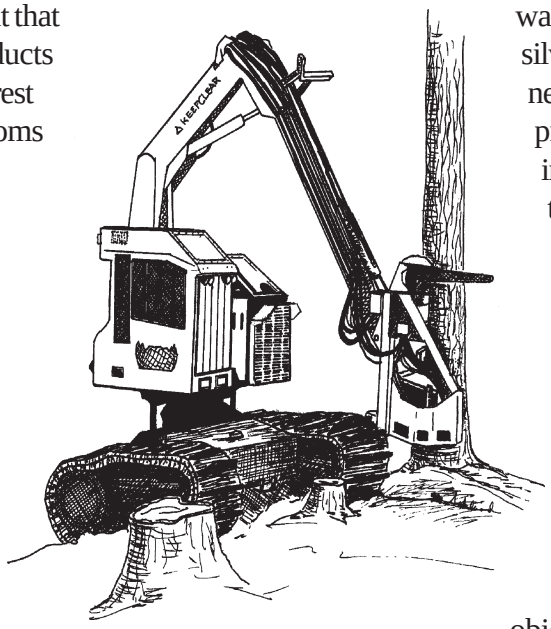
Pacific Northwest forests are generally managed to meet landowner objectives, whether held by a private individual or family, a business or trust such as industry or tribal lands, or public land. These objectives may be narrowly focused on specific products such as timber, but more commonly broadly focus on natural resource management that integrates timber and other products including wildlife and special forest products (floral greens, mushrooms etc.) along with less measurable assets often collectively described as *aesthetics*. Increasingly, social impacts and values are included as priority objectives.



Widespread recognition of the biological and financial hazards of decades of fire suppression and resultant high fire-risk forest conditions has led to extensive fire hazard reduction practices. Specifications for hazard reduction are often based solely on producing a more fire resistant forest stand or landscape. Plans for reducing and managing fuel hazards may meet other forest management (silvicultural) objectives such as forest health, aesthetics, and productivity with modifications and additions, or poorly address them.

Recently, I visited the *Coeur d'Alene Tribal Forestry Fuels Treatment Project* with Tribal Fuels Forester Eric Geisler and several other UI professors. The Tribe had implemented treatments that tested the fuel hazard reduction effectiveness of several machines and different mechanical cutting tools. We now are collaborating to develop a post fuels-treatment project that will measure the effectiveness of alternative vegetation management methods to maintain effective fuel hazard reduction. During our field examinations of the Tribe's fuels treatment project, it was very apparent that multiple silvicultural objectives were simultaneously achieved. A silvicultural prescription for multiple objectives, including timber production, in these stands would have paralleled the fuel hazard reduction plan that was applied. In this instance, the mechanical fuel treatment specifications developed by the Tribe and Tribal natural resource managers showed that they recognized and included many timber and social considerations in developing treatments that met multiple resource objectives under the primary objective of fuels reduction. While other site and forest vegetation situations, and certainly other ownership's constraints especially on public lands, will make this approach of meeting multiple objectives with fuels treatments unrealistic, this specific situation is an excellent example of where it works and why. Hopefully, the information presented in this article will help other landowners and resource managers think more broadly about good silviculture on a stand and landscape level when managing fire risks through fuels reduction.

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The Coeur d' Alene Tribe owns some 30,000 acres of trust land, and currently intends to treat the majority of the forested land in their fuel reduction project. Much of the 20,000 acres in these initial priority treatments are in small blocks of forests bounded by roads, homes and other tribal structures, cultural areas, and riparian and other sensitive sites. Consequently, there are many potential sources for ignition as well as many ecological, financial, social and cultural properties and resources to protect. Although some of the treated areas serve essentially as fire-resistant buffers for these other values, entire forest stands will be treated, following current trials to show which mechanical treatment is the most effective and efficient. Following initial fuel reduction treatments a new Tribal project in partnership with the University of Idaho will conduct experiments to test alternative strategies to maintain desired fuel levels. Post-treatment management would seem to be an obvious requirement, but many land owners and managers have made fuels reduction treatments with no provision for continued maintenance. The amount and species composition of regrowth and in-growth of vegetation, including invasive species, is a critical aspect of sustaining targeted fuel levels.

It is no accident that the Coeur d' Alene Tribal forest was much closer initially to the "prescriptive ideal" for the sites we visited than many other forests on similar habitats. The Tribal forest has sustained fire suppression for a much shorter time (about 40 years vs 80-100 years for much of the regional forest landscape). Historically, both Tribal Trust lands and individual forest land allotments were regularly under-burned by tribal owners and managers until the later 1960's. At the same time, Tribal cultural values and ecological understanding led to favoring large, healthy trees. In this landscape, that meant the seral species including ponderosa pine, Douglas-fir, western larch, and western white pine, species that continue to be favored to retain in fuels treatments and other Tribal management specifications. Consequently, a well-stocked overstory of seral species was present on all of the forest sites we visited. The understory is composed of diverse, largely native species that will be retained or removed to sustain wildlife and cultural values while reducing fire hazards.

A closer look at some of the stand conditions and fuels treatments, and their silvicultural implications, illustrates how compatible these management goals are, and reveals factors other land owners and managers might consider in fire hazard reduction prescriptions:

- The habitat types in this situation are primarily in the grand fir series ranging from its drier to wetter phases. The climax species, grand fir, is near the margin of its ecological limits for growth and will be the first species to experience stress and associated forest health problems. Some of the hazard reduction sites are at the wetter end of the Douglas-fir series or at the drier end of the western redcedar series but in general, the species designated to leave under fire hazard reduction, ponderosa and white pine, western larch, and Douglas-fir, are the same tree species I would prefer under a silvicultural prescription where the objective is forest health, sustainable timber production, stable, diverse habitats and consideration of appearance, accessibility, and resistance to fire.

- The tree species designated to remove in the fuel treatments are all grand fir, and commercial-sized lodgepole pine, along with any other species of poorer form, smaller, or less healthy than the nearest designated leave tree within 15 feet. This provides some commercial harvest during the treatments, and future harvest while suppressing establishment and growth of undesirable understory vegetation and conifer regeneration. This designation is compatible with most silvicultural goals, but the spacing of leave trees, 15 feet, would be more variable and likely wider depending on tree size, if timber productivity was a primary objective.

- The pre-treatment understory in these forests is a diverse composition of native species typical of the grand fir habitat types and is dominated by tall and medium height shrubs, with forbs and grasses and few invasive weed species. The understory also has significant conifer regeneration that is highly

variable in distribution and species. The preferred shrub species to leave include large scattered clumps of Rocky Mountain Maple as the highest priority species, along with service berry and chokecherry, bittercherry and other fruiting species for wildlife habitat. In addition, riparian areas are designated as preferred habitats to leave clumps of these taller species, along with shrub willows, aspen and lower, moist-site vegetation. Snowberry is left where it is shorter (<15"), but is designated for removal where it is taller and/or forms large blocks of continuous cover.

- Tall, dense clumps of shrubs are left primarily for wildlife habitat, particularly in riparian areas. Riparian vegetation, whether along streams or on seeps and other wetter, micro-habitats, will also stay more green and have higher moisture content through the typically dry summers. Retaining this vegetation in scattered, more green and moist clumps, will add little to the fire risk on these sites and add greatly to wildlife habitat and visuals. Retaining tall, dense clumps of maple also increases site stability. Rocky Mountain maple typically grows on spots with sub-surface irrigation from cresting water tables. It is also found on seeps that may form vernal pools in the spring (important habitat for many amphibians).Maple clumps stabilize wet-soil microsites that would be subject to compaction or slumping if removed with mechanical equipment or located in or just above roadbeds. These are important factors to consider in silvicultural prescriptions for any objective.

- Removing undesirable tree species and excess, defective trees in the overstory certainly accomplishes fire reduction and timber goals. Treating clumps of young conifer regeneration and scattered, suppressed trees is equally important. Tribal specifications designate pines, larch and Douglas-fir as preferred seedling/sapling leave trees, and require a spacing of about 15-18 feet, and a little closer in a few evenly-spaced plantations. This treatment also meets the objectives of managing the composition of the current forest and its options for future regeneration, and of maintaining a healthy, productive and diverse forest.

- Removing shrub species with lower wildlife value and higher fire-risk characteristics, especially ninebark, oceanspray, and taller snowberry, also removes a major component of competition for more desirable, less hazardous understory vegetation and tree seedlings. It also removes the lower level of "ladder" fuels which can lead to devastating crown fires, should ignition occur. Ladder fuel reduction is further achieved through the spacing of overstory and understory conifers, especially by removing grand fir and lodgepole pine, which retain long crowns either as green foliage (grand fir) or through poor self-pruning (both species).

- The treatment specifications also require vegetation designated for removal to be cut at low levels to discourage rapid sprouting or retention of any green growth, and to break both live and dead material into pieces that will put most debris in contact with the ground to encourage decomposition, sustain nutrient cycling, and reduce fuels' continuity and burn rates. A silvicultural prescription should consider the quality of understory and overstory for wildlife habitat as well as timber and other productivity, the need to reduce competition for desired tree, shrub, and lower vegetation, and the reproduction of desired tree species. Silvicultural objectives also may include recreation access and forage production for livestock and wildlife. These fuel treatment specifications achieve these goals, and more importantly, make them economically feasible. In many silvicultural prescriptions, the objective of treating understory vegetation including excess or undesirable conifer reproduction, is often specified but not achieved because of the significant cost of these treatments relative to the value of commodity production alone. This leads to the final point I would like to make about merging fuel reduction objectives with other silvicultural objectives*: the economic and other benefits of fuel reduction treatments on many forest stands will justify the cost of high-priority silvicultural treatments for many additional management objectives that are often not achieved when the timber cost/*

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benefit ratio alone is considered. In many cases, reducing understory competition, managing vegetation composition including conifers and desirable native species of shrubs etc., and discouraging or eliminating invasive species, are recognized as priority objectives from an ecological and long-term productivity and sustainability perspective, but are not accomplished due to financial constraints.

The huge financial and ecological costs of ignoring unhealthy, high fire-risk forest conditions, especially where they could impact structures and threaten human lives, has led to a new era where investments in fire hazard reduction treatments are being made. In some current forests, conditions are such that fuel treatments will do little to address other silvicultural objectives. But many forests designated for fuel reduction present an opportunity to economically address many other silvicultural objectives addressing recreational, ecological, and sustainable timber management goals. At a minimum, fire hazard reduction plans should not only address immediate catastrophic fire risk, but also consider setting the initial conditions that will help resource managers move towards more comprehensive plans and specifications to achieve a broader array of integrated objectives.

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