Recommendations for Wildfire Risk Management and Historic Structure Preservation in the Polallie-Cooper Planning Area and Adjacent Sites on the Mt. Hood National Forest

2 August 2004

Peter Morrison
Pacific Biodiversity Institute

Introduction

Planning for ways to reduce wildfire risk to communities and historic structures is an important element of modern land management. Wildfire risk management is most successful if it is based on the best available science and incorporates reliable information on the ecological characteristics of the target landscape. It is also important to have explicit social and ecological objectives that are realistic and readily achievable with existing management techniques (Finney and Cohen 2003).

Finney and Cohen (2003) show that successful fire and fuel management is dependent on having realistic goals and expectations and then applying fuel treatments at the appropriate scale to the appropriate source of the problems. They clearly state that it is impossible for fuel treatments alone to stop fires from burning or spreading. They also state that structure loss (i.e., homes burning) is highly dependent on the properties of the structure and its immediate surroundings – not the condition of the larger landscape. Responsibility for structure protection resides with the owners of the structure and immediate property, not with public land management agencies. Finney and Cohen describe a *home ignition zone* of 30 meters surrounding structures. They state that activities confined to this zone to reduce the potential for wildfire destruction of a structure can address the necessary factors that determine ignitions and can be done sufficiently to reduce the likelihood of ignition. "Given a wildfire, wildland fuel management alone (outside of the home ignition zone) is not sufficient nor does it substitute for mitigations within the home ignition zone" Finney and Cohen 2003).

Fire management should be based on a clear understanding of the historic fire regime of the target landscape. Information on the fire regimes of relevant Pacific Northwest forests is readily available (Agee 1993, Morrison and Swanson 1990). The fire regime of most of the Polallie-Cooper planning area examined in our field visit is that of mid and upper elevation Pacific silver fir (*Abies amabalis*) forests, which usually experience stand replacement fire events with a 150 to 200 year return interval in the Oregon Cascades (Agee 1993, Morrison and Swanson 1990). Much of the planning area has burned during the last 150 years; therefore these forests are not out of their normal range of variation in fire disturbance events.

Reduction of wildfire risk to communities and historic structures is an achievable goal if well established guidelines are followed. Jack Cohen, a US Forest Service research scientist who specializes in wildfire risks to communities and structures, emphasizes that the most important element of risk reduction is in building construction and maintenance followed by the maintenance

of a relatively fuel-free perimeter around structures (Finney and Cohen 2002, Cohen 2000a, Cohen 2000b, Cohen 2000c, Cohen 2000d, Cohen 1999, Cohen and Butler 1998, Cohen and Saveland 1997). If the goal is community and structure protection, then it is unnecessary to engage in fuel reduction activities that are a substantial distance from the areas targeted for protection (Finney and Cohen 2002).

Landscape perspective on wildfire risk management on the northeast side of Mt. Hood

On the northeast side of Mt. Hood, the areas that should receive the highest priority for wildfire risk reduction activities are on private lands where homes and other structures exist. Money and effort spent on risk reduction in the zone immediately around the homes on the northeast side of Mt. Hood will be much more effective in dramatically reducing wildfire risk than fuel reduction activities carried out on public lands that are not in close proximity. The one area of national forest land that should receive the highest priority for wildfire risk reduction on the northeast side of Mt. Hood is illustrated in Figures 1 and 2. This is an area of national forest land that abuts private lands with a moderate population density. This area also is in the hottest and driest fire regime of the Mt. Hood National forest (hot, dry Pine-Oak and Douglas-fir) (Figure 2), which is naturally prone to frequent fire and usually the fire regime that is the most out-of-balance from historic conditions. Fuel reduction activities in this area that are within a distance of 500 meters of homes should take priority over any other area in the national forest.

The area covered by the Polallie-Cooper timber sales represents in large part an area that is relatively distant from the rural population that inhabits the northeast side of Mt. Hood. This area is located in much cooler and moister fire regimes where the wildfires are more infrequent and the forest conditions are still largely with the long-term natural range of variability. Localized fuel reduction activities may be appropriate in some places within this area to help protect historic structures or private investments, but large-scale fuel reduction activities in this relatively remote area will offer little benefit to the local community.

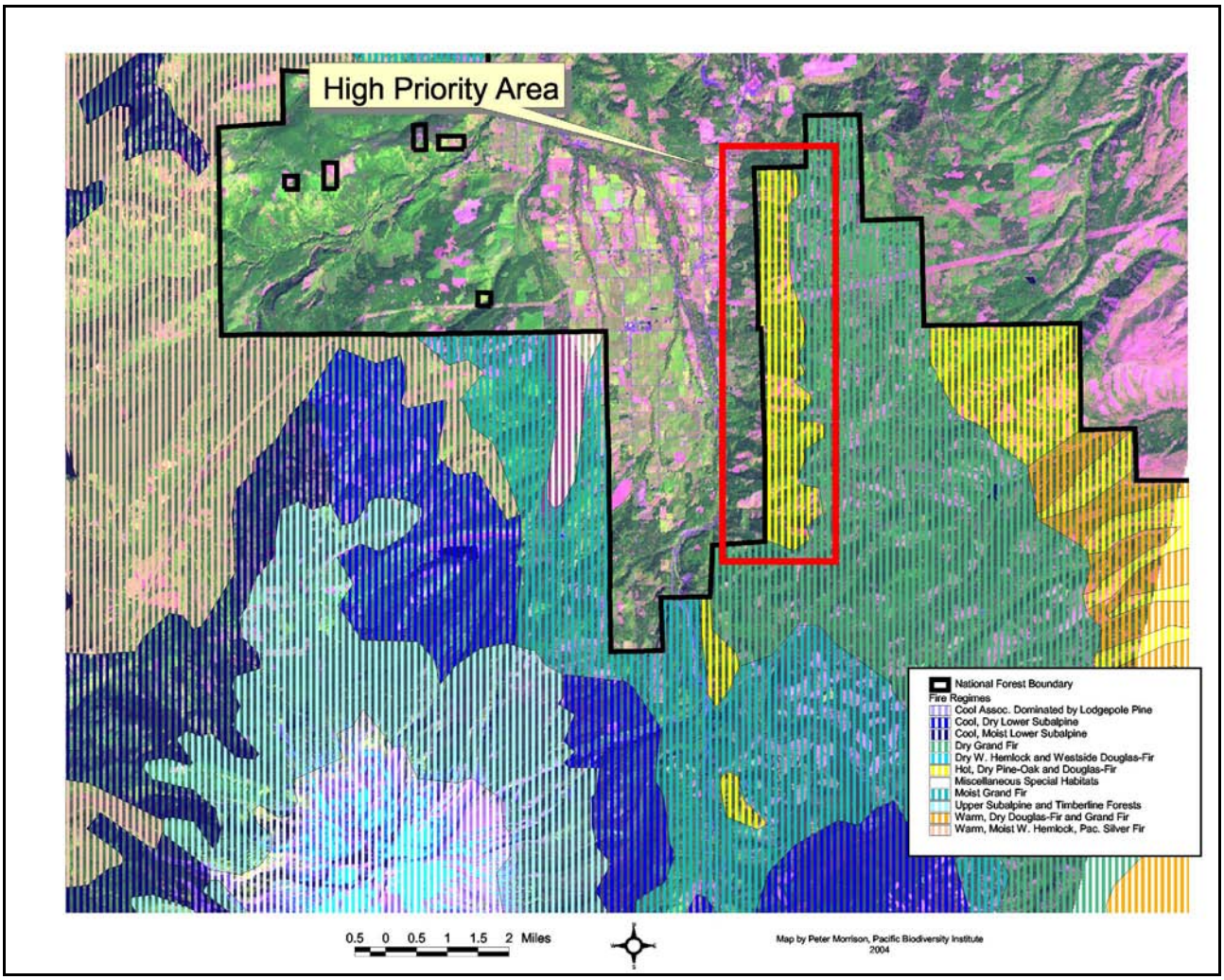

Figure 1. Overview of northeast side of Mt. Hood with highest priority area for fuel reduction activities on National Forest land indicated by red rectangle. An overlay of the Mt. Hood National Forest fire regime GIS layer shows area within the red rectangle with a hot, dry pine-oak and Douglas-fir fire regime.

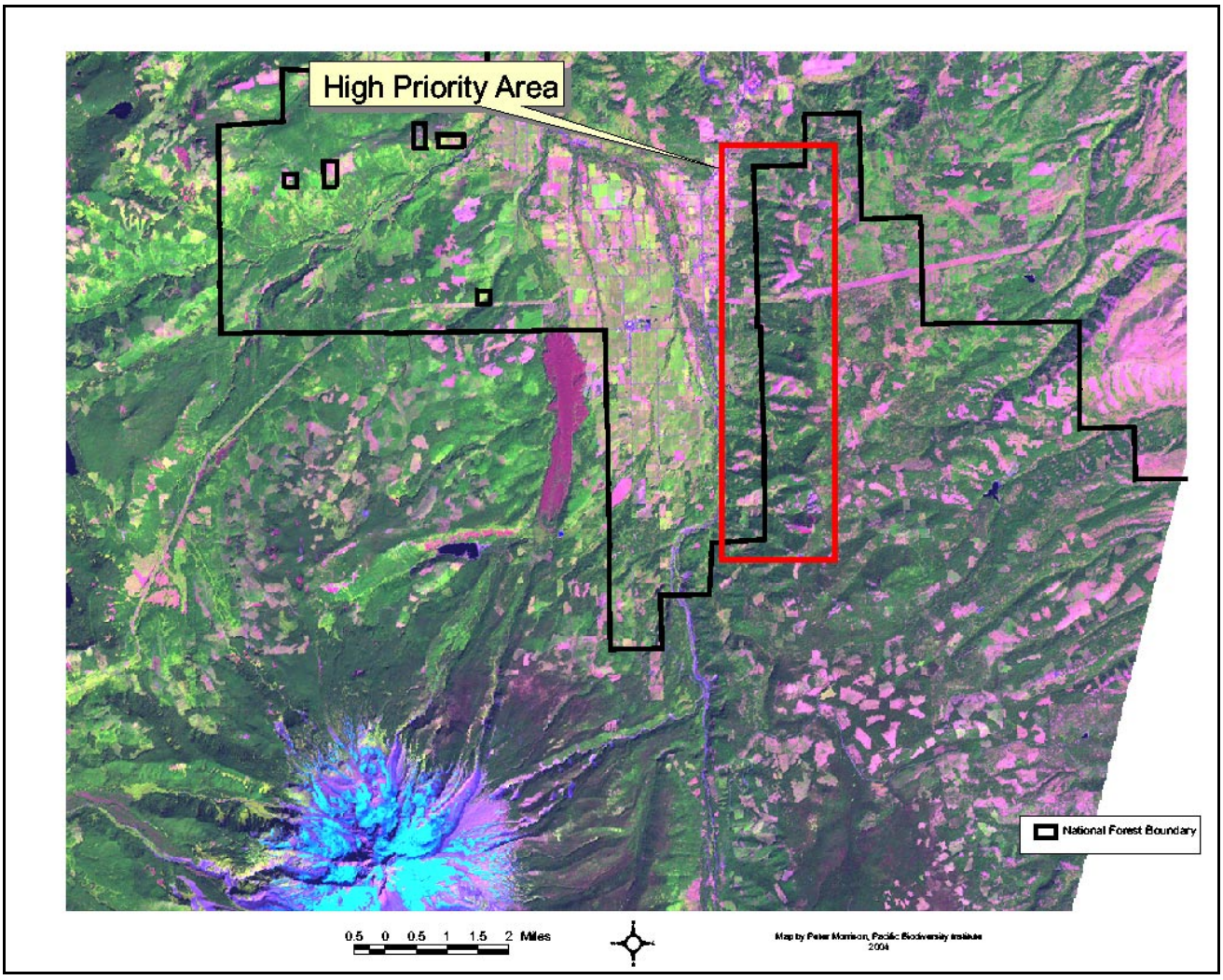

Figure 2. Overview of northeast side of Mt. Hood with highest priority area for fuel reduction activities on National Forest land indicated by red rectangle with a Landsat TM7 (Enhanced Thematic Mapper) satellite image background.

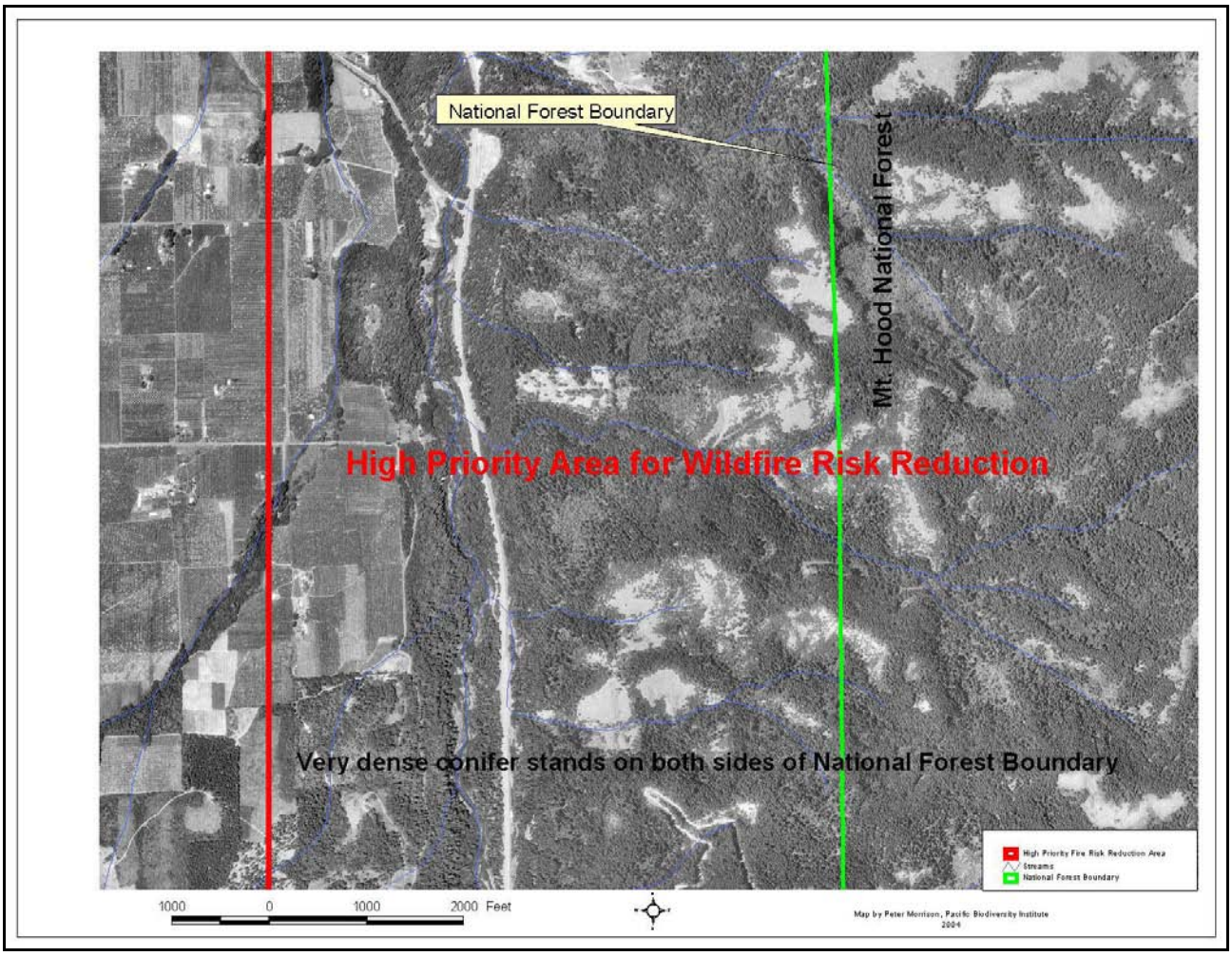

Figure 3. View of forest conditions within a portion of the high priority area outlined in Figures 1 and 2.

Field examination of forest conditions and fuel loadings in the Polallie-Cooper planning area

On June 15, 2004 I examined a number of areas within the Polallie-Cooper planning area and inspected forest conditions and fuel loadings. Our survey route and photo locations are illustrated in Figure 4. The focus of the field visit was to examine conditions surrounding the Cooper Spur Warming Shelter, conditions in proposed fuel reduction units, conditions adjacent to the Cooper Spur Ski Area and conditions within the larger landscape.

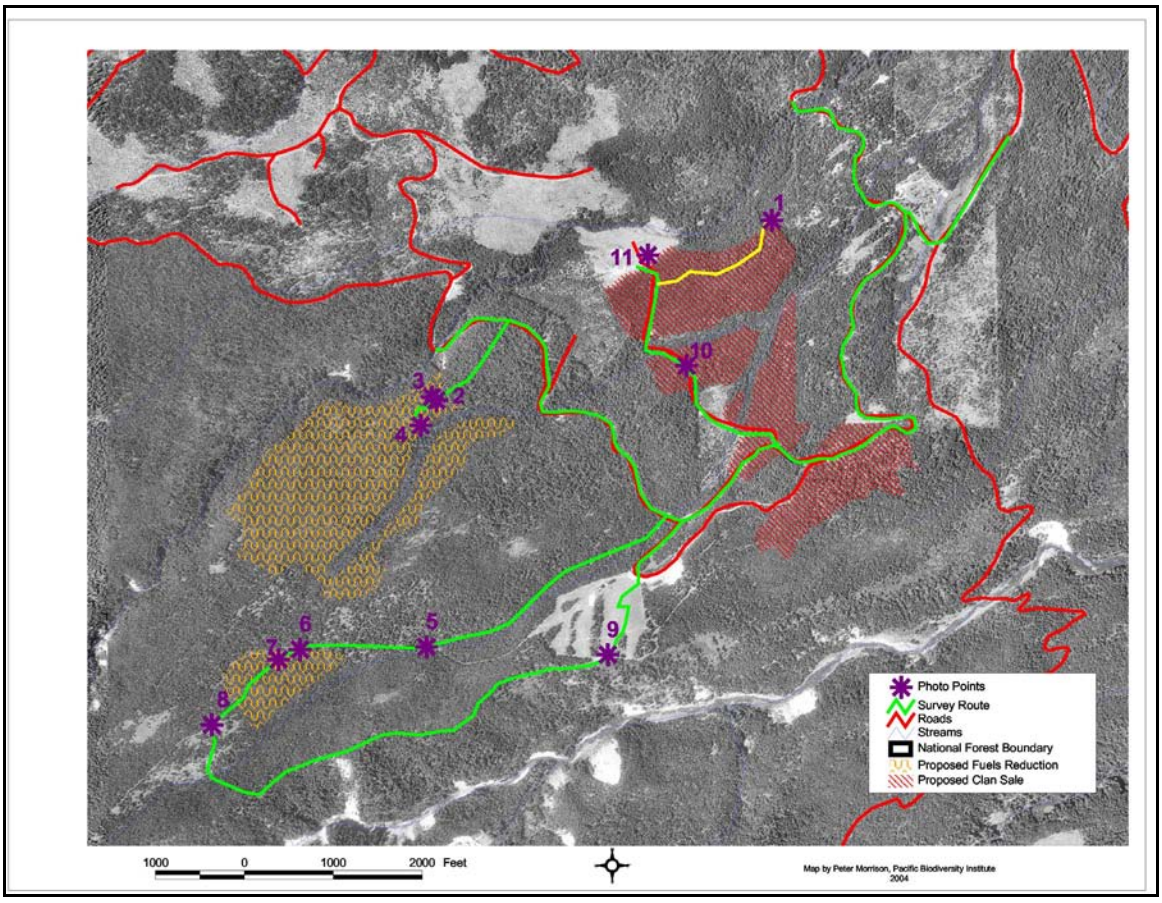

Figure 4. Survey route and photo locations in relationship to proposed fuel reduction units and proposed Clan timber sale units.

Forest conditions surrounding the Cooper Spur warming shelter and recommendations for protection of this structure

The Cooper Spur warming shelter is a historic structure constructed of logs and cedar shingles located at photo point 1 in Figure 3. Currently, relatively small conifers surround the shelter (Figures 4, 5, 6). Some of these conifers touch the shelter and dead and live fuels from the conifers and shrubs surrounding the structure would readily carry fire to the walls of the shelter. There is also a substantial buildup of needles and other ground fuels surrounding the shelter. The forest in the area surrounding the structure is also fairly dense, with significant small and medium size trees, shrubs and herbaceous vegetation. Under the right weather conditions, the surrounding forest could burn intensely. The condition of the warming shelter is such that any significant fire in the surrounding forest would probably ignite the shelter (because of its construction and the fuels that are immediately adjacent to the structure).

Dramatic reduction of wildfire risk to the structure would be easy to accomplish through a volunteer effort and a minimal expenditure in materials. The steps necessary to protect the structure are outlined below in order of priority:

1. Install metal roofing on the shelter. All other wildfire risk reduction efforts will result in failure to protect the shelter if the shake roof is not covered.
2. Rake and remove all conifer needles and branches away from the shelter (including some that have fallen inside the shelter for a distance of at least 30 feet.
3. Cut and remove all coniferous trees that are in close proximity to the shelter. A recommended setback for any coniferous tree is 50 feet in this landscape setting.
4. Cut and remove all flammable shrubs within 50 feet of the shelter.
5. Maintain a "zero fuel" area around the shelter for the first 50 feet.
6. Reduce fuel loading in the zone of up to 200 feet surrounding the shelter through a combination of thinning, pruning, raking, piling and burning of small conifers, shrubs and ground fuels.
7. Maintain this zone so that fuel levels are relatively low.
8. If an active wildfire does move through the area near the shelter, additional protection to the structure may be accomplished through spraying fire-retardant foam or wrapping the building in fire foil paper. However, this will be largely unnecessary if the above seven steps are accomplished.

I estimate that a volunteer crew of 10 people could accomplish these activities in 2 to 4 days. The only materials needed are a small amount of metal roofing and fasteners.

Figure 5. Cooper Spur warming shelter from north.

Figure 6. Cooper Spur warming shelter from east.

Figure 7. Cooper Spur warming shelter from west.

Field review of proposed fuel reduction units to the north of Doe Creek

Figure 8. Forest condition and fuel loading at photo point 2 (looking east) at east edge of proposed fuel reduction units.

Fuel reduction units proposed by the US Forest Service in the Polallie Cooper Planning Area were examined during the field visit. There was considerable variation in forest condition and fuel loading within the proposed fuel reduction units. The area is entirely within the Pacific Silver Fir zone mapped in the Mt. Hood National Forests vegetation zone GIS layer. Most of the area proposed for fuel reduction is within the "cool, dry lower subalpine" fire regime mapped by the Mt. Hood National Forest. The upper parts of the fuel reduction units are within the "upper subalpine and timberline forest" fire regimes mapped by the Mt. Hood National Forest.

Much of the area within the proposed fuel reduction units had been partially cut and logged at some point in the last 10 years. I followed a tractor skid trail into the area. The area that was partially cut all had heavy logging slash on the ground (Figures 9, 10 and 11). The heavy fuel loading from conifer logging slash in much of this area would classify this area as a National Fire Danger Rating System fuel model J and/or I – some of the highest fire danger fuel models (Schlobohm and Brain. 2002).

Adjacent uncut stands had much lower fuel loadings (Figures 12 and 13). Further up in the fuel reduction units I encountered areas where partial cutting had left very large fuel loadings after the slash and unutilized tree boles had been cut and scattered (Figure 14). Throughout much of the area

examined there was an abnormal amount of unutilized timber left mixed with smaller diameter logging slash on the site. To reduce the fuel loading that the Forest Service left in this area, the Forest Service should do a prescribed burn in this area at the appropriate time, either in the fall or in the spring.

Figure 9. Forest condition and fuel loading at photo point 2 (looking south) at east edge of proposed fuel reduction units.

Figure 10. Forest condition and fuel loading at photo point 2 (looking west) in logged area at eastern part of proposed fuel reduction units.

Figure 11. Forest condition and fuel loading near photo point 2 in logged area at eastern part of proposed fuel reduction units.

Figure 12. Forest condition and fuel loading in unlogged forest at photo point 3 at eastern part of proposed fuel reduction units.

Figure 13. Forest condition and fuel loading in unlogged forest at photo point 3 at eastern part of proposed fuel reduction units.

Figure 14. Forest condition and fuel loading in logged area with cut and scatter fuel treatment around photo point 4 at east edge of proposed fuel reduction units.

Figure 15. Forest condition near photo point 5 (looking south).

Figure 16. Forest condition and fuel loading near photo point 6 (looking south).

Figure 17. Forest condition near photo point 6 (looking west).

Figure 18. Forest condition near photo point 5 (looking southwest).

Figure 19. Forest condition near photo point 7 (looking southwest).

Figure 20. Forest condition near photo point 7 (looking southeast).

Figure 21. Open forests and meadows at photo point 8.

Field examination of Doe Creek forest condition and proposed fuel reduction units

The forest condition encountered in our visit to the portion of Doe Creek illustrated in Figure 4 indicated that these forests are in a typical condition for mid seral forests in the Pacific silver fir zone on the northeast side of Mt. Hood. These forests are mature forests that regenerated after high severity fire during the early part of the last century. Most of the forest has a high canopy closure, which is typical for forests in this zone. The forests have undergone a stem exclusion phase in stand development and numerous standing dead snags and down logs have resulted from this in places (Figures 15, 19 and 20). Other areas were more open initially and did not undergo stem exclusion and do not have a large snag or downed log component (Figures 16, 17, 18 and 21). Many of these areas have a beargrass (Xerophyllum tenax) understory (Figures 16-19) or have young trees growing into subalpine meadows (Figure 21).

Fuel conditions in parts of the proposed fuel reduction units examined in Doe Creek did not appear to be abnormal for this forest type. Many areas had quite low current fuel loads (Figures 16-19).

Figure 22. Cooper Spur Ski Area with view of ski runs at photo point 9 and forest below and to the north and east where fuel treatments and timber sales are proposed.

Figure 23. View from photo point 10 east into proposed Clan Timber Sale Unit 2 from the road on the west side of the unit.

Forest condition surrounding the Cooper Spur Ski Area
Figure 22 illustrates the forest condition surrounding the Cooper Spur Ski Area. The forests have high canopy closure and are relatively dense, but are not abnormal for this relatively high elevation forest type.

Forest condition at the edge of the proposed Clan Timber Sale Unit 2
Figure 23 illustrates the dense forests at the edge of the road in the proposed Clan Timber Sale Unit 2. These conditions are typical of mid elevation, mid successional forests that are growing on productive sites and are going through a stem exclusion phase. High stand densities currently exist and many of the less dominant trees will eventually die, leaving standing snags and down logs. This area currently has relatively high fuel loadings and this condition will persist for many years. The current conditions are not unnatural and are found in many areas within the Cascade Range forests of this type.

Thinning would open up this stand and expose the ground surface to solar radiation and desiccating winds. If the stand is thinned, any fuels that remain in the form of slash, shrubs or herbaceous vegetation will be drier and more flammable than if the stand is left untreated (Countryman 1955). This can result in an increase in rate of fire spread, flame length and heat per unit area (van Wagtendonk, 1996). The result of thinning a stand like this can be an increase in fire risk rather than a decrease - if great care is not taken to remove remaining fuels through application of prescribed fire.

Forest condition within plantations in the Cooper Spur Planning Area
Figures 24 and 25 illustrate the conditions within one of the plantations in old clearcuts within the planning area. The plantation that I examined had a high density of small conifers and considerable remaining logging slash. The fuel conditions represented in parts of this plantation represent a considerable fire risk to surrounding forests. During a wildfire, this plantation would probably burn at a high severity, killing nearly all the young trees and some of the surrounding forest.

Figure 24. Dense young stand at photo point 11 resulting from recent clearcut to the north of proposed Clan Timber Sale Unit 2.

Figure 25. Dense young stand and logging slash at photo point 11.

Conclusions and Recommendations

My primary conclusion is that fuel reduction activities proposed for the Polallie-Cooper Planning Area should not be a high priority for the Mt. Hood National Forest. Other much higher priority areas exist. Secondly, efforts to reduce wildfire risk to homes and communities should target the home ignition zone (30 meters from structures) where effective actions can be undertaken. It is a mistaken notion that large-scale wildland fuel reduction activities can effectively reduce fire risk to homes and communities.

Protection of structures within the Polallie-Cooper Planning Area can be accomplished with a minimal effort directed toward structure improvements and fuel reduction in the immediate zone surrounding the structures. There is no need to undertake massive fuel reduction activities in the planning area to protect structures in the area and the greater human population that lives in the Hood River Valley.

Forest condition and fuel loadings in the portions of the uncut forests of the Polallie-Cooper planning area that I examined appear to be within the normal range on natural variation that can be expected on these sites. There is no "forest health crisis" in this area and no need for dramatic intervention. Fuel loadings on some sites that have been partially cut or clearcut are abnormal and should receive treatment. Precommercial thinning of plantations in the area and proper fuel treatment of slash are appropriate at this time.

References

Agee. J. K. 1993. Fire Ecology of Pacific Northwest Forests. Island Press, Washington DC.

Cohen, Jack D. 2000a. Wildland-Urban Fire—A different approach. In: Proceedings of the firefighter safety summit. Misc. Pub. USDA Forest Service, Rocky Mountain Research Station Fire Sciences Laboratory, Missoula, Montana. 6 p.

Cohen, Jack D. 2000b. Examination of the Home Destruction in Los Alamos Associated with the Cerro Grande Fire. Misc. Pub. USDA Forest Service, Rocky Mountain Research Station Fire Sciences Laboratory, Missoula, Montana. 6 p.

Cohen, Jack D. 2000c. What is the Wildland Fire Threat to Homes? Presented as the Thompson Memorial Lecture, April 10, 2000. School of Forestry, Northern Arizona University, Flagstaff, AZ. 13 p.

Cohen, Jack D. 2000d. Preventing disaster: home ignitability in the wildland-urban interface. Journal of Forestry 98(3):15-21.

Cohen. Jack D. 1999. Reducing the Wildland Fire Threat to Homes: Where and How Much? Proceedings of the symposium on fire economics, planning and policy: bottom lines. Gen. Tech. Rep. PSW-GTR-173. USDA Forest Service. 189-195.

Cohen, Jack D. and Bret W. Butler. 1998. Modeling Potential Structure Ignitions from Flame Radiation Exposure with Implications for Wildland/Urban Interface Fire Management. 13th Fire and Forest Meteorology Conference. Lorne, Australia 1996. pp. 81-86.

Cohen, Jack D., and Jim Saveland. 1997. Structure ignition assessment can help reduce fire damages in the WUI. Fire Management Notes 57(4):19-23.

Countryman, C.M. 1955. Old-growth conversion also converts fire climate. *in:* Fire Control Notes. 17(4): 15–19 *and also in*: Proc., Soc. Amer. Foresters Annual Meeting, Portland, OR, 158:160.

Finney, Mark A. and Jack D. Cohen. 2003. Expectation and evaluation of fuel management objectives. In: Fire, Fuel Treatments and Ecological Restoration: Conference Proceedings. April 16-18, 2002. Fort Collins, CO. USDA Forest Service. RMRS-P-29. 353-366.

Morrison, Peter H. and F.J. Swanson. 1990. *Fire history and pattern in a Cascade Mountain landscape*. USDA Forest Service General Technical Report PNW-254, Portland, OR, Pacific Northwest Research Station, 77 pp

Schlobohm, Paul and Jim Brain. 2002. Gaining an Understanding of the National Fire Danger Rating System. National Wildfire Coordinating Group. PMS 932. NFES 2665.

Van Wagtendonk, J.W. 1996. Use of a deterministic fire growth model to test fuel treatments. Pages: 1155-1166, *in*: Status of the Sierra Nevada: Sierra Nevada Ecosystem Project, final report to Congress. Vol. II. Assessments and Scientific Basis for Management Options. Wildl. Res. Ctr. Rep. No. 37. Davis, CA: University of California Davis, Center for Water and Wildland Resources.