EXECUTIVE SUMMARY

This report covers Objective 5 “compare the future mix of timber products under alternative treatment scenarios” of the Joint Fire Sciences Funded project ”Assessing the need, costs, and potential benefits of prescribed fire and mechanical treatments to reduce fire hazard.” Under this objective we developed and demonstrated an analytical method that uses readily available tools to evaluate: pre- and post-treatment stand conditions; size, species, and volume of merchantable wood removed during thinnings; size and volume of sub-merchantable wood cut during treatments; and financial returns of prescriptions that are applied repeatedly over a 90 year period.

Our approach uses existing modeling tools and inventory data, linked in a way that allows a comprehensive analysis of treatment options. Primary tools include the forest vegetation simulator (FVS) growth and yield model with the Fire and Fuels Extension (FFE) and the Financial Evaluation of Ecosystem Management Activities (FEEMA) model. Data are stored in a Microsoft Access database and a standard set of reports was developed within the database. This analytical protocol is portable to anywhere in the western United States where an FVS variant with an FFE extension and a FEEMA variant are available. The tools are familiar to, or can be readily learned, by forest planning and analysis staff within Federal agencies and most state or private organizations. Where they exist, other growth models, fire models, and financial models could be substituted for those used in this study.

In this report, we used Forest Inventory and Analysis (FIA) data for Montana and New Mexico as categorized and processed in the companion reports by Fiedler and others

that cover Objectives 1-4 of this project[1]. Our methods are robust, however, and can accept stand level data that is available from many sources. Suitable stand exam data must be usable as input data for FVS and comprise a statistically representative sample of the vegetation on the target landscape. This means that our methods could be used for analyses at many scales from environmental assessments of individual projects, to forest or estate level planning, to state or regional planning.

Analyses presented here cover two thin from below prescriptions for each of two forest types in Montana and New Mexico. One of the Montana prescriptions was diameter limited and the other was basal area limited. Both New Mexico prescriptions are diameter limited. All four prescriptions included prescribed burning at regular intervals (30 years in Montana and 20 years in New Mexico).

The results suggest that all of these prescriptions reduced fire hazard over the long term, but they were not equally effective. Over the course of several entries, the basal area limited prescription modeled for Montana created stands that were open with a few scattered large trees while the diameter limited prescription created dense stands with many mid-sized trees. The diameter limited prescription as applied in Montana sometimes resulted in combinations of basal area, tree size, and stand age that raise concerns over insect outbreaks, specifically Douglas-fir beetles, western pine beetles, and mountain pine beetles. These conditions were only rarely encountered in New Mexico. Final stand conditions varied in New Mexico depending on initial stand conditions and other factors but in general a wider range of density and tree size combinations developed over the simulation period than were projected for Montana.

[1] A strategic assessment of fire hazard in Montana, and A strategic assessment of fire hazard in New Mexico by Fiedler, C.E.; Keegan, C.E. III; Woodall, C.W.; Robertson, S.H.; and Chmelik, J. (Submitted under separate cover to the JFSP Board).

Even with the simple prescriptions modeled here, it would be possible to select stands with different initial conditions and ages then apply the prescriptions at different times to develop a diverse set of conditions on a landscape. We did not explore such spatial or temporal arrangements of treatments but this will undoubtedly be important when developing management plans that consider the interactions of hazardous fuel reduction treatments with multiple resource values and episodic disturbances on large landscapes.

In terms of wood utilization, the analysis showed that the diameter limited prescriptions produced only small volumes of small trees from the first entry and minimal volumes in subsequent entries. These prescriptions almost universally had negative net returns, even without considering the costs of a regular cycle of prescribed fire, so some sort of subsidy would be required to implement them. If these prescriptions were widely implemented and if industrial capacity were developed to use the wood removed under them, it would be important to size processing plants and develop treatment schedules to ensure a sustainable supply of raw material.

The basal area limited treatment modeled in Montana resulted in more volume than the diameter limited prescription and sometimes showed a positive net return. This prescription produced trees and logs in a variety of sizes. Although average diameter of cut trees increased with successive entries, the total volume cut generally declined over time.