Appendix E – Literature Review

The literature cited in comment analysis represents the current and accurate science and/or discloses scientific uncertainty in relation to the proposed action. It is a result of searches conducted through professional contacts, internet search engines such as Google Scholar (http://scholar.google.com/), and the Rocky Mountain Research Station (RMRS) publications site: http://www.fs.fed.us/rm/publications/titles.shtml, which lists all RMRS publications from 1963 to current.

This paper documents review of scientific literature identified during scoping provided by the Utah Environmental Congress.

/s/ *Diane M. Cote* March 15, 2008

COMMENT ANALYSIS – REVIEW OF SCIENTIFIC LITERATURE RECOMMENDATIONS & OTHER DOCUMENTS

Current and accurate science has been used in the formulation of the proposed action and in evaluation of the proposal as documented in specialist reports and information provided in the project record.

This paper documents review of scientific literature identified during scoping of the Lake Fuels Project on the Ferron District, Manti-La Sal National Forest, provided by Utah Environmental Congress in 2007 in relation to this project.

1. Does the Best Available Science support the MLS's Purpose and Need statement that beetle killed spruce stands have increased fuel loading?

Bebi, P., D. Kulakowski and T.T. Veblen. 2003. Interactions between fire and spruce beetles in a subalpine Rocky Mountain forest landscape. *Ecology* 84(2): 362-371. In a subalpine forest landscape in northwestern Colorado researchers quantified spatial associations of fire and spruce beetle outbreaks over more than a century and developed a model of probability of occurrence of spruce beetle outbreaks. Forests that had burned in 1879 were less affected by the 1940s outbreak than older stands. On the other hand, areas affected by the 1940's spruce beetle outbreak showed no higher susceptibility to subsequent fires. The results of this study do not support the often suggested increase in fire occurrence expected to follow spruce beetle outbreaks.

Kulakowski, Dominik; Veblen, T.T.; Bebi, Peter. 2003. Effects of Fire and Spruce Beetle Outbreak Legacies on the Disturbance Regime of a Subalpine Forest in Colorado. *Biogeography* 30:l-12. Scientists concluded that, "The lack of increased fire spread or occurrence in beetle-affected stands suggests that a response of fire-hazard mitigation following outbreak may not be necessary in order to maintain a normal fire hazard." This research concludes that, "Beetle outbreaks may have a counterintuitive effect on the potential of low-severity fire to spread. Stands affected by beetle outbreak may experience increased moisture as suggested by the proliferation of mesic under-story herbs (Reid, 1989), and this increase in moisture may actually decrease the potential of low-severity fire to spread in beetle-affected stands."

Both papers discuss the possible correlation between fire occurrence and spruce beetle epidemics. In short the papers state there is not likely to be an increase in fire occurrence following a beetle epidemic.

Response:

The Lake Fuels Project did not propose to reduce fire occurrence, as that is a function of many different factors of which fuels is just one. The project proposes to change the Condition Class of the treated acres and therefore lessen the effects of a fire should one occur.

Analysis of fire potential and the effects within the project area has been analyzed in the Environmental Assessment (Project Record Document #25, Lake Fuels Analysis). In addition I want to list specific examples of wildfires that have occurred on the Manti-LaSal in the past 5 years.

Sixmile Wildfire Use – 2004, burned approximately 1000 acres in spruce beetle killed spruce fir type.
White Knoll Wildfire Use – 2005, ignition started in a spruce beetle killed spruce at 10,000 foot elevation on July 14, burned approximately 500 acres in the spruce fir type, the rest in aspen mixed conifer type.
Jungle burn escaped wildfire burned approximately 400 acres of spruce beetle killed spruce fir type.

All 3 of the wildfires listed burned in spruce beetle killed forests that no longer had red needles on the trees. The needles had fallen a minimum of 4 years prior to the wildfires.

The document by Graham and others (*Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity*. USDA General Technical Report RMRS-GTR-120, January 2004) states that stand structure and wildfire behavior are clearly linked. Decision-makers should consider 4 basic principles when making decisions regarding fuel treatments: 1) Reduce surface fuels; 2) Increase canopy base height; 3) Decrease crown density; and 4) Increase proportion of fire resistant trees. Obviously when decisions are made to plant trees in burned areas, vegetation changes as grass, forbs, and shrubs thrive in the open conditions that are created. When trees are planted a vegetation layer is restored to an area that for 20 years or more may be more susceptible to fire because of ladder fuels, low branches, and canopy density. This requires that we consider implementation of measures through time to protect them and eventually reduce the associated fire hazard.

The planned treatments would create openings in the general overstory canopy, provide safe access routes, and create fuel breaks of various age groups of trees. Initial attack forces would have access to the area; have time and defensible space to control the fire prior to the end of the 4-hour window, the reduction of post-activity fuels should, theoretically, increase the effectiveness of control efforts (e.g. less effort required to build fire line in and between former treatment units), increasing the probability of success of the control efforts. (Finney, Design of Regular Landscape Fuel Treatment Patterns for Modifying Fire Growth and Behavior, Forest 7 Science, 2001).

/s/ *Diane M. Cote* March 15, 2008
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