Conclusions for Dead Downed Wood

Several features mitigate these possible effects. First, in each geographic area only about 70% of the area is suitable for timber harvest, and some of that may be designated as old growth or security areas. The limitation on harvest to 25% of each watershed will slow the rate of harvest in some areas. In spruce/fir forests, harvest will be limited to group selection and individual tree section, so that large expanses that are low in downed wood are not created. Despite these limitations, there will be a net loss of downed wood over time in all alternatives except possibly F. The ecological significance of this change is not clear.

The evaluation criteria used to compare the consequences of the alternatives on creation of dead downed wood are the standards and guidelines in retention of downed wood after logging, the amount, the distribution of MAs that would manage for harvest on a 120-year rotation. Size, amount, and distribution of downed wood will decline most in alternatives with large amounts of MA 5.13. Impacts will be greatest when MA 5.13 occurs in large continuous areas (up to 20 miles by 5 miles in size). Alternatives D FEIS, D DEIS, and E have smaller blocks of 5.13, have more 5.15 (which is designed to emulate natural patterns and retains more standing material in clearcuts). Alternative F places the most emphasis on natural processes and the least emphasis on removal of timber and is expected to produce the largest amount of dead down wood.

AFFECTED ENVIRONMENT
SNOW COMPACTION

Snow is an integral component of habitat. Snow depth and characteristics affect animals' access to prey or vegetation, the ease of travel, and availability of insulated microsites. Modern human activities, particularly use of snowmobiles and skiing, have the potential to alter snow conditions.

Winter in the mountains of Wyoming poses challenges for warm-blooded animals. In addition to snow, extreme cold and wind make it difficult to maintain a positive energy balance, that is, to provide more calories (whether from stored fat, stored food, or by active foraging) than the animal must consume each day to maintain its body heat. Many native animals meet this challenge by leaving the area (migration) or by storing fat and reducing energy demand (hibernation). Most of the breeding birds migrate south for the winter. Some birds and mammals move to lower elevation where the weather is less extreme and snow is less deep. Black bears and many rodents hibernate.

However, even at high elevation, some animals are present and active all winter. Some animals have anatomical adaptations for locomotion on or through snow (like the large feet of snowshoe hare or the shoulder structure and long legs of the moose which allow it to move through deep snow and to spend the winter at higher elevation than deer and elk (Marchand 1996). Animals that are active on the surface may change color to provide camouflage (like ptarmigan, weasels, snow buntings, and snowshoe hares). Insulation may be increased by the growth of a denser coat (Ivanter, in Merritt et al 1994) or deposition of subcutaneous fat. Many animals have seasonal physiological adaptations, like changes in metabolic rate, fat storage, or ability to mobilize energy in response to cold (e.g. Merritt 1984). Other species live in or beneath the snow.

Animals that live in snowy environments are adapted for survival with snow. They may rely on snow for creation of sheltered microsites or for competitive advantage over species lacking their adaptations. High mortality or reduced reproduction may occur in years with little snow (Formozov 1946), (Jannet Jr. 1984), (Merritt 1985), (Merritt, Lima et al. 2003). Alterations in snow compaction have implications both for animals that live above the snow ("supranivian") and for those that live on or below the ground surface, at the base of the snowpack ("subnivian").

Supranivian species at high elevation include the lynx and the snowshoe hare, both of which have large feet and long legs that support them on top of the snow when another animal of the same weight would sink and be unable to travel efficiently. In an early assessment of the effects of snow compaction on animals, Bury (Bury 1978) concluded that the animals most affected were small mammals that live beneath the snow and are active during the winter. A review some of the features of the snowpack that affect subnivian wildlife habitat is given in the Wildlife Section of Appendix D – Biological Diversity. For a more thorough review, see (Pruitt Jr. 1960), (Halfpenny and Ozanne 1989), and (Marchand 1996). For an extensive review of the physical properties of snow and the ecology of snow-covered ecosystems, see (Jones, Pomero et al. 2001).

Alterations in Snow Compaction with Winter Recreation

Skiing, snowshoeing, and snowmobiling alter the formation of the snowpack. On the Medicine Bow NF, snowmobiling affects far more area than downhill skiing, crosscountry skiing, and snowshoeing. In the first snows of the season, any of these uses will compress the snow hard against the ground (in the same way that snow freezes to a driveway under tire tracks). Unlike natural snow, this compacted snow is not likely to melt off (after an early snowfall followed by mild weather), terminating access to food earlier in the autumn. Compacted snow will also melt later in spring, again denying access to food supplies for animals that survived the winter. Finally, this compression onto the ground eliminates the basis of the formation of the subnivian space (the air space under the snow around grass and other clumps of low vegetation) replacing it with a dense layer that animals cannot burrow through. These winter recreation activities also alter the density of the snowpack. The degree of natural compaction of snow is variable. In open windy settings, snow is blown and the "arms" of the flakes are broken, forming pellets that lie in a dense pack. However, even in the open areas in the Snowy Range, snowmobile and ski tracks are