

ISSUE 36: SUBNIVIAN SMALL MAMMALS

Changes from the Draft to the Final EIS

There were no significant changes to this section from the Draft to the Final EIS.

Introduction

This issue concerns animals dwelling and/or foraging under snow cover. It was raised in several comments received. Subnivian habitat areas occur seasonally throughout the higher elevation areas of the Gallatin Forest, typically, areas of persistent, deep snow cover occur above 6,000 feet in elevation. However, habitats may vary widely because of localized events and topographical features. Many trail systems that provide recreational opportunities for snowmobiles, cross-country skiing, snowshoeing and other types of winter recreation are present within this zone. The effects of these recreational uses on subnivian mammals can be described in general terms of thermal regulation concerns and direct loss of subnivian habitats. They can be assessed in terms of the amount of compacted play areas or trails.

There are differences among the alternatives in terms of the potential effects to subnivian small mammals, due to variations in area for marked and groomed routes managed for snowmobiles, skiing and snowshoeing. However, this issue was not considered significant to the Travel Plan decision because there is such an abundance of area on the Gallatin National Forest that would remain unaffected by winter uses, under any alternative.

Discussion

The subnivian environment is a protective zone in which many species can spend the winter. The layers of snow moderate air temperature fluctuations and protect animals and plants from extremes and rapid changes in temperature. Snow also provides protection from chilling winds and radiation heat loss. The subnivian environment of the north-facing slope appears to be the most stable from year to year. Variation in snowpack conditions from year to year on the valley bottom and south-facing slopes result in greater thermal instability for subnivian organisms (Auerbach and Halfpenny 1991).

Snow cover is important to the winter survival of many species because of the protection that the subnivian environment provides from the stresses of direct exposure to severe winter weather and predation (Formozov 1946, Pruitt 1957, Fuller 1969). Consequently, the subnivian small mammal environmental requirements were considered when analyzing the use of snowmobiles. Snow compaction by snowmobile use reduces the insulating value of the snow and increases mechanical barriers to small mammal movements beneath it. Damage to browse and forage plants can be caused by snow compaction (Boyle and Sampson 1985). Jarvinen and Schmid (1971) found that snowmobile-compacted snowfields increased the winter mortality of small mammals. They indicated that compaction inhibited mammal movements beneath the snow and subjected subnivian organisms to greater temperature stress. Furthermore, Neumann and Merriam (1972) showed that snowmobile use in Ontario caused changes in snow structure and, subsequently, wildlife behavior.

Snowmobiles affected snowshoe hare and red fox mobility and distribution and caused serious damage to browse plants.

Bury's (1978) analysis of snowmobile impacts on wildlife concluded that the major effects of snowmobiles on most wildlife species appeared to be "*changes in the animals daily routine, rather than direct mortality.*" For small mammals, this was found to be the case for rabbits by Baldwin and Stoddard (1973). Schmid (1972) showed through experimental manipulation of a snowfield that the mortality of small mammals is markedly increased under snowmobile compaction. A number of researchers (Mezhzherin 1964, Schwartzet et al. 1964, Fuller 1969, Fuller et al. 1969, Brown 1971) have shown that small mammals experience reduced growth during the winter. Jarvinen and Schmid (1971) stated, "*The colder temperatures of winter seem to be stressful to small mammals, even if moderated by snow cover.*" Obviously, as the population of small mammals is reduced, the populations of predators that prey on them (e.g., foxes, weasels, martins, hawks, owls, etc.) may also be reduced (Brander 1974).

General Effects

The regulation of snowmobile use can mitigate the impact to subnival habitats and species dependent on these habitats for winter survival. The alternatives under consideration vary in the amount of area where snowmobile use is not restricted. In all alternatives the amount of Wilderness that is closed to snowmobiling is constant. Alternative 1 and 2 have the greatest potential effect on subnival habitat, based on the acres of the Forest that would be closed for snowmobiles by seasonal and year-long closures. In these alternatives approximately 48% of the Forest is closed to snowmobiling. There would be no effect on subnival mammals in these areas. Alternative 3 would have the greatest miles of groomed and marked trails for snowmobiling and other winter recreation, but would be more restrictive in the total acres available for these pursuits. The other alternatives would generally have reduced impacts because of increased restrictions. These alternatives have restrictions on approximately 70-80% of the Forest, including Wilderness. Alternative 7-M has snowmobile restrictions on 83%. These alternatives would have less impact on these species than is currently occurring.

One important cumulative effect is the existing and developing winter recreation and over-snow activities that are occurring on adjacent private lands. Winter recreation is becoming more popular on the Gallatin Forest and on adjacent lands. It is impossible to forecast what increases in these activities will occur in the future, but as populations increase in and around the Gallatin Forest, there will likely be some increases in winter recreation pursuits. Increased pressure on the winter recreation travel areas would likely have negative impacts on wildlife species dependent on subnival ecosystems. However, the abundance of Wilderness acreage and other areas that would remain unavailable to snowmobiling, under any alternative, provides sufficient habitat for the overall small mammal population on the Gallatin National Forest.