Effects of Winter Recreation on Coyotes and Lynx

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In its decision to list the Canada lynx as a threatened species under the Endangered Species Act (Federal Register Vol. 65(58): 16051-16086), the U.S. Fish and Wildlife Service stated that "snowmobile trails and roads that are maintained for winter recreation and forest management create packed snow corridors that give other species access to lynx habitat…Coyotes use packed snow trails and now occupy the winter habitats of lynx and, therefore, are a concern as a potential lynx competitor in winter." The decision acknowledged, however, that no clear evidence yet existed demonstrating that competition between coyotes and lynx had negatively affected contiguous U.S. lynx populations.

Coyotes have a high foot-load (ratio of body mass to foot area; Murray and Boutin 1991; Figure 10) compared to lynx. This high foot-load makes travel through deep snow more energetically costly to coyotes than lynx and could cause the 2 species to use different winter habitats. Buskirk et al. (2000) suggested that spatial separation between lynx and coyotes due to deep snow might break down if human-caused snow compaction allowed coyotes to access lynx habitat. They and others theorized that compacted snowmobile trails might allow coyotes to more successfully hunt hares in high elevation, deep snow environments and persist there year round, thus significantly decreasing the number of hares available to lynx (Ruediger et al. 2000).

We studied coyotes near Seeley Lake, MT from 2002 to 2004 to:

- Assess the degree of coyote and lynx sympatry during winter;
- Characterize coyotes' association with compacted snowmobile trails;

- Describe coyotes' winter food habits.

Clearer understandings of these 3 aspects of coyote ecology will allow managers to better assess the potential implications of snow compacting activities within lynx habitat.

We radio collared 25 coyotes within lynx home ranges during summer. Over the next three winters we backtracked a total of 12 coyotes (4 males, 8 females) for over 320 km in areas with both documented lynx presence and recreational snowmobile use. One technician followed a coyote backtrack using a data logging GPS unit for 3 km while another walked a spatially paired, randomly located, non-use track. Each technician then digitized all snowmobile trails within 1 km of any portion of their respective track. This design allowed us to evaluate how coyotes selected habitat conditions, such as snow supportiveness and the presence of snowmobile trails, which changed on a daily basis. An example of one day's backtracking data is shown in Figure 11.

Coyotes remained in lynx home ranges throughout the winter and the distance they traveled from compacted snowmobile trails did not vary as snow conditions changed or as winter progressed. Although coyotes used compacted snow significantly more than random expectation, they did not travel closer to snowmobile trails than randomly expected. Coyotes traveled on snowmobile trails 7.7 % of the time and for short distances (median = 124 m, Table 5). Interestingly, coyotes traveled along uncompacted forest roads 4.6 % of the time which was statistically similar to the distance that they traveled along forest roads compacted by snowmobiles (5.7 % of travel). This suggests that coyotes may select for the roads' structure (a cleared travel corridor) and location rather than the compacted snow sometimes present on them. In addition, coyotes strongly selected for naturally shallower and more supportive snow surfaces when traveling off compacted snowmobile trails. Coyotes were primarily scavengers in winter (snowshoe hare kills comprised only 3% of coyote feed sites, Table 6) and did not forage closer to compacted snowmobile trails than random expectation.

Our results suggest that the overall influence of snowmobile trails on coyote movements and foraging success was minimal on our study area. It is unlikely that compacted snowmobile trails increased competitive interactions between coyotes and lynx during winter.