2.6 APPENDICES

APPENDIX A Status and Trend of Canada lynx in Montana

In Montana, Canada lynx are known to be present in the Rocky Mountains from the Canadian border south to the Yellowstone area (Butts 1992; McKelvey, et al. 1999; Ruediger, et al. 2000) and east to the Big Belt, Little Belt, and Crazy Mountains (Butts 1992; Ruediger, et al. 2000). The current status of the lynx population in isolated Montana mountain ranges, including the Big Snowy and Judith Mountains, has not been determined (Ruediger, et al. 2000). Trapping records indicate historical occupancy of the Big Snowy, Little Snowy, and Highwood Mountains. Potential Canada lynx habitat in Montana is shown on **Map 4**.

Abundance of Canada lynx in Montana has not been enumerated, although limited population data indicate that Montana likely has more lynx than any other western state (Foresman 2001). Foresman (2001) estimated the Montana population between 800 and 1,000 lynx, and MFWP (2005) considers the Montana lynx population to be well-distributed and stable in the western third of the state. However, more recent observations, particularly in light of observed climatic warming trends, have raised questions about numbers and stability of local populations (McKelvey, et al. 2000). Canada lynx are capable of traveling long distances, and there are occasional records for Montana of lynx sightings in habitat unsuited to sustaining a lynx population (Foresman 2001).

Squires, et al. (2006) summarized a Canada lynx research program conducted by the Wildlife Ecology Unit of the USDA Forest Service, Rocky Mountain Research Station that has greatly expanded our understanding of lynx ecology in the intermountain west. That work occurred from 1998 to 2007, primarily in three northwest Montana study areas: Seeley Lake/Clearwater River drainage, Garnet Mountains, and Purcell Mountains. The following pertinent excerpts were selected from their summary of research accomplishments:

- Captured the largest sample of lynx (70 males, 47 females) from a naturally occurring, southern population (i.e., south of the Canadian border) to date;
- Developed a survey method for delineating local lynx distributions based on snow tracks (Squires, et al. 2004), and documented the distribution of lynx in portions of western Montana. The method used an 8 x 8 kilometer grid overlay on the survey area of interest. Each cell of the grid is a single sample unit, with 10 kilometer survey routes completed by snowmobile or snowshoe within each cell. The method incorporates genetic sampling to correct for track misidentifications, and produces a distribution map delineating which survey units are occupied by lynx;
- Described circadian activity patterns of lynx (Kolbe and Squires 2007). During summer, male lynx exhibited a crepuscular activity pattern, whereas females with kittens remained active throughout the photoperiod. During winter, lynx of both sexes were most active during the afternoon and early evening;
- Documented lynx winter food habits and hunting methods at 86 kill sites (Squires and Ruggiero 2007). Lynx depended almost exclusively on snowshoe hares (69 kills, 96% of prey biomass), with red squirrels being the second most common prey (11 kills, 2% of biomass);

- Completed 362 miles (582 kilometers) of lynx back-track surveys and a similar distance of paired, randomly located, non-use track to study winter habitat selection. Lynx preferentially foraged in spruce-fir forests with high horizontal cover, abundant hares, deep snow, and large-diameter trees during winter. Lynx killed prey in areas with greater horizontal cover than was encountered along their snow-tracks;
- Quantified habitat structure and composition at 630 use and 630 random points to study summer habitat selection. During summer lynx select habitat with high horizontal cover, however, the horizontal cover results from a higher density of small diameter (< 7.6 centimeters) trees and shrubs;
- Lynx generally used the same home range and many of the same forest stands during both summer and winter. However, during summer, lynx broaden their habitat use to include younger forest stands with an abundance of shrub cover;
- Lynx mate in late winter and females localize at natal den sites by mid-May. The average litter size for lynx in the Seeley Lake area was 2.3 while litters in the Purcell Mountains were larger, averaging 3.2 kittens per female. During late May and June a molly may move kittens from the natal den to a series of maternal den sites, often located in the same or an immediately adjacent forest stand;
- Located and quantified habitat structure at 56 dens for 19 female lynx, and confirmed birth of 110 kittens (Squires, et al. 2008). Lynx do not excavate a den, but instead locate dens under naturally occurring structure such as downed logs, root wads, or rock piles. In particular, lynx select den sites with abundant downed woody debris in forest stands with the greatest horizontal cover compared to elsewhere in the animal's home range.
- Lynx dens are typically in mature, mesic forests on northeast aspects, although they also den along the edges of regenerating forests where trees have blown down into jackstraw piles of wood;
- Results suggest that the overall influence of recreational snowmobile trails on coyote movements and foraging success was minimal in the Seeley Lake study area. It is unlikely that compacted snow trails increased competitive interactions between coyotes and lynx during winter.
- The habitat and landscape features that lynx select when choosing den sites is an important management consideration, and requires an understanding of not only the fine-scale habitat features found at the actual den site (e.g., slope and aspect, snowshoe hare pellets, size and species of large trees, number and species of saplings, shrub cover, woody debris, canopy cover, horizontal cover or sightability), but also the larger-scale habitat context that surrounds each den (e.g., distance to edge, adjacent stand types, patch size, patch richness, topographic morphometrics, density and location of roads).

The FWS recovery outline (USFWS 2005) provides preliminary recovery objectives for the contiguous United States distinct population segment of the Canada lynx. To date, no method exists to estimate current lynx populations in the six core areas. Given this lack of ability to assess population size or trend, it is not yet possible to develop demographic recovery criteria in Montana. The cyclic or fluctuating nature of lynx populations provides an additional element of uncertainty in assessing population trends. Western Montana includes core, secondary, and peripheral areas (**Map 3**).

Core Area Criteria

To meet the definition of a core area for Canada lynx, the area must meet all of the following conditions (USDI 2005):

- Has verified evidence (e.g., McKelvey, et al. 2000a; Hoving, et al. 2003) of long-term historical and current presence of lynx populations. Lynx occurrences within the core area are persistent over time despite the cyclic or fluctuating nature of lynx and snowshoe hare populations that may periodically result in reduced populations or suspected local extirpation of lynx. This is normal unless populations do not show a positive response when snowshoe hare populations increase.
- Has recent (within the past 20 years) evidence of reproduction. Reproduction or recruitment into the lynx population may not occur every year because of natural cyclic or fluctuating populations that are tied to snowshoe hare population levels.
- Contains boreal forest vegetation types of the quality and quantity to support both lynx and snowshoe hare life needs.
- Snow conditions are generally fluffy and/or deep enough to favor the competitive advantage of lynx.

Secondary Area Criteria

- Compared to core areas, secondary areas have fewer and more sporadic current and historical records of lynx and, as a result, historical lynx abundance has been relatively low. Reproduction has not been documented. Some of the secondary areas have not been surveyed following any survey protocol; as a result the current status of lynx occupancy in some secondary areas is not known.
- Quality and quantity of lynx habitat (including snowshoe hare densities and snow conditions) is less clear. Information is currently lacking to understand why historical lynx abundance in these areas appears to be less than in core areas. Compared to core areas, habitat in secondary areas may be patchier, drier, and/or more maritime resulting in snow or habitat conditions that are not favorable to lynx. Another explanation may be that lynx populations were extirpated because of changes in vegetation structure that resulted in poor prey populations or some disturbance, such as past trapping, and lynx have not re-colonized the area.
- As new information becomes available, some areas currently classified as secondary may be elevated to core status.

Peripheral Area Criteria

- Areas that contain few verified historical or recent records of lynx; records are sporadic and usually associated with periods when there were unprecedented cyclic population highs in Canada, such as the early to mid-1960s and/or 1970s. There may be large gaps in time, e.g., from 1920s to 1960s, with no records of lynx.
- Quality and quantity of habitat to support adequate snowshoe hare or lynx populations are questionable. Habitat may occur in small patches and is not well-connected to larger patches of high quality habitat.
- May sustain short-term survival during lynx dispersal.