

NOTES FROM THE FIELD

PREDICTING THE EFFECTS OF FOREST MANAGEMENT ON LYNX POPULATIONS

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Lynx are quintessential snowshoe hare predators with morphological adaptations such as large paws, long legs and light bone structure for hunting in deep snow. This species depends on boreal forests, so the listing of Canada Lynx as a Threatened species is a major conservation issue to forest managers. The U.S. Fish and Wildlife Service stated that human alteration of forest abundance, composition, and connectivity was the most influential factor affecting lynx habitat (Federal Register 63(130):36994-37013). Yet, we do not understand how forest structure and landscape pattern impact the ecology of southern lynx populations. Thus, land managers lack the empirical basis for predicting the positive and negative effects of forest management on lynx populations.

In 1998, the USFS Rocky Mountain Research Station initiated research at Seeley Lake, Montana that was designed to address these pressing information needs. In 2002, we expanded our study areas to include the Garnet Range. We then added the Purcell Mountains north of Libby, Montana as third study area in 2003 (Fig. 1). To date, we have radio collared 114 lynx on all study areas combined.

Our research topics have changed through the years as we accomplished old objectives and identify new research needs and questions. We initially used conventional telemetry to study seasonal movements and habitat-use patterns of lynx relative to vegetation structure, forest management, human disturbance, and prey abundance within forest stands. This involved back-tracking radio collared lynx for over 600 km during the winter to precisely plot their movements relative to habitat features. We also use radio telemetry to document summer habitat-use patterns in order to understand seasonal changes in habitat-use.

In 2002, Jay Kolbe, as part of his graduate research at the University of Montana, studied the effect of packed snow corridors on the competitive interactions between coyotes and lynx on the Seeley study area. This research was instrumental in helping agencies to address winter recreation in management plans, and this work was recently published in *Journal of Wildlife Management*

(2007) [see page 18]. In addition, we studied lynx den-site selection as a hierarchical process based on 59 dens from 19 females that we located in western Montana. We considered den selection at 3 spatial scales including the den site, den stand, and den landscape (1 km radius surrounding dens) and these results were also recently published in *JWM* (2007). Locating dens with young kittens also allowed us to document productivity that we are now using to model population viability. Other recently published topics include: seasonal changes in lynx activity patterns; food habits and prey selection; and the efficacy of using snow-track data to delineate locally lynx distributions.

Although fine-scale understandings of habitat use are vitally important to conservation, they are not sufficient; we also need to understand how human actions may affect broad-scale movements/connectivity and habitat sustainability. By the end of this summer (2007), we expect to obtain about 70-90,000 highly-accurate (<35 m error) GPS relocations from 16 lynx from our 3 study areas. We programmed the collars to delineate movement paths that extend across 24-hr day cycles, both winter and summer. We are using these data to build empirical models that predict how lynx traverse landscapes relative to habitat features. We hope this information will help highway planners maintain population connectivity across western Montana. We are also using GPS data to delineate habitat-use polygons that represent a continuum (low-high use) of lynx use across broad landscapes. This summer, we started to quantify vegetation and landscape characteristics at each polygon, so that we can then use silvicultural models to project forest development through time. Thus, the goal of this research is to determine how to sustain lynx habitat across broad landscapes for the long-term within a multi-use management context.

Studying lynx ecology is difficult and expensive. The continued success of our program is due to our many partnerships with state/federal agencies and industry. Initial financial support was provided almost exclusively by the Wildlife Ecology Unit of the Rocky Mountain Research Station located in Missoula, MT. However, this work has continued due to the contributions of the following important partners: Clearwater National Forest and Region 1 of the U. S. Forest Service, the Bureau of Land Management, the Federal Highway Administration, the Idaho Department of Transportation, Plum Creek Timber Company, Wyoming Game and Fish Department, the University of Montana, and Montana Fish, Wildlife and Parks. §



Credit: Western Montana Lynx Study -
USFS Rocky Mtn. Research Station

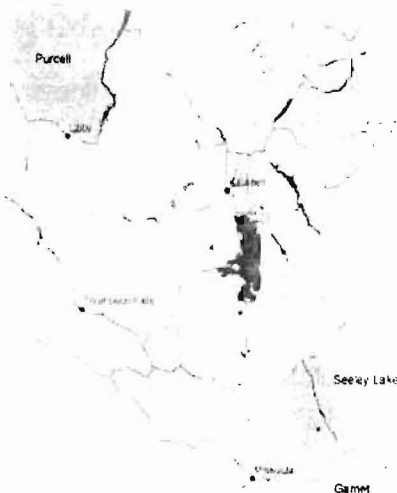


Figure 1. Location of lynx study areas in
western Montana, 1999-2006