Alberta Conservation Association

2022/23 Project Summary Report

Project Name: Wolverine Reporting

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We greatly appreciate the work of Andrea Morehouse (Winisk Research and Consulting), who completed much of the analysis presented in this report.

Partnerships

Alberta Environment and Protected Areas
Alberta-Pacific Forest Industries Inc.
Alberta Trappers Association
Animal Damage Control – A Division of Bushman Inc.
Crowsnest Conservation Society
Daishowa-Marubeni International Ltd./ Mercer Peace River Pulp Ltd.
McGill University
Roadrunner Leasing and Sales Ltd.
Shell Fueling Change
TD Friends of the Environment
University of Alberta

Key Findings

- Wolverine and lynx distribution is closely tied in Alberta's boreal forest, with the presence of one being a good indicator that the other may be around too.
- Marten in the boreal forest were associated with areas of less conifer-dominated forest, which is opposite to what we expected.

- Radio-collared wolverines selected for habitat with greater availability of snowshoe hares, grouse, and the possibility of wolf kills.
- Radio-collared wolverines selected for areas close to young burns but avoided their interior, whereas the interior of medium to old burns was used more than you would expect by chance.

Abstract

We worked with Alberta Trappers' Association (ATA) to learn more about where wolverines and other furbearer species occur in the province, using trapper-maintained trail cameras. Camera data identified a close relationship between wolverines and lynx in the Boreal Forest Natural Region, with the presence of one species being a strong predictor for where we would find the other. Unexpectedly, marten in the boreal forest were associated with sites that had lower amounts of conifer forest in the surrounding landscape. To investigate fine scale habitat use by wolverines in a landscape dominated by wildfires, we deployed radio collars on animals in north-central Alberta. A total of ten wolverines were captured and fitted with collars over the course of the study. We found that radio-collared wolverines selected for habitat within their home ranges that had higher expected densities of snowshoe hares and grouse, as well as higher expected densities of wolves. We also found that wolverines selected for areas near the edges of recent wildfires but avoided the interiors of these regenerating forests until they reached a medium age (11–24 years).

Introduction

We worked in partnership with Alberta Trappers' Association (ATA) to identify where wolverines occur in the province and to determine the major factors associated with their distribution. We collected information on Alberta's boreal wolverine population using trapper surveys (local ecological knowledge), trail cameras, and radio-collared animals. Although data collection has concluded, we continue to work on sharing our findings in the scientific literature and are collaborating with other researchers in Canada and the United States to learn as much as we can from the information we collected on this data-deficient species.

Methods

Baited camera trap sites (n=146) were established across northern Alberta and monitored by trapper volunteers. We used a multi-stage generalized linear model framework to model detections of wolverines, fisher (*Pekania pennanti*), lynx (*Lynx canadensis*), and marten (*Martes americana*) in association with forest cover and stand age, climate, and anthropogenic disturbance. We then investigated whether the presence of other furbearer species and their mutual prey helped to explain the observed pattern of occurrence.

We used data obtained from individual wolverines fitted with GPS radio collars to investigate finer-scale habitat use patterns. We used a multi-stage generalized linear mixed-effects model to evaluate the effect of various covariates related to landcover, wildfires, and food availability on wolverine habitat use, applying a used versus available analysis at the home range scale (i.e., third order selection) (Johnson 1980, Manly et al. 2002). For landcover data, we used Alberta Biodiversity Monitoring Institute's (ABMI) 2010 provincial landcover data. We obtained spatial wildfire data from Alberta Agriculture, Forestry and Rural Economic Development. For the food models, we used relative density data layers available from ABMI. These data layers are based on remote trail camera data and, in the case of grouse, point counts and automatic recording units.

Results

Wolverine detections by camera traps were associated with cooler mean annual temperature and the co-occurrence of lynx and prey species. Likewise, lynx detections were best explained by the co-occurrence of wolverines and prey species. Fisher were more likely to be found in areas with a higher mean annual temperature. Marten presence was positively associated with snow depth and negatively associated with the amount of conifer-dominated forest in the surrounding landscape.

Radio-collared wolverines selected for areas closer to treed peatlands, upland conifer, and upland mixedwood habitats. Conversely, wolverines showed lower relative use of areas near non-treed peatlands. There was a positive relationship with mean annual temperature, distance to major rivers, and distance to winter roads. Wolverine use was positively associated with medium age

and older burns, but negatively associated with young burns. However, wolverines did select for areas closer to the edge of young burns. The opposite relationship was observed for medium age and older burns. The best food model suggested that wolverines were positively associated with areas where you would expect higher wolf, grouse, and hare density, but they avoided areas closer to beaver habitat (Table 1).

Table 1. Wolverine coefficient estimates (β), standard errors (SE), and p values for the most parsimonious prey model, based on radio-collar data.

Parameter	β	SE	p
Mean Annual Temp	2.231	0.027	<0.001
Dist. Snowmobile Trail	0.000	0.038	0.999
Dist. Road	1.643	0.049	<0.001
Dist. Major River	0.299	0.014	<0.001
Dist. Non-treed Peatland	0.114	0.023	<0.001
Dist. Mash/Swamp	-0.044	0.021	0.037
Dist. Treed Peatland	-0.180	0.024	<0.001
Dist. Upland Conifer	-0.203	0.024	<0.001
Dist. Upland Mixed	-0.116	0.023	<0.001
Dist. Upland Shrub	0.008	0.021	0.698
Wolf density	0.047	0.019	0.014
Grouse density	0.060	0.021	0.004
Hare density	0.509	0.022	<0.001
Dist. Beaver Complex	0.066	0.018	<0.001

Conclusions

To address the data deficient status of wolverines in Alberta and to add to our understanding of the species for management purposes, we have been working with ATA and university researchers to learn more about the species in the province. Among the goals that we identified when we initiated this research was the desire to provide information that would be useful for conducting a status assessment. The provincial government has now started that process and will be utilizing information produced by this project. We also continue to learn about wolverine ecology by asking questions using data that was collected between 2011 and 2017. This year, we were able to learn more about how furbearer species may interact with the landscape and each

other. We were also able to investigate how wolverines in north-central Alberta may be using the landscape based on wildfire history and prey availability. A number of questions remain regarding wolverines in Alberta's boreal forest, including what role snowshoe hares play in wolverine distribution and population numbers.

Communications

We gave two presentations on our camera trap findings:

- The Wildlife Society international conference in Spokane, WA, in November 2022.
- Alberta Chapter of the Wildlife Society conference in Calgary in March 2023.

Literature Cited

Johnson, D.H. 1980. The Comparison of Usage and Availability Measurements for Evaluating Resource Preferences. *Ecology* 61:65–71.

Manly, B.F.J., L.L. McDonald, D.L. Thomas, T.L. McDonald, and W.P. Erickson. 2002. *Resource selection by animals: statistical design and analysis for field studies.* Second edition. Kluwer Academic Publishers, Dordrecht, The Netherlands.

Photos

Not applicable