

**Alberta Conservation Association
2019/20 Project Summary Report**

Project Name: Wolverine Reporting

Wildlife Program Manager: Doug Manzer

Project Lead: Robert Anderson

Primary ACA staff on project: Robert Anderson and Mike Jokinen

We greatly appreciate the work of Shevenell Webb who put in a lot of effort to make this project a success.

Partnerships

Alberta Environment and Parks

Alberta-Pacific Forest Industries Inc.

Alberta Trappers' Association

Animal Damage Control – A Division of Bushman Inc.

Daishowa-Marubeni International Ltd.

Crowsnest Conservation Society

McGill University

Roadrunner Leasing and Sales Ltd.

Shell Fueling Change

TD Friends of the Environment

University of Alberta

Key Findings

- A trapper local ecological knowledge paper was published in the *Wildlife Society Bulletin* in September 2019. This manuscript describes the variables associated with where trappers reported seeing wolverine sign on their traplines.

- A wolverine den paper was published in the *Canadian Field Naturalist* in September 2019. This manuscript is a descriptive paper that discusses the characteristics of dens used by our radio-collared wolverines in north-central Alberta.
- Female wolverines in the lowland boreal of Alberta appear to be selecting denning habitat that differs from what has been reported elsewhere. Seven of the eight dens were in a partially lifted root ball created by a leaning or fallen spruce tree. These were found in black spruce stands lacking in persistent spring snow coverage and characterized by hummocky, wet, and mossy terrain subject to windthrow.
- Camera trap data was used to investigate wolverine density in north-central Alberta, but we learned that our study area would have had to be several times larger to get a precise estimate.
- The first ever estimate of energy use by free-ranging wolverines was determined by a collaborating Ph.D. student using scat samples collected during the radio-collaring study.

Abstract

We worked with Alberta Trappers' Association (ATA) to identify where wolverines occur in the province and to determine the major factors associated with their distribution. Trapper local ecological knowledge demonstrated that wolverine sign is more likely to be found in trapping areas with less human disturbance. To investigate fine scale habitat use, movement, and denning behaviour in a landscape dominated by wildfires, we deployed radio collars on animals in north-central Alberta. A total of 10 wolverines were captured and fitted with collars over the course of the study. Two of the collared females had young during the study, providing us with valuable information about where wolverines den. Seven of the eight dens investigated were under a partially lifted root ball created by a leaning or fallen spruce tree. These were found in black spruce stands characterized by hummocky, wet, and mossy terrain subject to windthrow. Although field data collection has ended, we continue to work with the data to learn as much as we can about this data deficient species.

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, 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 Ph.D. students and other researchers in Canada, the United States, and Great Britain to learn as much as we can from the information we collected on this data deficient species.

Methods

In the early phase of the study, we asked trappers whether they had observed wolverine sign on their traplines (i.e. Registered Fur Management Areas (RFMA)). We analyzed this local ecological knowledge in relation to a suite of variables measured for each trapline. In more recent years, we focused on live capture, collaring, and recapture of wolverines, as well as the use of camera traps, to learn about the type of habitat they use. We investigated clusters of data points from reproducing females to identify the characteristics of their dens. Ongoing collaborations include a study on wolverine genetics across western Canada and United States, wolverine energy demands, and the role of co-created citizen science projects for conservation outcomes.

Results

Two important scientific papers were published this year from our local knowledge survey and radio-collaring work:

Across the province, trapper observations of wolverines were associated with less anthropogenic disturbance. Each increase of 1% in the amount of intact forest within an RFMA increased the odds of a trapper observing wolverine sign by 4% (Figure 1). In the boreal forest, wolverines were more likely to be found in areas that had a cooler climate and more intact forest.

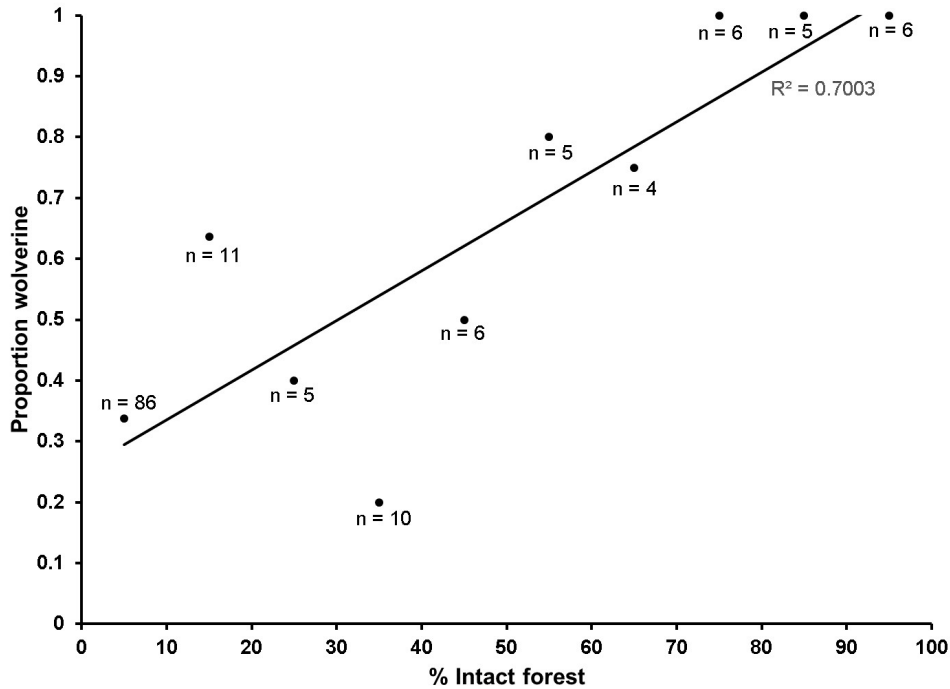


Figure 1. As the amount of intact forest in the surrounding area increased, so too did the proportion of trappers reporting that they had seen wolverine sign. For example, for the 86 trappers that had between 0 and 10% intact forest on their trapline, only one third reported seeing wolverine sign; whereas, all of the 17 trappers that had between 70 and 100% intact forest on their traplines reported seeing wolverine sign.

Wolverine dens have previously been documented under wind-drifted snow, large boulders, and trees in areas with deep snow (Magoun and Copeland 1998, Krebs and Lewis 2000, Dawson et al. 2010, May et al. 2012, Makkonen 2015), but these features are lacking in the boreal forests of northern Alberta. Instead, seven of the eight wolverine dens in our study were in the hollow created by a partially uplifted root mass (i.e., root ball, root wad) of a leaning or fallen spruce tree. One den was under decayed logging debris in a ~30-year-old regenerating deciduous forest. Seven of eight dens were in mature (50–120 years) or old (> 120 years) black spruce stands. Two of the seven dens were in mossy formations originating from an uplifted root mass, but the trees had decayed, while the other dens were braced by the roots of intact leaning or fallen spruce trees. Root mass dens require little to no excavation by a wolverine as a natural cavity is created when a thick moss blanket separates from the soil below as the shallow roots of a leaning or fallen tree upheave. The lateral roots form the skeleton of the den, which supports a dense mat of

soil and moss creating the den walls. Internal den dimensions were slightly variable in size, but den size was ultimately determined by the extent of the root heave (~1 m x 1 m). A soccer ball-sized opening (~30 cm) often created the den entryway and most dens had alternate openings or potential escape routes in the walls.

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. Part of that process is to publish our findings in scientific journals. This year, we made progress with two of those papers. Insights from trappers provided valuable baseline data on a sensitive species that is complementary to other research findings and stimulated hypotheses that wolverines in northern Alberta are linked to cooler climates and less-disturbed environments. Collared female wolverines used locally available denning structures in the lowland boreal forest, despite a lack of deep snow, persistent spring snow cover, or large boulders documented in other studies. During the coming year (2020/21), we will be contributing to a state-of-knowledge report for wolverines in Alberta, which will help to determine whether enough new information exists to conduct an updated status assessment for the province.

Literature Cited

- Dawson, N.F., A.J. Magoun, J. Bowman, and J.C. Ray. 2010. Wolverine, *Gulo gulo*, home range size and denning habitat in lowland boreal forest in Ontario. Canadian Field-Naturalist 124: 139–144.
- Krebs, J.A., and D. Lewis. 2000. Wolverine ecology and habitat use in the North Columbia Mountains: Progress Report. Pages 695–703 in Proceedings of Biology and Management of Species at Risk, Kamloops B.C.
- May, R., L. Gorini, J. van Dijk, H. Brøseth, J.D.C. Linnell, and A. Landa. 2012. Habitat

- characteristics associated with wolverine den sites in Norwegian multiple-use landscapes. *Journal of Zoology* 287: 195–204.
- Magoun, A.J., and J.P. Copeland. 1998. Characteristics of wolverine reproductive den sites. *Journal of Wildlife Management* 62: 1313–1320.
- Makkonen, T. 2015. Den site characteristics of female wolverine (*Gulo gulo*) in Scandinavian forested landscape. M.Sc. thesis, University of Oulo, Sweden.

Communications

- Webb, S.M., R.B. Anderson, M.E. Jokinen, B. Abercrombie, B. Bildson, and D.L. Manzer. 2019. Incorporating Local Ecological Knowledge to Explore Wolverine Distribution in Alberta, Canada. *Wildlife Society Bulletin* 43(3): 414-424.
- Jokinen, M.E., S.M. Webb, D.L. Manzer, and R.B. Anderson. 2019. Characteristics of Wolverine Dens in the Lowland Boreal Forest of north-central Alberta. *Canadian Field Naturalist* 133(1): 1-15.
- In response to these scientific publications, a writer for The Wildlife Society wrote an online article on ATA and ACA's collaboration to study wolverines in Alberta
- We gave a presentation on our den findings at the Alberta Chapter of the Wildlife Society conference, which was held in Camrose in March 2020.
- Updates continued to be provided to participating trappers via the furbearer newsletter in June 2019 and November 2019.
- In addition to reads via the journals themselves, the two papers have received over 200 reads on ResearchGate and they have also been posted on ATA's and ACA's websites for public access.

Photos



Trappers acquire local ecological knowledge while spending time on their traplines. We were able to tap into this resource to learn about the habitat that wolverines use in Alberta. ACA staff assisting a trapper while checking run poles on his line. Photo: A. Murphy



Most of the wolverine dens that we found were under the partially uplifted roots of a leaning spruce tree. Photo: M. Jokinen