Alberta Conservation Association
2016/17 Project Summary Report

Project Name: Working with Alberta's Trappers to Map Wolverine Distribution and Identify Conservation Risks

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We also 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 Trappers' Association
Animal Damage Control – A Division of Bushman Inc.
Daishowa-Marubeni International Ltd.
Environment and Climate Change Canada
Harvest Operations Corp.
Shell FuellingChange
Trapper Gord Homestead & Survival
United States Forest Service Genetics Laboratory
University of Alberta
Individual Donors – W. Sullivan

Key Findings

- Wolverines visited 8 of the 46 run-pole sites during the winter of 2015/16, near Hawk Hills, Milligan Hills, Rainbow Lake, High Level, Thurston Lake and Birch Mountains.
- Fisher were very common and visited 28 of the 46 sites, and lynx visited 18 of the 46 sites.
- We identified 23 individual wolverines from their unique chest patterns using camera images from winter 2015/16, including 7 wolverines that had been identified in previous winters.
- Using non-lethal methods, we collected hair samples from 12 marten, 52 fisher, 16 lynx, 1 coyote, 1 black bear, 1 squirrel, 6 weasel and 24 wolverine visits during winter 2015/16 (though many samples may be repeat individuals).
- After analysing 222,869 photos of animals at run pole sites, we determined that wolverines visited a minimum of 568 times. We also recorded 22 black bear, 11 coyote, 1 cougar, 904 fisher, 20 deer species, 311 bird species, 9 flying squirrel, 465 lynx, 399 marten, 5 moose, 84 weasel, 15 snowshoe hare, 244 red squirrel and 3 wolf visits.

Introduction

We partnered with the Alberta Trappers' Association (ATA) to identify where wolverines and other focal furbearers occur in the province and to determine the major factors associated with their distribution. In addition, we hope to better understand wolverine gene flow within Alberta and between Alberta and other jurisdictions, which will provide useful information to help conserve this species over the long term. We predicted that areas with high human disturbance would have a lower probability of use by wolverines, and areas predicted to have cooler theoretical temperatures (i.e., further North and higher elevations) would have a higher probability of use. Because lynx also thrive in areas that receive deep snow and have been shown to prefer thick conifer canopy inhabited by their primary prey (snowshoe hare), we predicted that lynx occupancy would be greater in areas that have cooler theoretical temperatures and greater conifer forest cover. We predicted that fisher would be more abundant in areas with lower human disturbance and with greater deciduous and/or mixed canopy cover. We also predicted that wolverines in the boreal forest would be more closely related to each other than they were to wolverines in the mountains.

Methods

The field component of the wolverine distribution project has been largely focused on a citizen-science approach in which ATA members collect wolverine population and distribution data using a run pole (bait, hair snag, and trail camera) field protocol (Magoun et al. 2011). We tested the method during winter 2011/12 and expanded the field program in 2012/13 to include trappers province-wide who span a variety of habitats. In 2013/14, 2014/15 and 2015/16, we concentrated our efforts in the Boreal natural region because very little is known about wolverines in this area. Our study area stretched roughly from Cold Lake to Grande Prairie and north to the Northwest Territories border. Genetic information (DNA) in hair samples will help us understand genetic relationships of wolverines across the province, and occurrence data (photos) will provide information on the distribution of wolverines in relation to factors such as human disturbance and landscape features.

Results

Camera images collected in 2013/14 were analyzed during the spring and summer of 2014. Photos collected during the winter of 2014/15 were analyzed during the spring and summer of 2015. Finally, photos collected during the winter of 2015/16 were analyzed during the spring and summer of 2016.

Between November 2015 and April 2016, volunteer trappers and ACA staff deployed 46 run-pole camera stations, set up on 34 different Registered Fur Management Areas (traplines), to passively collect wolverine photographs and hair (DNA) samples. After analysing 222,869 photos of animals at run pole sites, we determined that wolverines visited a minimum of 568 times. A new visit was recorded when there was greater than one hour between visits. Other data included 22 black bear, 11 coyote, 1 cougar, 904 fisher, 20 deer species, 311 bird species, 9 flying squirrel, 465 lynx, 399 marten, 5 moose, 84 weasel, 15 snowshoe hare, 244 red squirrel, and 3 wolf visits. Wolverines were detected at 8 of the 46 sites during the winter of 2015/16, near Hawk Hills, Milligan Hills, Rainbow Lake, High Level, Thurston Lake and Birch

Mountains. We identified at least 23 different wolverines based on unique markings, including 7 individuals that were detected in previous winters.

Occupancy was lower than previous winters, but we found a similar trend in increasing number of sites with wolverine activity from January to March (December: 2 sites, January: 5 sites; February: 6 sites; March: 5 sites). Occupancy analysis of the traplines sampled in multiple winters (2013 – 2016) indicated that wolverines were more likely to be found at northerly latitudes. Wolverine occupancy was negatively associated with oil and gas well sites and road density, and positively associated with cooler theoretical temperatures (Figure 1). We found similar patterns when analyzing data from the surveyed traplines in the Boreal (2013 – 2016). Wolverine occurrence was positively associated with intact forest, snow depth and cooler theoretical temperatures, and negatively associated with density of roads and wells; earlier findings showed that wolverines tended to occur further from towns, in areas with more conifer forest, lower road densities, and cooler theoretical temperatures (Figure 2). There was high overlap in occurrence of wolverine and lynx throughout our study. Lynx occurred at all latitudes (54 – 59°N) but appeared to be more common at northerly latitudes. Conifer forest and snow depth were the most important variables in predicting lynx occurrence. In contrast, fisher were typically associated with areas located closer to towns, with more deciduous forest cover and shallow snow depths. We did not find any significant associations between lynx and fisher and disturbance variables (e.g., roads, wells, intact forest).

We submitted the remaining wolverine DNA samples to the United States Forest Service Genetics Laboratory in December 2016 to determine individual, gender and haplotype. Our samples included tissue submitted by trappers from harvested wolverines between 2012 and 2016 (27 samples) and hair collected from run poles between 2014 and 2016 (28 samples).

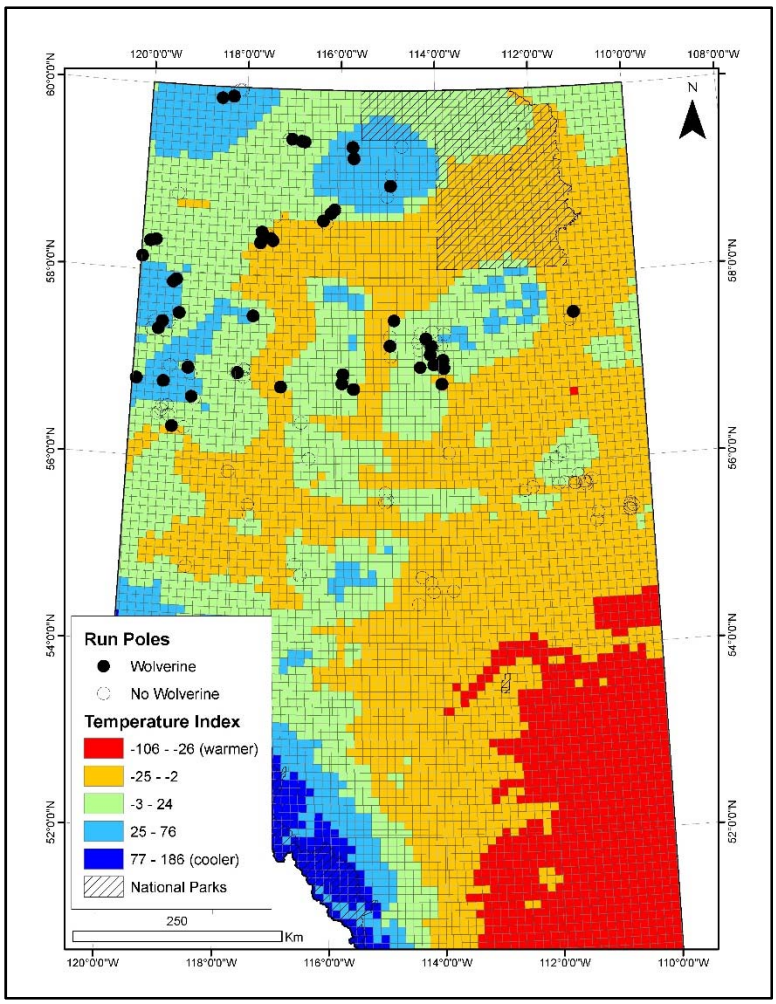

Figure 1. Over three winters (2013 –2016), we have found that wolverines tend to occur in townships predicted to have cooler theoretical climates (higher index value represents a cooler overall theoretical climate, but does not represent an actual temperature), based on elevation and latitude.

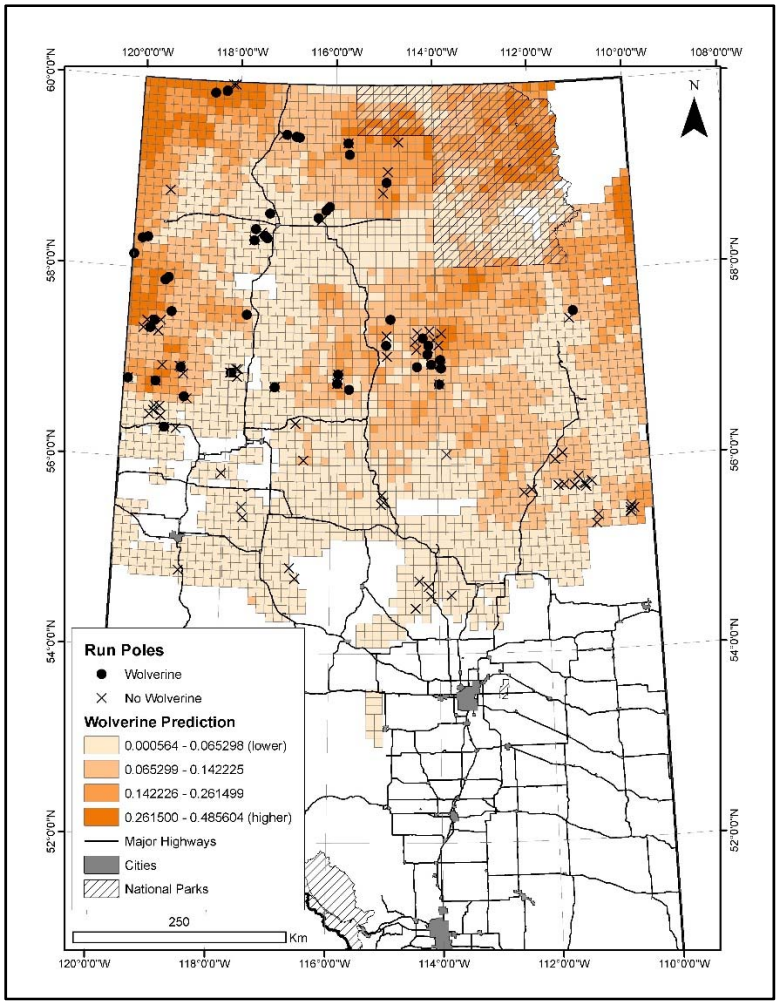

Figure 2. Comparison of places where wolverines were detected (black circles) and not detected (X) from 2013 – 2016 relative to predicted occurrence based on township proximity to nearest town, percent conifer, road density and temperature index in the Boreal Forest. Darker colours indicate higher probability of wolverine occurrence in a township.

Conclusions

Field data collected in a partnership between trappers and biologists has shed light on wolverines in an understudied part of their range. At a coarse scale, we saw that wolverines are more likely to be found in areas predicted to have cooler climates. Contrary to what we expected, we did not find Boreal wolverines to be associated with the distribution of late spring snow. Wolverines and lynx appear to have a high level of overlap in occurrence and seem to prefer conifer cover, whereas fishers tend to occur in areas where the canopy cover is dominated by deciduous trees. Many of these field results mirror the conclusions of our trapper traditional knowledge survey and harvest analyses, which highlight the value of the information that this user group can contribute to discussions regarding long-term species conservation and sustainable management of the province's furbearer populations.

Communications

Presentations

- Information booth at the Alberta Trappers' Rendezvous, Pincher Creek, AB, July 2016
- Project update provided at the ATA AGM, Westlock, AB, September 2016
- Poster and paper presentations at The Wildlife Society Conference, North Carolina, U.S.A, October 2016
- "Skin in the game: Trappers take on the role of citizen scientists to study wolverines in a changing landscape": presentation given to McGill University Fish and Wildlife Management class, Montreal, QC, October 2016

Other

- Produced quarterly project newsletters
- Produced project progress report
- Conducted annual planning meeting with ATA representatives and University of Alberta, Sherwood Park, AB, May 2016
- Provided updates for ACA website and Facebook site
- Articles on the wolverine work published in *Alberta Trapper* magazine
- Article "Trappers as citizen scientist" published in *Wildlife Professional*, a magazine produced by The Wildlife Society, April 2016
- Peer-reviewed article published in a wildlife journal: Distribution of female wolverines relative to snow cover, Alberta, Canada. Journal of Wildlife Management 80: 1461–1470.
- Online article "JWM study: How much snow cover do female wolverines need?" published on The Wildlife Society's website, November 2016

Literature Cited

Magoun, A.J., C.D. Long, M.K. Schwartz, K.L. Pilgrim, R.E. Lowell and P. Valkenburg. 2011. Integrating motion-detection cameras and hair snags for wolverine identification. Journal of Wildlife Management 75: 731–739.

Photos

Two white-toed marten fed on the bait together during several occasions. A third marten with dark feet was also spotted at this site during a separate event. Photo: Alberta Conservation Association

A female fisher visits a run pole in early spring. Fisher were very common, occurring at 57% of all sites in the Boreal Forest (2013 – 2016). Photo: Alberta Conservation Association

Wolverine W1 is a male who has visited a run pole near Rainbow Lake for five winters (2011 - 2016). Unique markings, like the “M” near W1’s left shoulder, do not change as an animal gets older and help us to identify individual wolverines. Photo: Alberta Conservation Association

We sometimes capture more than one wolverine visiting a run pole at the same time, like wolverines W99 and W100 near Rainbow Lake. We suspect that these interactions are often two young siblings following mom or dad around, getting accustomed to life on their own. More commonly, we see the adult show up at a run pole and then a few hours later one of their young show up to see what mom or dad have been up to. Photo: Alberta Conservation Association