Red Lake Wolverine Project Field Report 2019/2020

BACKGROUND

Wildlife Conservation Society Canada (WCSC) initiated a wolverine field study in Red Lake in the spring of 2018 that has continued through the winter and summer of 2020. Below we briefly describe the rationale for the study, the methods associated with our research objectives, and descriptive information about our initial findings. A series of photos, maps, and tables, referenced in the text, follow the report starting on page 9.

Wolverines are listed as threatened under the Ontario *Endangered Species Act, 2007*. The Ontario government's primary rationale for listing wolverines is that there are fewer than 1000 individuals in Ontario. Scientists drafted a Wolverine Recovery Strategy (2013) in response to their listing and the Ministry of Natural Resources and Forestry (MNRF) followed with a Government Response Statement (2016) that prioritized research and conservation measures for wolverines in Ontario. Our project is designed to address 3 high-priority action items in the Government Response Statement including: 1) producing data that quantifies wolverine abundance in Red Lake and across the Ontario shield (Action #1); 2) determining wolverine habitat use and den-site selection in response to industrial disturbance (Action #2); and 3) developing best-management practices for human activities in wolverine habitats (Action #7). Our field work centers around documenting wolverine movement, distribution, and abundance in Red Lake, Ontario with the use of live traps, GPS collars, and run poles.

Project funders include the W. Garfield Weston Foundation, the Ontario Species at Risk Stewardship Fund administered by the MNRF, Evolution, and Domtar. The field crew is comprised of seasonal technicians, WCSC scientists, and local trappers.

METHODS & RESULTS

Wolverine captures/detections

An accurate estimate of wolverine abundance is necessary for managers to assess the current status of wolverines in Ontario and for use as a baseline assessment for future monitoring. We are estimating wolverine abundance in Red Lake by identifying the number of unique individual wolverines at live traps and run poles. Live traps are baited with trapper-donated beaver carcasses (Fig. 1). When a wolverine pulls on the beaver bait in the trap, the trap lid closes and a satellite-trap transmitter immediately notifies field crews of the capture location. Wolverines captured at live traps are sedated by field technicians and given ear tags to identify individuals. We also take hair, tissue, and physical measurements and attach a GPS collar.

Run poles are a non-invasive method of identifying individual wolverines by their unique chest markings (Fig. 2). We also bait run poles with beaver carcasses and when the wolverine uses the

WCS Canada
10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

run pole to access the bait, a motion-sensor camera opposite the bait takes a pictures of the wolverine, hopefully with a clear view of its chest. Moreover, barbed wire on the run pole snares hair samples for DNA analyses. It also is possible to identify individual wolverines at run poles if they have ear tags or GPS collars.

We established 10 live traps in the spring of 2018, an additional 13 live traps and 5 run poles in the winter of 2018/2019, and an additional 5 live traps and 4 run poles in the winter of 2019/2020. In total, there are 28 live traps and 9 run poles distributed throughout our 6,500 km^2 study area (Fig. 3). Live traps and run poles have been operational for a total of 6,563 trap nights over the course of the project. For live traps specifically, there were 259 trap nights in the spring 2018 field season, 2,321 trap nights in the winter 2018/2019 field season, and 2,789 trap nights in the winter 2019/2020 field season. The increased number of trap nights last season is because there were more live traps and run poles on the landscape

We captured and collared 2 wolverines (1 female and 1 male) during the spring 2018 field season. During the winter of 2018/2019, we collared 8 new wolverines (1 female and 7 males). During the winter of 2019/2020, we collared 21 new wolverines (8 females and 13 males). In total, we have collared 31 individual wolverines (10 females and 21 males) at our live traps. The physical measurements from these animals are in Table 1.

We have identified 7 additional wolverines at run poles and live traps (wolverines we have been unable to live trap) based on photographs of unique chest patterns. There are also unknown wolverines at live traps and run poles, who we suspect are new individuals based on locations and timing, but who are difficult to identify because of poor-quality chest pictures. Therefore, between live traps and run poles, we have estimated a minimum of 38 wolverines in the Red Lake area.

The specific live trap and run pole locations where wolverines were first detected (with photographs or physically captured) can be seen in Figure 4. For example, 4 different wolverines were first detected at a live trap to the east of Little Vermillion Lake (Silver) (Fig. 4).

We are often able to detect the same wolverine in multiple field seasons - Table 2 provides a summary of the number of days per field season that wolverines were detected at live traps and run poles. For example, we have detected wolverine F01 in each of our 3 winter-field seasons. This table also shows that wolverines were frequently detected at multiple run poles and live traps across the study area. For example, wolverine M03 (an "M" before the ID designates a male, an "F' a female) has been detected at 6 live traps over the course of the project. The wolverines we were not able to recapture in 2019/2020 that were captured and collared in 2018/2019 were F02, M06, M07, and M08 (Table 2) – all of these wolverines have dropped their GPS collars. There were no wolverines collared in the 2018/2019 field season that have not since been recaptured or dropped their collars.

We have been able to detect wolverines at 87% of our live traps and run poles within 12 weeks of establishing and baiting them, with 52% of sites detecting a wolverine within 5 weeks. One site took 322 days to detect a single wolverine whereas a different site detected a wolverine

WCS CANADA
10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

within 2 days of us building it. There are 8 sites where we have not yet detected a wolverine – these sites have been baited for an average of 107 days.

There is general increase in our success with live trapping wolverines as the field season progresses into spring. Our capture success (trap nights per wolverine capture during the 2019/2020 field season) was 0.16 in November and December, 0.18 in January, 0.21 in February, 0.37 in March, and 0.49 in April. One potential reason for this pattern is that wolverines increase their movement in the spring (discussed below).

Tracking wolverines

We are using GPS collars to track wolverine movement, den use, foraging, and habitat selection relative to available habitats (e.g., streams, lakes, forest cover, roads, cutblocks) in Red Lake. This information will be important for developing best-management practices for wolverine habitats in areas with commercial forestry. The GPS collars are programmed to take GPS positions every 2 hours for 12-16 months before the remote drop-off triggers and the collar falls off the wolverine or we can recapture the wolverine in a live trap.

We have collected a total of 33,317 GPS locations from 27 wolverines (9 females and 18 males) between spring 2018 and August 2020 (Fig. 5). The median (minimum, maximum) number of GPS locations from males is 1010 (301, 3492) and for females is 963 (455, 3836). A large portion of our GPS locations are from the summer relative to the winter, which is because we capture many of our wolverines in the latter part of the winter. Below we provide some descriptive statistics from these data.

Home-range size

The median (minimum, maximum) female wolverine home-range size (polygon around 95% of the wolverine's GPS locations) was 665 km^2 (71 km^2, 42,986 km^2) (Fig. 6) whereas median male home-range size was 1,388 km^2 (190 km^2, 13,235 km^2) (Fig. 7). The smallest female home range (71 km^2) was from F05 who was denning during spring 2020 – potentially biasing this estimate low because she was bound to a reproductive den. The smallest male home range (190 km^2) was from wolverine M06. When we captured M06 in February 2019 he was not yet sexually mature. Since F05 and M06 have home ranges that overlap considerably, this suggests that M06 could be F05's offspring and therefore similarly have a small home range that corresponds to his mother. The large male and female home ranges are associated with juvenile wolverines that are often dispersing or exploring new territory. We believe that wolverine M02, M16, and M17 are resident males with breeding partners (Fig. 7).

Dispersal or exploratory movements

There were 7 wolverines (1 female and 6 males) that displayed significant dispersal or exploratory movement from the study area. Among these 7, wolverine F03 and M15 have displayed the most significant movements and interestingly both initiated these movements on March 26th, 2020 (Fig. 8). Wolverine F03 moved 385 km north while wolverine M15 moved 287

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

km east – these distances represent the straight-line distance from one end of their home range to the other – therefore their actual movements are much greater in length.

Although wolverine M03 spends much of his time in the Red Lake area, we have noticed him making considerable movements north (90-150 km) on 4 separate occasions - with him returning to Red Lake after each excursion (Fig. 9). These movements increased considerably in the summer of 2020, suggesting he is a juvenile that might soon permanently move to a new home range. However, M03 was in the Red Lake area as of August 2020.

Movement distances

By connecting sequential GPS locations with a line, we get a rough understanding of the distances that wolverines travel over a specific time period. Most wolverine movements are less than 1 km over a 24-hour period (Fig. 10) – this pattern likely results from wolverines localizing movements to feed or search for food in a particular area of their home range. Wolverine movements over a 24-hour period can be more than 20 km though (Fig. 10).

Throughout the year, wolverine movement increases in late spring and early summer – likely as a result of movement for mating or dispersal (Fig. 11). The low movement distances in February might represent localization during the reproductive period (Fig. 11).

Foraging locations

We have visited a total of 33 GPS clusters, or concentrations of wolverine GPS locations from individual wolverines, since the project began in the spring of 2018. We have found evidence of prey remains at 21 of these clusters - 7 with evidence of moose remains, 4 with evidence of beaver remains, and 2 with evidence of snowshoe hare remains. There were single incidents of wolverines foraging a bear, caribou, and another wolverine plus many with unknown prey. Below we describe in more detail what we found at a few of these foraging sites.

Caribou carcass near Coli Road - M19 was first captured March 7, 2020 near Coli Creek, and because of his worn teeth, appears to be one of the oldest males we are monitoring. The day after M19 was released from the live trap he localized his movements just north of the trap. We were not exactly sure what he was doing but our first thought was that his collar had fallen off. But we did notice some slight movements from the collar. Was a scavenger pushing the collar around? We hiked into the location and discovered that M19 had found a winter-killed caribou. The carcass was buried under hard-packed snow and M19 dug a tunnel into the ribcage, where he ate all the insides without eating any of the muscle. He had small caves in the snow beside the caribou where he was sheltering when digesting or resting. We left cameras at the site and recorded photos of him feeding (Fig. 12). Surprisingly, without ever eating any muscle from the carcass, he went north to Pikangikum and has stayed there since. Sometimes older wolverines like M19 become nomadic after they are displaced from their home range – maybe that explains some of his behaviour?

WCS Canada
10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Moose carcass off Red Lake - F04 was first captured on December 13, 2019 near Mt. Jaime Road. In mid-February 2020, we noticed that she began to localize her movements in a small area west of Alford Lake. This localization corresponded with the reproductive period so we walked-in to investigate if she was denning, but what we found was a large area covered in moose fur, wolverine scat, and abundant wolverine tracks – F05 had been scavenging a moose carcass and eating much of the bone. It is unclear if the site was a scavenged wolf kill, a winter-killed moose, or even a weakened moose killed by F04. The only bones left were half of the lower jaw and the roof of the mouth with a few teeth. There were beds and trails all around but no sign of a reproductive den.

Madsen wolverine resting site – We noticed that M05 was spending most of his time in a small area just south of Faulkenham Lake. Don Billard showed us the way to the area where we found evidence that M05 had numerous snow caves under fallen trees that were the victim of a recent wind storm. Other times we have seen these caves under beaver-felled trees. We found no sign of any kill, although many scats which contained beaver fur.

Dixie wolverine den/resting site – We found another wolverine resting site just north of the Dixie Road (Fig. 13). Again, this site was a snow cave dug under a few fallen trees and was used by both F07 and M17. Around the site were the remains of numerous snowshoe hares suggesting it was an important foraging area for these wolverines.

Wolverine reproductive dens

We use a few pieces of evidence to justify searching for a wolverine reproductive den: a female expressing milk through her teats during handling, localization of female movement during the reproductive period, and missed GPS locations from a female collar during the reproductive period. The missed GPS locations or fixes generally occur because a female is in a den and the collar can't acquire satellites for an accurate GPS fix. Sometimes days or weeks will pass before a collar can take a GPS fix because the female does not often leave the den – this information in itself gives us a good idea of when and how often females leave dens during the early reproductive period. We are generally only able to track a female successfully to her den after the first emergence of the female from her den after having her kits. This is because the collar will provide a few GPS locations near the den – although sometimes still many kilometers away from the actual den site. To find the den, we have to use an antenna to track the VHF signal from the wolverine GPS collar on foot or during a flight – however the signal generally only carries 1-2 km in the bush – making this task difficult at times! Ideally, the female is in the den when we track her and shows us the exact structure and location she is using. Below we discuss the behaviours of known reproductive females in our study area.

Wolverine F01

We found wolverine F01's reproductive den in the spring of 2018. This winter, the GPS locations from F01 suggested she entered into a den on February 17, 2020. The MNRF helped us by flying for her VHF signal and they were able to spot her on the ice on Little Trout Lake at a

moose carcass. F01 was at this carcass a number of times over the next few weeks. Ultimately, we were never able to confirm that F01 denned this spring.

Wolverine F05

We first captured wolverine F05 on February 16, 2020 near Walsh Lake. She did not have visible teats but she weighed 11.75 kg - fairly heavy for a female which made us suspicious she was pregnant. Based on missed GPS fixes, we think that F05 went into her den and had her kits on February 26th. The MNRF flew looking for F05's VHF signal and spotted her in open forest but not at a den. We eventually found her den on foot on March 28th near the Nungesser Road. We walked into her den and she was inside the den structure when we got there. Her den was in a forestry slash pile in a small forest opening near a snowmobile route (Fig. 14). The den was near the edge of the forest and there were dispersed bushes throughout the forest opening. There appeared to be single entrance to the den and there were well-worn paths in and out of the entrance hole. We left a camera at the den and the recovered pictures showed her often coming and going from the den over many weeks (Fig. 15). Interestingly, we also found that wolverine M02 was visiting her den, suggesting that he is the father of her kits (Fig. 16). We monitored F05 with VHF until late-April and she appeared to continue use of the slash pile for the duration of the early spring denning period. We left a camera at the den and plan to retrieve it this fall.

Wolverine F07

We first captured F07 on March 22, 2020 near Dixie Lake. We found she had teats that were expressing milk (lactating). We used the VHF signal to track her to her den on March 27th. She was in her den when we found it and left the area during our approach in plain view of us – then she circled the area while we were at the den. The den was located on a north facing rocky face overlooking a fen – much of the country that we covered while searching for her den was hilly with large rock features. Her den entrance was situated in a rock crack covered with snow (Fig. 17-19). There were very well worn paths in and out of the den and there appeared to only be a single entrance hole. We believe that F07 abandoned this den a few days after we found it. We searched for her secondary den but were unable to find it. We believe that M17 is the breeding partner of F07 because M17 appeared to be an adult wolverine and the 2 wolverines traveled closely together during the reproductive period.

Wolverine F09

We first captured F09 on April 1, 2020 near Little Vermillion Lake and found she was lactating. We conducted an extensive search to find her reproductive den but we were never able to locate it.

Wolverine mortalities

We documented 4 wolverine mortalities this field season. Three of these mortalities were from wolverines getting caught in wolf and lynx snares or marten sets. Wolverine M05, who was missing his front right paw, was hit and killed by vehicle west of Red Lake.

Other wildlife at live traps

Wolves were seen over 12 days at 6 sites (either run pole or live trap) – we did not live trap a wolf this winter although we did during the winter of 2018/2019. Lynx were frequently seen on cameras at trap sites (seen 311 days at 18 sites). We would catch lynx in our live traps but tried to avoid these captures by making it more difficult for lynx to pull the bait and trigger the trap, or by closing traps until the lynx left. Marten were the most frequent visitors to our sites (seen 921 days at 31 sites) and would sometimes be able to trigger live traps if the bait was not secured properly or the individual was particularly tenacious.

Road cameras

We distributed cameras on roads to document their use by wildlife, with a specific focus on understanding wolverine and wolf use of roads for movement. We have deployed road cameras along road sections over 4 winter or summer seasons, with 54 road sections monitored in the winter of 2018/2019, 19 in the summer of 2019, 58 in the winter of 2019/2020, and 19 in the summer of 2020. We summarize some of the road-camera data from the summer of 2019 based on the number of independent observations, or events, of wildlife on roads. There were a total of 1,523 wildlife events at road cameras during the summer of 2019. Not surprisingly, vehicles were seen on road cameras more than wildlife during the summer. There were only 2 events where wolverines were seen on roads, but wolves (n = 110 events) (Fig. 20), moose (n = 102 events), and lynx (n = 132 events) were regularly seen using roads. Black bears used roads the most of any wildlife species during the summer (n = 209 events) (Fig. 21; Fig. 22). A summary of the number of events by wildlife species (and non-wildlife events) is in Figure 23. Black bears were most often observed using roads during twilight hours whereas wolves, lynx, and to some extent moose used roads most at night (Fig. 24).

Carnivore track project

We helped collect field data for a wolverine track study started by the Cascade Carnivore Project in Washington, USA (cascadescarnivore.org). This effort was lead by WCSC field assistant Anna Machowicz. The aim of the project is to evaluate the ability of citizen scientists to correctly identify wolverine tracks from other carnivores such as lynx, wolf, and fisher, helping researchers understand the reliability of track observations submitted by the public. Our role was to collect tracks from carnivores that we directly observed in the field. Citizen scientists would then be tested on which species these tracks were associated with. Last winter we collected 27 tracks – 19 from wolverines (Fig. 25), 6 from lynx, and 2 from wolves.

DISCUSSION AND FUTURE PLANS

We detected many more wolverines in the winter of 2019/2020 than in previous winters. There are a few potential reasons for this increase: 1) a warm winter that encouraged greater wolverine movement – the winter prior (2018/2019) had long periods with extreme cold; 2) a larger number of live traps operational across the study area - we started the 2018/2019 field season with 10 traps and started the 2019/2020 field season with 23 traps – moreover live traps were open for a

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

longer period of time; and 3) dogged determination – we worked really hard this winter, with long days in the field, although prior winters had very similar field schedules.
The increase in females is a critical success for the project because many of our study objectives are focused on understanding the ecology of reproductive female wolverines in Red Lake. We increased our sample of known reproductive dens from 1 to 3. These den locations have been given to the MNRF, and we have worked with the MNRF to develop plans to manage the habitats around these dens to reduce human disturbance.

We believe that we now have sufficient data to develop a reliable estimate of wolverine abundance and density in Red Lake. We will work over the coming year to make an estimate of density. Moreover, we will model the factors that affect density, such as land cover or human disturbance.

As we found after the 2018/2019 field season, there is a skewed sex ratio in Red Lake towards males. Over our 6,500 km^2 study area we have only been able to detect 10 females suggesting that they exist at very low densities in the southern boreal forest of Ontario. Relatedly, we are monitoring many young males that are dispersing from or through the study area. These two observations together suggest that the Red Lake wolverine population is representative of population at the edge of its distribution – where habitats might not be ideal for wolverines. We will dig into this question more in the future.

Our field work will start again in mid-November 2020 and continue through April 2021. We will continue much of the same work from previous winters, but especially focus on finding new female ranges and their dens. Moreover, we want to track wolverines more closely, especially females, to understand what they are eating. We also will work closely with Red Lake High School to involve students in field work and data analyses – this work is in collaboration with Newmont.

ACKNOWLEDGEMENTS
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WCS CANADA
10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

FIGURES

Figure 1. Wolverine live trap in Red Lake, Ontario. The wolverine is attracted to the live trap because of the beaver bait that is inside. When the wolverine pulls on the bait, the trap door closes and we are notified through satellite message that the trap is sprung.

WCS Canada
10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 2. Wolverine run pole in Red Lake, Ontario. Much like the live trap, the wolverine is attracted to the run pole because of beaver bait that is hanging from a wire. When the wolverine tries to access the bait a camera opposite the wolverine takes a picture of its chest. We can then use this picture to identify unique individuals. Moreover, the uprights on the run pole have barbed wire that snares hair samples for DNA analyses.

WCS Canada
10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

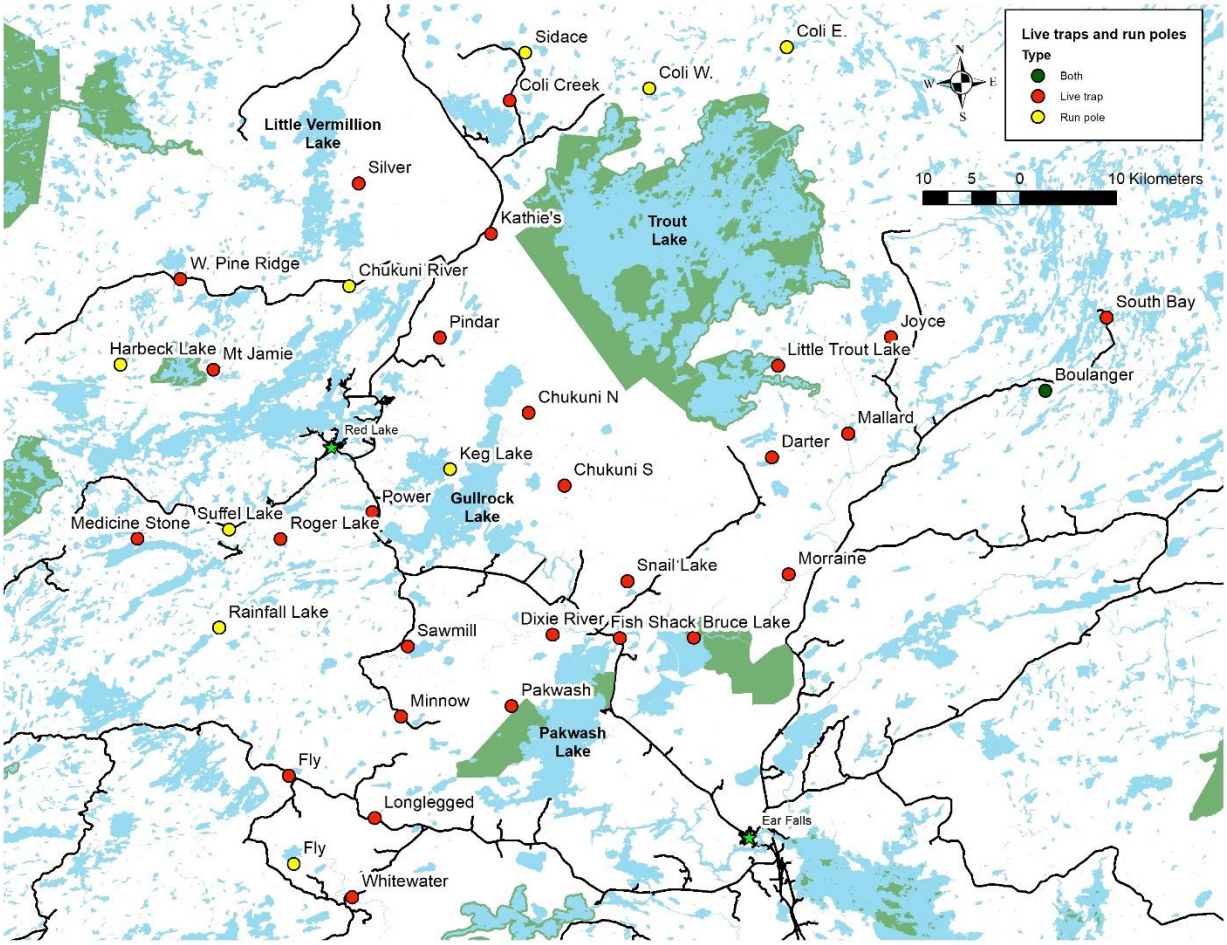

Figure 3. The distribution of live traps and run poles in Red Lake, Ontario. The "red dots" are live traps, the 'yellow dots' are run poles, and a "green dot" indicates there is both a live trap and run pole at that location. We try to space live traps and run poles ~15 km from each other. A polygon surrounding the live traps and run poles measures 6,500 km^2 which is the approximate area we call our study area.

WCS Canada
10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

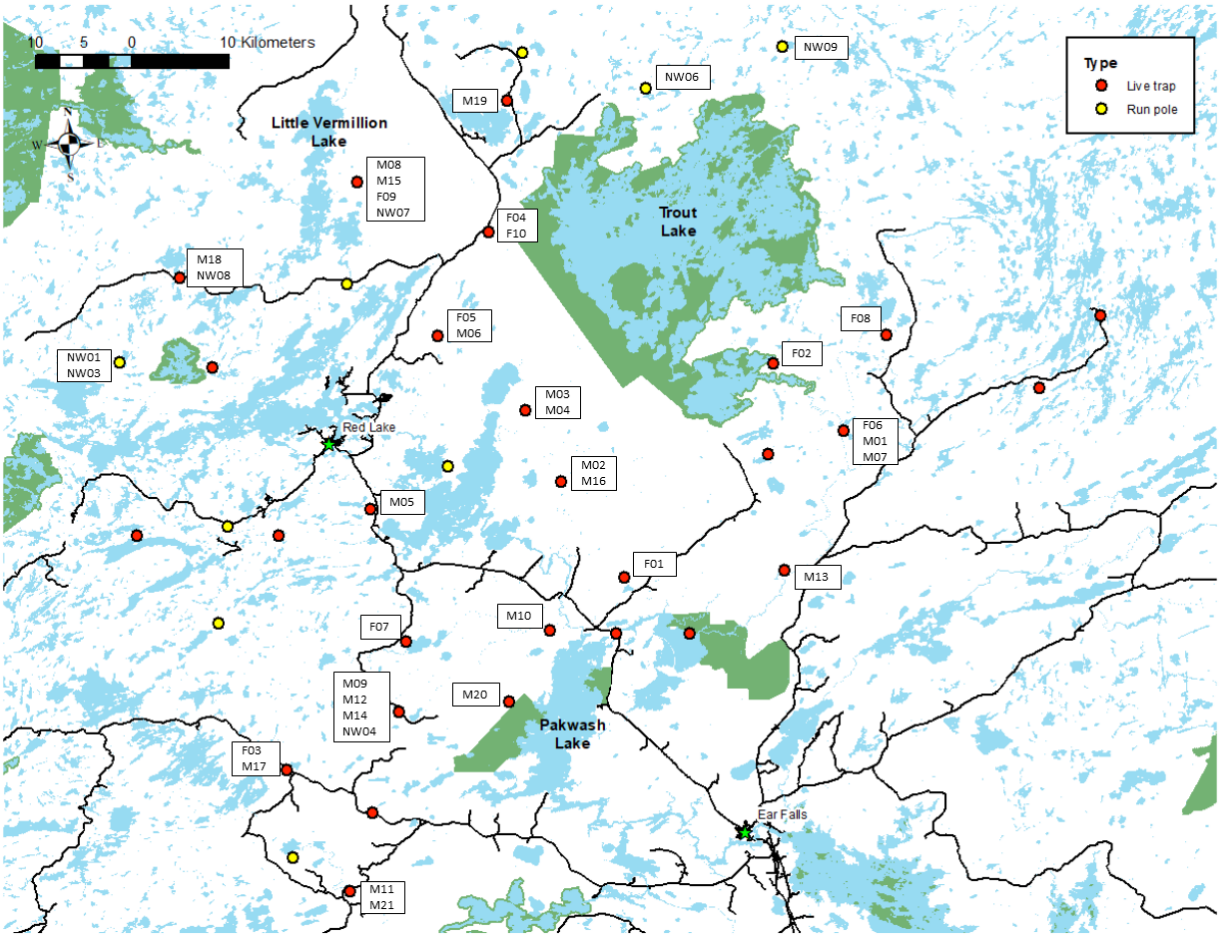

Figure 4. The live trap and run-pole locations where individual wolverines were initially detected (live trapped or photographed). An “F” before the number indicates a female wolverine, a “M” indicates a male wolverine, and a “NW#” indicates a wolverine that we identified as unique based only on chest pictures.

WCS Canada
10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

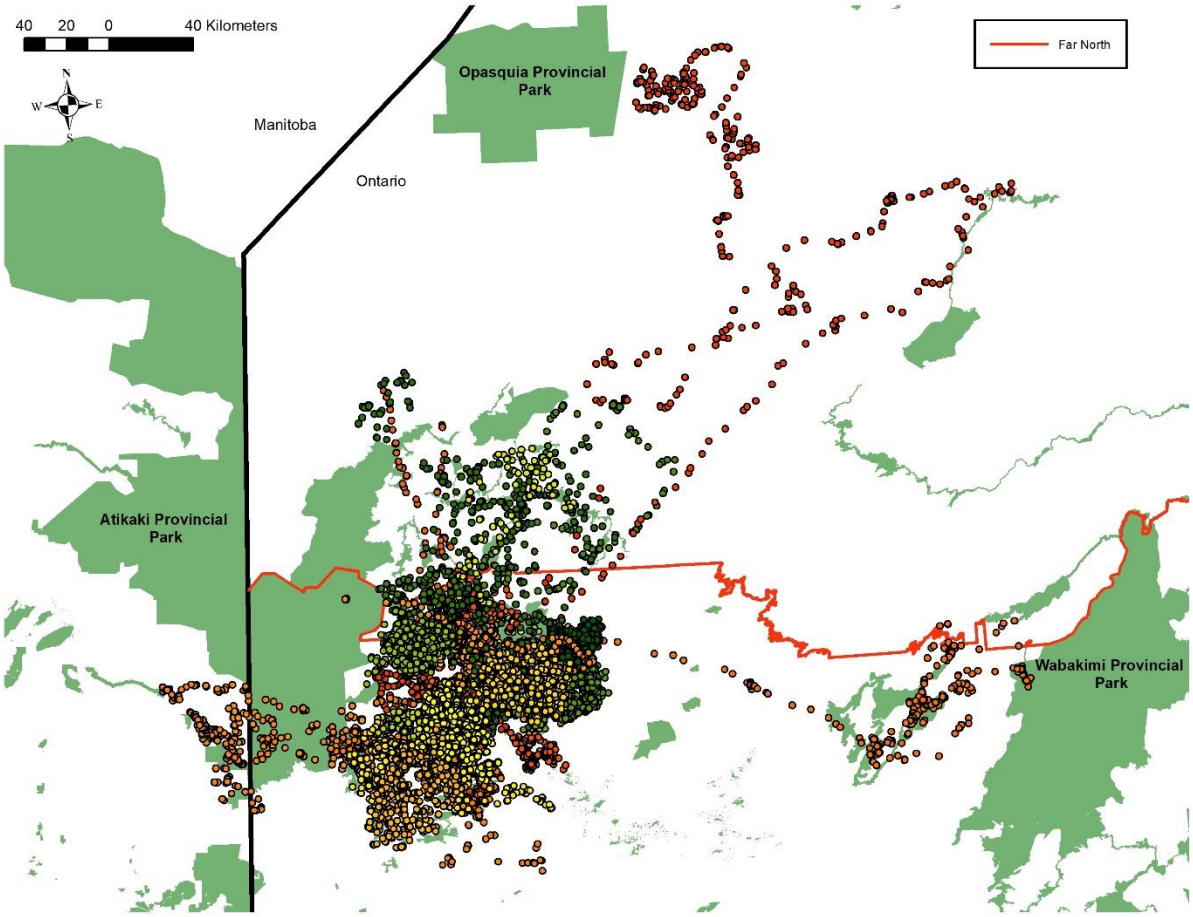

Figure 5. Wolverine GPS locations in Red Lake, Ontario. The GPS collars take GPS locations at 2-hour intervals – we have collected ~33,000 GPS locations since the project began. Unique individual wolverines are identified by unique colour points.

WCS CANADA
10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

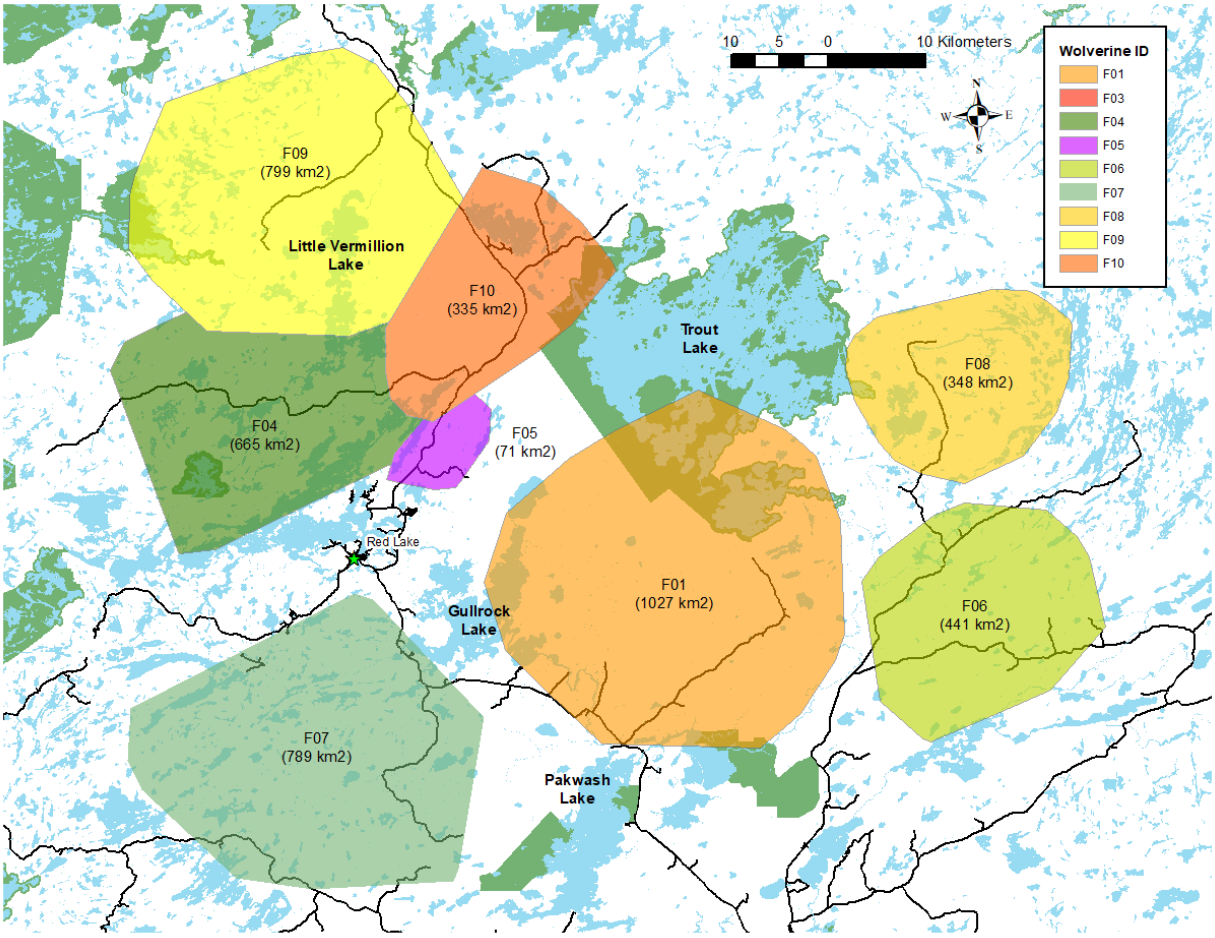

Fig 6. The home-range size of resident female wolverines in Red Lake, Ontario. We constructed home ranges as a 95% MCP (a polygon surround 95% of a wolverine's GPS locations). We did not include wolverine F03 who dispersed north out of the study area.

WCS CANADA
10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

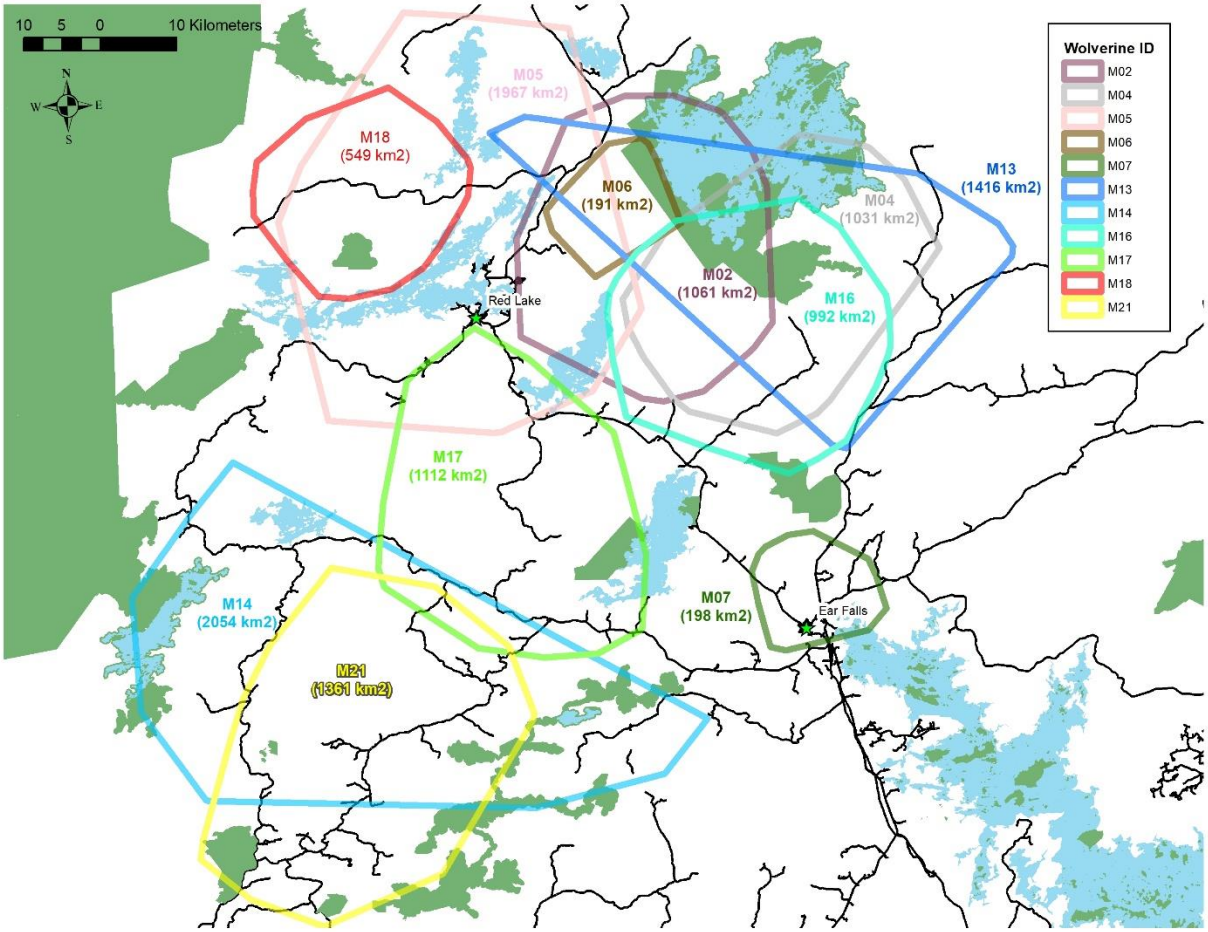

Fig. 7. The home-range size of resident male wolverines in Red Lake, Ontario. We constructed home ranges as a 95% MCP (a polygon surround 95% of a wolverine's GPS locations). We did not include wolverine M01, M03, M12, and M15 because they dispersed out of the study area. Also not included are wolverines without enough GPS locations (M08, M09, M10, M11)

WCS CANADA
10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

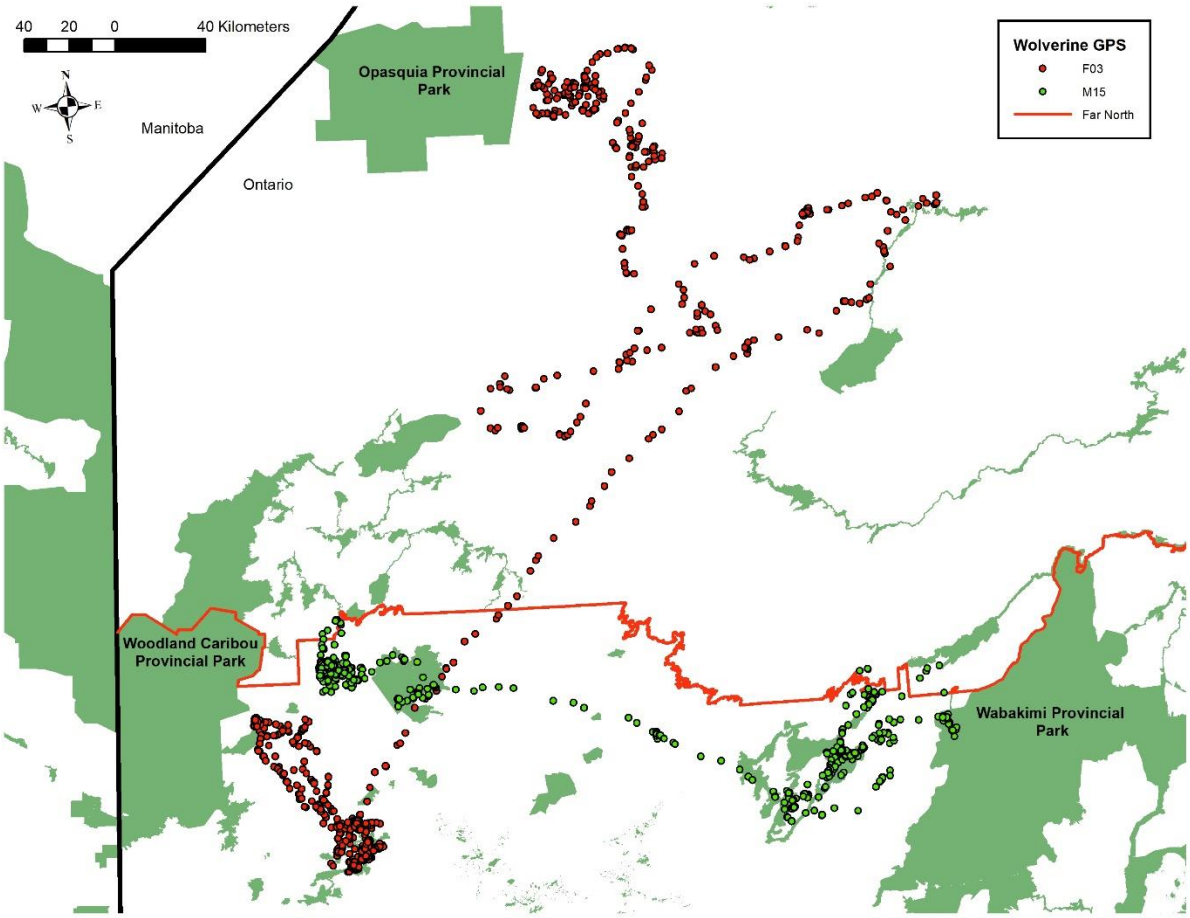

Figure 8. The dispersals of wolverine F03 and M15 from Red Lake, Ontario. Interestingly, both M15 and F03 initiated their dispersal movements on March 26, 2020. We believe that both wolverines have since dropped their GPS collars.

WCS Canada
10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

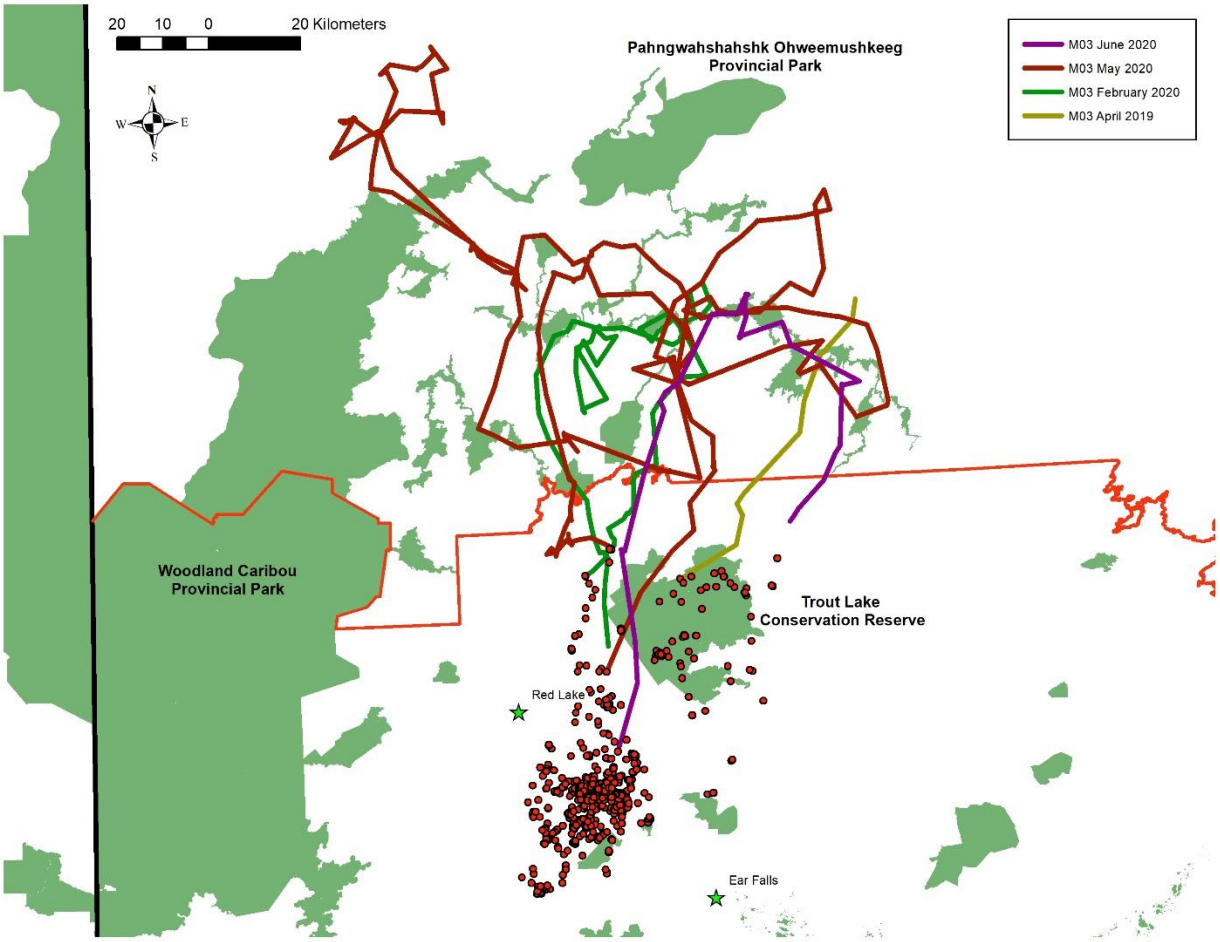

Figure 9. Wolverine M03's movements north from Red Lake, Ontario. Each different movement is a different colour. In September 2020, M03 was in the Red Lake area.

WCS CANADA
10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

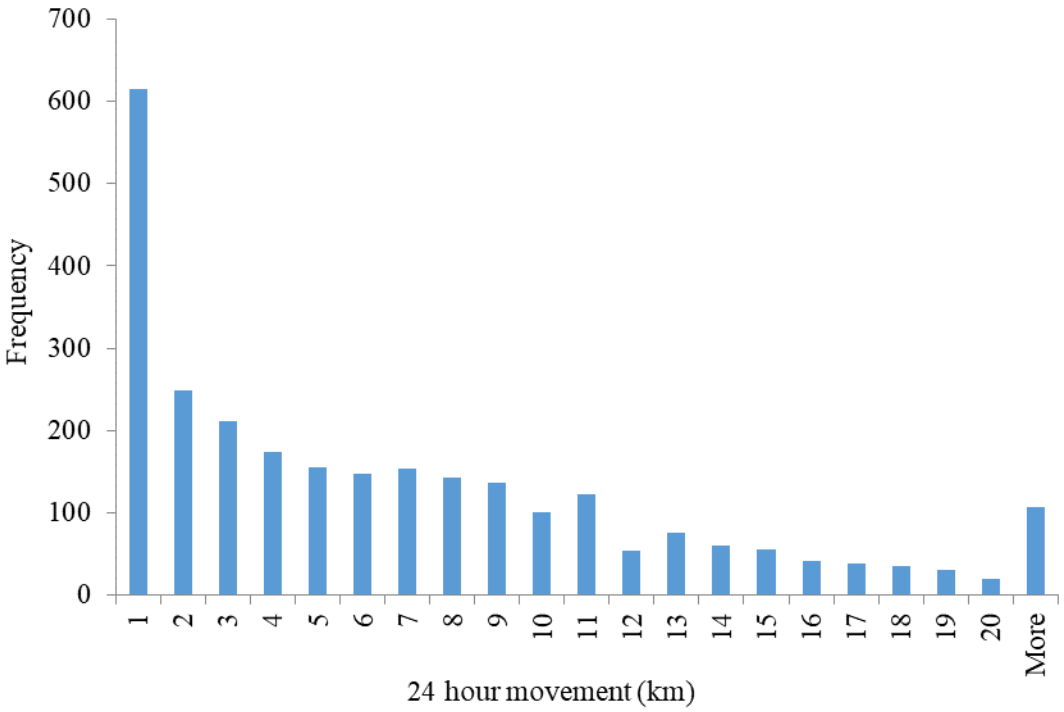

Figure 10. The frequency of wolverine movement distances (km) over a 24-hour period in Red Lake, Ontario.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

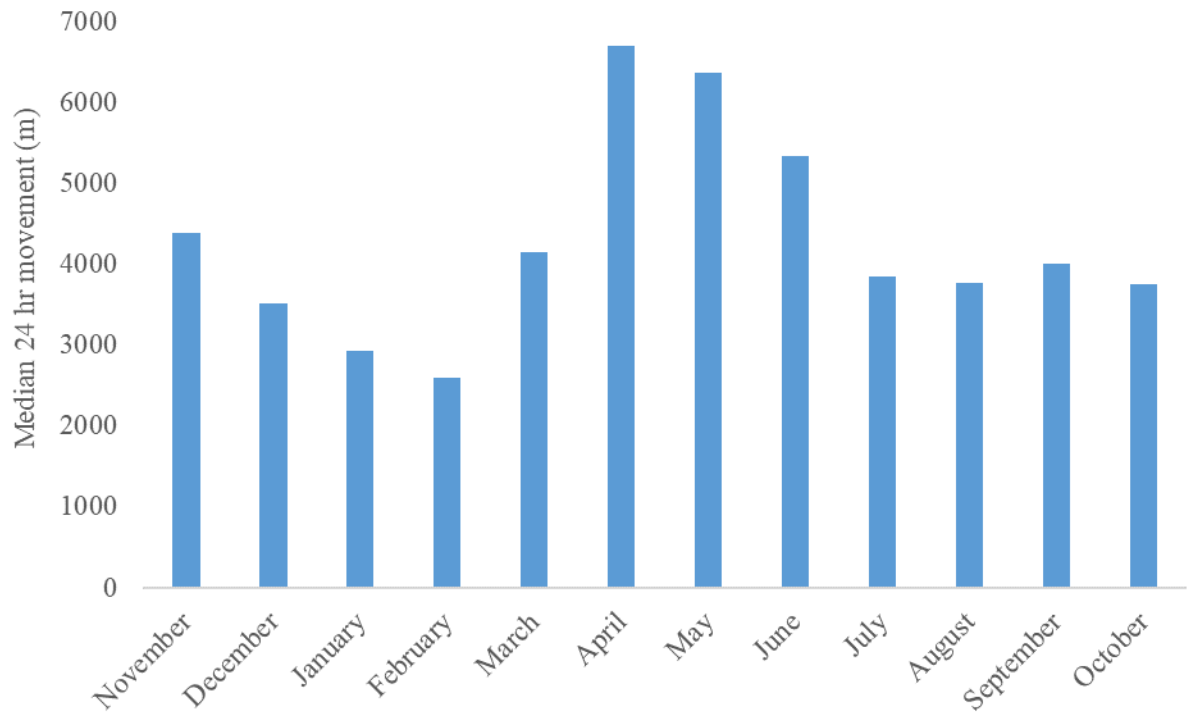

Figure 11. The 24-hour movement distance of wolverines by month in Red Lake, Ontario.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 12. Wolverine M19 at a caribou carcass near Coli Road in Red Lake, Ontario.

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Thunder Bay, Ontario, P7A 4K9, Canada
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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 13. Resting site for M17 and F07 in Red Lake, Ontario. The wolverines were living under the down trees. Nearby we found the remains of snowshoe hares that were killed by the wolverines.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 14. Wolverine F05's reproductive den in Red Lake, Ontario.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 15. Wolverine F05 at her reproductive den in Red Lake, Ontario.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 16. Wolverine M02 at F05's reproductive den in Red Lake, Ontario.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 17. Wolverine F07's reproductive den on a rocky face in Red Lake, Ontario.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 18. Wolverine F07's reproductive den in Red Lake, Ontario.

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www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 19. Wolverine F07 at her reproductive den in Red Lake, Ontario.

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www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

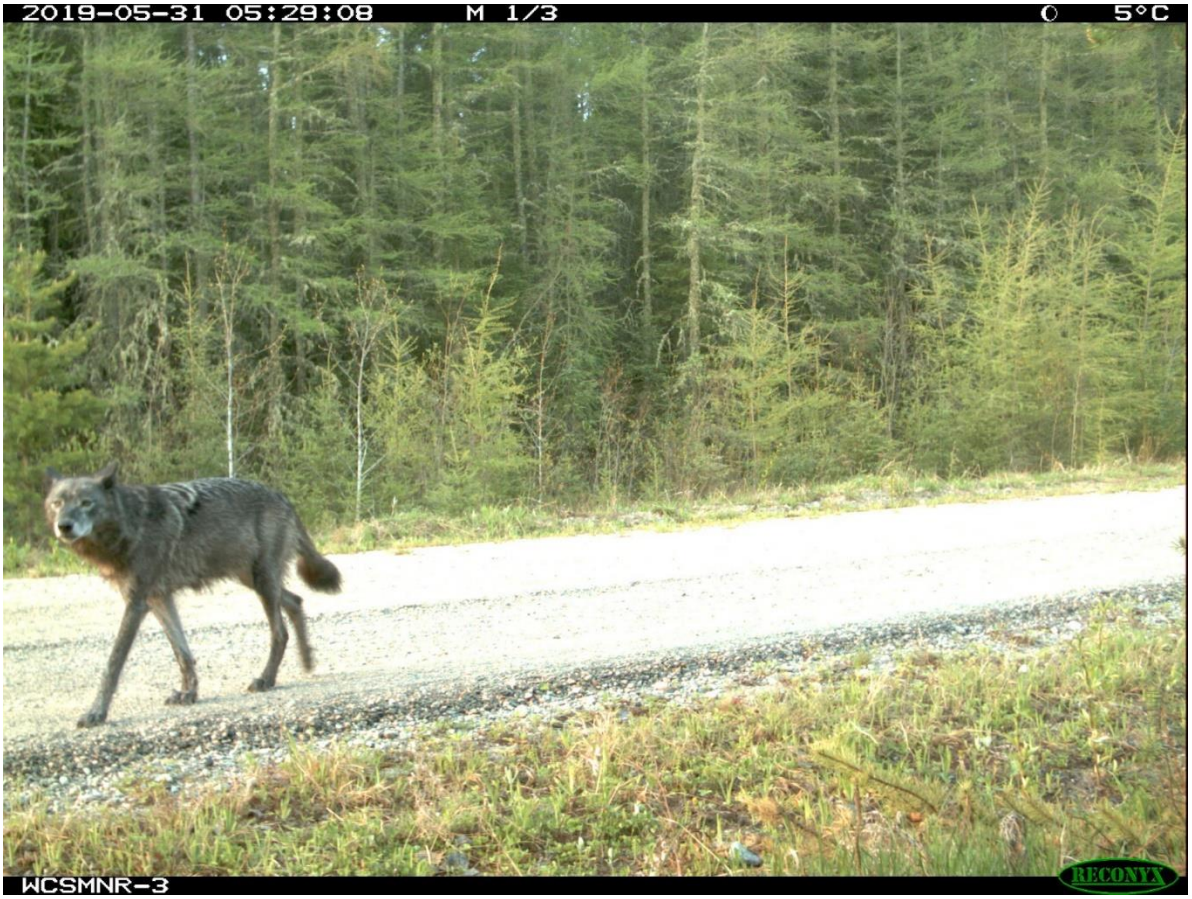

Figure 20. Wolf on a road camera in Red Lake, Ontario.

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www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 21. Black bear on a road camera in Red Lake, Ontario.

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Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 22. Black bear and cub on a road camera in Red Lake, Ontario.

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www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

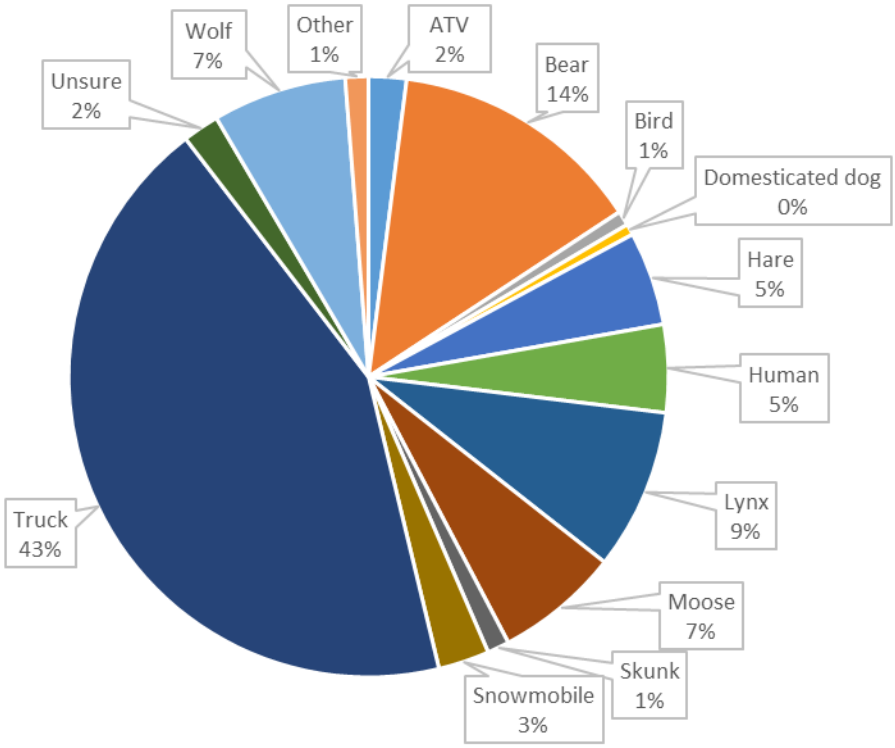

Figure 23. Breakdown of unique events at road cameras (total = 1,523 events) during the summer of 2019 in Red Lake, Ontario. For example, wolves were seen on road cameras 7% of the time and black bears were seen 14% of the time.

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10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

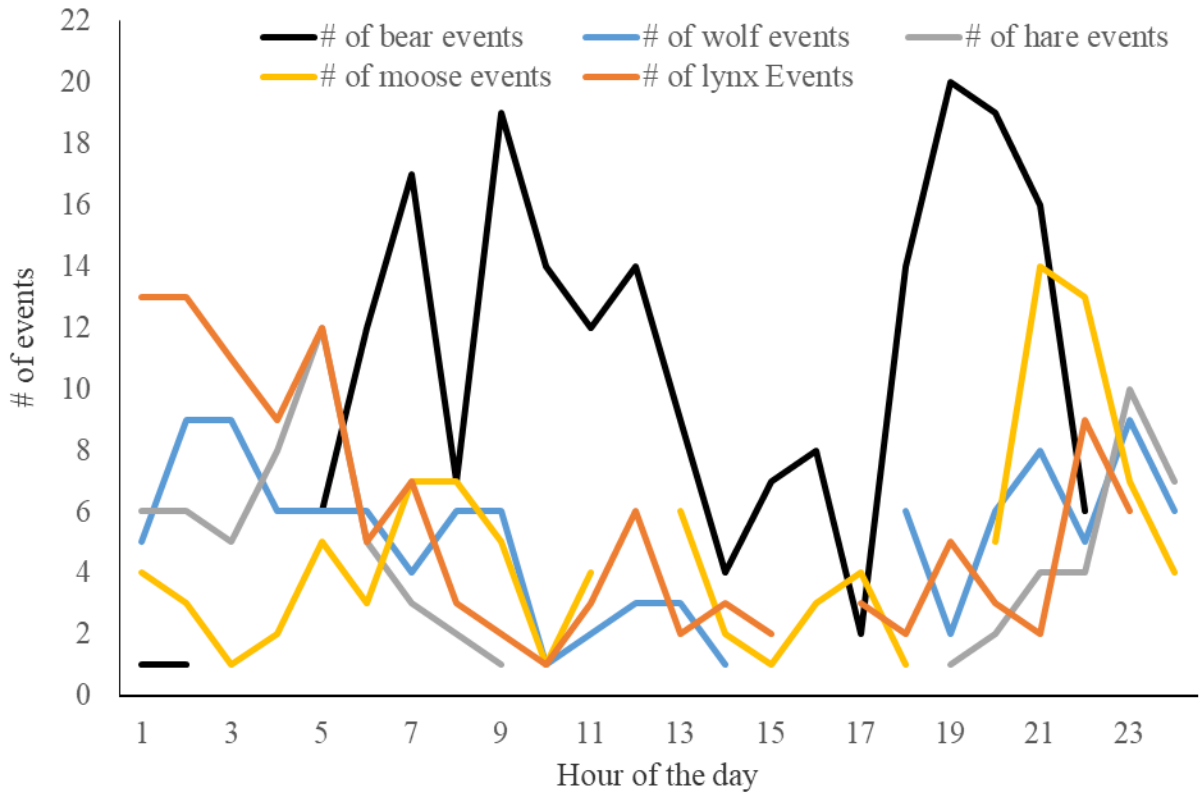

Figure 24. Number of wildlife events on road sections by hour of the day in Red Lake, Ontario. For example, black bears were most often seen in the early morning and late evening during the summer of 2019.

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10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

Figure 25. Wolverine tracks off the Chukuni Road in Red Lake, Ontario.

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10 Cumberland St. N
Thunder Bay, Ontario, P7A 4K9, Canada
www.wcscanada.org

Matthew Scrafford
mscrafford@wcs.org
Phone: (CAN) 807 285 9126

TABLES

Table 1. Physical measurements from wolverines in Red Lake, Ontario. These measurements were taken when we handled the wolverine during chemical immobilization.

	Average value	
Measurement	Female wolverine (n = 10)	Male wolverine (n = 21)
Weight (kg)	10.85	13.24
Neck circumference (cm)	29.46	34.22
Body length (cm)	81.96	86.43
Tail length (cm)	17.37	19.41
Chest circumference (cm)	42.42	46.67
Forearm length (cm)	15.43	16.28
Paw length (cm)	10.23	11.52
Head circumference (cm)	34.26	37.56

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10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126

Table 2. The total number of days in a field season that individual wolverines were detected (either by camera or by live trapping) at live traps and run poles in Red Lake, Ontario.

Field season	Live trap	F01	F02	F03	F04	F05	F06	F07	F08	F09	F10	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	NW01	NW03	NW04	NW06	NW07	NW08	NW09	Unknown	Unsure
Spring 2018	Chukuni N.																																								3
Spring 2018	Mallard	1				3					2																															2
Spring 2018	Minnow																																								
Spring 2018	Snail Lake	3																																						1	
Winter 2018/2019	Bruce Lake											3	2	4																										1	
Winter 2018/2019	Chukuni N.	6										4	2	2																										1	10
Winter 2018/2019	Chukuni S.	3												1																										1	5
Winter 2018/2019	Darter											4	2																												1
Winter 2018/2019	Dixie River														4																										
Winter 2018/2019	Roger Lake																1																								
Winter 2018/2019	Fly																																1	1					1		
Winter 2018/2019	Harbeck Lake																																								
Winter 2018/2019	Kathie's											1		7																										3	
Winter 2018/2019	Keg Lake													2				1																1						1	
Winter 2018/2019	Longlegged													5																					1						
Winter 2018/2019	Minnow																																								
Winter 2018/2019	Pakwash											5				13			4																						
Winter 2018/2019	Pindar																1																								
Winter 2018/2019	Power													1																										1	
Winter 2018/2019	Silver																	1																						
Winter 2018/2019	Snail Lake															4																								
Winter 2018/2019	Whitewater																																							1	
Winter 2018/2019	W. Pine Ridge																																3						1	4	
Winter 2018/2019	Little Trout Lake	1																																							
Winter 2019/2020	Coli																												6												
Winter 2019/2020	Darter																									4															
Winter 2019/2020	Dixie River																										6														
Winter 2019/2020	Fly		3					5					7									2							18												
Winter 2019/2020	Joyce																																								
Winter 2019/2020	Little Trout Lake																																								
Winter 2019/2020	Long Legged		1																			1																		1	
Winter 2019/2020	Mallard						2																3																		
Winter 2019/2020	Minnow																							3																	
Winter 2019/2020	Morraine						2													1																				2	
Winter 2019/2020	Mt. Jamie														1																										
Winter 2019/2020	Chukini N.	14	2																					1																	
Winter 2019/2020	Pakwash																									4															
Winter 2019/2020	Pindar				1							3				1																									
Winter 2019/2020	Power						1	3																																
Winter 2019/2020	Sawmill																																								
Winter 2019/2020	Silver							3																																
Winter 2019/2020	South Bay Trap																								8													1			
Winter 2019/2020	Chukini S.	16																																							
Winter 2019/2020	W. Pine Ridge																							1		3			18												
Winter 2019/2020	Whitewater															3					2				1														1		
Winter 2019/2020	Coli E.																														3										
Winter 2019/2020	Coli W.																																					2		1	
Winter 2019/2020	South Bay																																								11

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10 CUMBERLAND ST. N
THUNDER BAY, ONTARIO, P7A 4K9, CANADA
WWW.WCSCANADA.ORG

MATTHEW SCRAFFORD
MSCRAFFORD@WCS.ORG
PHONE: (CAN) 807 285 9126