

Aboriginal Traditional Knowledge COSEWIC Status Report

on

Wolverine

Gulo gulo

Qavvik

prepared for

**COMMITTEE ON THE STATUS OF ENDANGERED
WILDLIFE IN CANADA**

by

Nathan Cardinal

1883 Agassiz Ave.

Agassiz, B.C. V0M 1A2

Funding

provided by Environment Canada

December, 2004

Please Note:

This ATK report is not intended to act as a stand-alone status report. This ATK report was completed as part of a case study to determine ways of incorporating ATK into the COSEWIC species assessment process. This report is designed to show what kind of information ATK can contribute to species assessment, and where it can be included in the report. It is meant more to act as an example for future purposes.

The information gathered in this report is not the definitive guide of all available wolverine ATK. Due to the evolving nature of ATK and its diffusion over many cultures, communities, and people, the sum total of ATK for any one species could never be collected into one report.

Information from this report can be integrated into a regular status report on wolverines at a later date. Status reports must be based on all available information including scientific, community, and Aboriginal traditional knowledge, where available.

EXECUTIVE SUMMARY

Species information

Wolverines are known by a number of different names across the North, most notably as *qavvik*, and *kalvik* (Inuktitut) across Nunavut and the Inuvialuit Settlement Region (ISR), as *nogha* (Dene) in the North Slave region, and as *nehtryooh* and *nehtryuh* (Gwich'in) in the Gwich'in Settlement Area and in the North Yukon, respectively. Wolverines resemble a small bear with golden markings, and are known for their intelligence and ferociousness. Wolverines range all across northern Canada, and some knowledge holders recognized two types: a relatively large, light coloured variety, and a smaller, darker type.

Distribution

Wolverines are distributed all across northern Canada, from forested and alpine areas in the west to arctic tundra in the east. Wolverines continue to occupy the same regions that they have inhabited for many years.

Habitat

Wolverines occupy a variety of habitats from open tundra to forested mountains, but are associated more with food availability than a particular habitat type. In much of the Boreal and Arctic ecological areas, wolverine presence is tied to the availability of caribou. While food availability is an overriding factor, wolverines were noted to prefer certain habitat types over others. Wolverines preferred forested areas to open tundra in the Boreal areas. In treeless areas like the Arctic Ecological Area, wolverines preferred rocky or hilly habitats. In the Northern Mountain ecological area, wolverines preferred higher altitude habitats. Knowledge holders noted that wolverines prefer to den along creeks and banks, in rocky outcrops, or in the snow. Few participants recognized existing threats to wolverine habitat, but were concerned about the effects of potential future development in some regions.

Biology

Wolverines were described as naturally uncommon and generally solitary, except during breeding season when they were observed tracking one another. Wolverines were also observed in groups during the winter, often feeding at a large source of carrion. It was rare to see a wolverine with young, but litter size ranged between two to four. The majority of wolverines caught by knowledge holders were more than one year old and in good health, indicating a high survival rate beyond their first year. Wolverines have few natural competitors, and are known to take food away from larger animals such as bears and wolves. Most wolverines likely have very large home ranges, but some are transients with no home range.

Wolverines are both a scavenger and a predator. In the Arctic and Boreal

ecological areas, their main source of food is caribou, which is obtained mainly through carrion created by wolf kills. Carrion is also an important food source for wolverines in the North Mountain ecological area. Wolverines also prey on smaller animals such as rabbits and ptarmigan, and feed on vegetation and bones and antlers.

Population sizes and trends

Wolverines are naturally uncommon across the North. Knowledge holders in Nunavut readily identified that wolf control programs in the mid-1900's had a dramatic effect on wolverine survival, threatening local populations with extirpation. Knowledge holders in the Kivalliq area reported an increase in the wolverine population since the 1960's, when the wolf control program ended. Wolverine populations in the Kitikmeot region were stable, and large enough to support strong harvest pressure. Wolverines in the North Slave region were reported to be stable or decreasing, perhaps due to the large amount of development occurring around the area. Wolverines in the ISR and the Yukon were stable or increasing.

Limiting factors and threats

Wolverines are sensitive to human developments and activities, and will move away from areas of activity. However, there are few current threats to wolverines across the North where there is little development. Consequently, the main cause of mortality is from hunting and trapping, which often goes unreported in the Boreal and Arctic ecological areas because of high local use of fur for parka trim. Harvesting statistics likely underestimate the actual harvest in Nunavut and NWT. However, wolverine harvesting is mostly opportunistic and incidental, and is largely restricted to certain areas. This allows migrating wolverines from unharvested regions to sustain harvested populations. Wolverines are linked to carrion sources and wolves, therefore negative impacts to either of these could affect their survival.

Special significance of the species

Wolverines are extremely important for Aboriginal Peoples throughout northern Canada, used mainly for parka trim because of the fur's warmth, durability, and frost-resistant properties. Wolverines were held in high respect by Aboriginal Peoples, and have been personified in various stories.

Summary of status report

Wolverine populations are largely stable across northern Canada but are susceptible to increased natural resource development. Impacts on carrion sources, especially caribou, or wolves, will impact wolverines.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	iii
List of figures.....	vi
List of tables.....	vi
SPECIES INFORMATION	7
Name and classification	7
Description	7
Nationally significant populations	9
DISTRIBUTION.....	9
Canadian range.....	9
HABITAT	10
Habitat Requirements	10
Trends.....	13
Protection/ownership.....	13
BIOLOGY	14
General	14
Reproduction.....	14
Survival	16
Movements/dispersal	17
Nutrition and interspecific interactions.....	19
Behaviour/adaptability.....	22
POPULATION SIZES AND TRENDS	22
Nunavut.....	23
Northwest Territories	26
Yukon Territory.....	28
LIMITING FACTORS AND THREATS	29
SPECIAL SIGNIFICANCE OF THE SPECIES.....	32
SUMMARY OF STATUS REPORT.....	33
ACKNOWLEDGEMENTS	34
LITERATURE CITED	34
BIOGRAPHICAL SUMMARY OF CONTRACTOR	36
KNOWLEDGE EXPERTS CONSULTED.....	36
SIMILARITIES and DIFFERENCES	
Similar Information	39
New Information	39
Differing Information.....	40

List of figures

Figure 1. A deadfall trap	27
Figure 2. Map of regions and communities of knowledge holders visited.	37
Figure 3. Canadian distribution of wolverines.	38

List of tables

Table 1. Wolverine habitat use described by participants	11
Table 2. Participants' responses to questions about wolverine young	15
Table 3. Participants' responses regarding wolverine home range	17
Table 4. Wolverine diet as described by participants	19
Table 5: wolverine trends, described by participants	23
Table 6. Information regarding participants' individual wolverine harvest	25

SPECIES INFORMATION

Name and classification

The wolverine, *Gulo gulo* (Linnaeus, 1758), is known by a variety of different names across northern Canada, depending on the language and dialect of the local Aboriginal Peoples. While “wolverine” is the dominant term used by people in the North, in Inuktitut it is also known as *kalvik* (plural: *kalvin*) in the Kitikmeot region of Nunavut, and *qavvik* (*qagvik*) in the Kivalliq region. *Qavvik* is also the common name for the wolverine in the Inuvialuit Settlement Region (ISR). One knowledge holder in Kugluktuk noted that First Nations people living in the treeline south of Kugluktuk call it *carcajou*. Dene knowledge holders in the North Slave region of NWT referred to the wolverine as *nogha*, while the Vuntut Gwitchin of Old Crow referred to it as *nehtryooh*, and as *nehtryuh* in the Gwich’in Settlement Region of NWT. In the southern Yukon, the wolverine is called *naghay* in the southern Tutchone language.

Few of the knowledge holders recognized any nicknames for the wolverine. In the Kivalliq region, one hunter noted that

Some people call it nanujaaqtuq, which means it’s like a small polar bear.... A very strong animal, it has a capacity to think right and hard to catch, and a very intelligent animal. (Participant #401, Arviat NU)

Also in the Kivalliq region, another knowledge holder called the wolverine *qauqtuuq*, which refers to the wolverine’s prominent forehead (‘qauk’).

For the purposes of this report: “hunters” and “hunting” refers to actively pursuing and catching wolverines, often with rifles; “trappers” and “trapping” refers to catching wolverines using traps, and; “harvesters” and “harvesting” includes both groups of people and activities together.

Description

Knowledge holders described the wolverine as resembling a small bear or a large weasel. Wolverines were portrayed as being dark brown, almost black, with two whitish or golden stripes along their sides, meeting above the tail to form a golden harp. One hunter declared that what is “most admirable about them is their kind of v-shape, like a little harp on the back” (D. Joe, Inuvik NWT). Knowledge holders noted that the wolverine’s fur becomes faded and “dirty” in the spring and summer months. A nearly all-white variant of wolverine has been trapped by hunters in the Kitikmeot region. Knowledge holders in the region state that this variety is very rare; in all of the other regions, only one other knowledge holder reported catching a wolverine that had a significant amount of white on it. Knowledge holders also mentioned that this variant has always occurred in this one area and reported their parents had caught this variety in the past. A pelt was also on display at the local HTC.

The primary features depicted by nearly all knowledge holders were the wolverine’s strength and intelligence. Wolverines were described as being very muscular, looking “just like a person when you skin them out” (J. Pokiak, Tuktoyaktuk

NWT). In one display of strength, three different hunters reported seeing a wolverine carrying a whole caribou: “one time in Aklavik, we seen one packing a whole caribou. A frozen one” (G. Kasook, Inuvik NWT). Another knowledge holder commented on the wolverine’s strong bushy tail, saying that “they use their tails as crow bars, by curling it, they can move [rocks] with their tails” (Participant #404, Arviat NU). Described as “very smart”, wolverines were reportedly ingenious at getting food, including robbing meat caches and taking bait out of traps. One knowledge holder commented on how difficult they were to trap:

I’ve seen where they been round, or they spring a trap, you have a hard time to catch them. They’ll come take your bait, they’ll find a way. Last winter I had a place, he took open the trap, he come in through the back end of the pen. Come through the back and take the bait out of the back and gone. (Participant #1003, Teslin YT)

While intelligent, they were also rendered as vicious, and would not hesitate to steal food away from larger animals, including grizzly bears, polar bears, and packs of wolves. Knowledge holders reported wolverines destroying traps, stealing bait, and eating animals out of their traps. Wolverines were described by some trappers as the most hated of animals because of their vicious and destructive nature. Nevertheless, harvesters also admired the wolverine for their toughness and intelligence, and had much respect for them.

One of the most notable qualities was the wolverine’s characteristic gait, which was described as anything from a rolling ball, to a loping walk, to a turtle-like appearance. One knowledge holder stated that when wolverines “run, [it] looks like they’re a piece of a material blowing” (M. Akalak, Baker Lake NU). Knowledge holders commented that wolverines were never resting but were constantly on the move, following various scents looking for food: “the main feature that always stands out when I see a wolverine running or loping, is that it never ever hardly walks” (A. Niptanatiak, Kugluktuk NU). Knowledge holders noted the wolverine’s keen sense of smell, which could detect faint smells from far away. As one knowledge holder recalled:

I was tracking a wolverine one time, and all of a sudden it turned towards the wind and it went for about a mile, and it dug into the snow and it retrieved a whole, you know weathered bone – caribou. Completely white, and yet a mile away. (Participant #401, Arviat)

Many knowledge holders commented on how fast the wolverine could run, and four hunters noted that wolverines could reach speeds of between ten and thirty miles per hour (A. Niptanatiak, Kugluktuk NU; Participant #603, Kugluktuk NU; S. Gruben Sr., Tuktoyaktuk NWT; D. Joe, Inuvik NWT).

Knowledge holders noted that wolverines are sexually dimorphic. Males were described as larger than females, weighing fifteen to forty pounds, with an average weight of twenty-five pounds; females were seven to ten pounds lighter than males (A. Niptanatiak, Kugluktuk NU). One knowledge holder reported catching a sixty-pound male (P. Gruben, Tuktoyaktuk NWT). In another study, elders in the Gwich’in Settlement Area (GSA), an area in northern NWT just south of the ISR, stated that the average weight of wolverines is twenty-five pounds, but they can get as heavy as eighty pounds (GRRB 2001). Females were described as being faster than males because they were

the more dominant hunter (A. Niptanatiak, Kugluktuk NU). Females also had a different gait than males, and some harvesters could tell by the shape of a track if a male or female wolverine had made it. Gwich'in elders also describe female wolverines as being smaller, and "have fur with white or silver patches on the back instead of the male's solid black" (GRRB 2001, p.68).

Nationally significant populations

Wolverines ranged all across the North, and most knowledge holders did not recognize any special groups or populations. However, some knowledge holders in the Kivalliq region of Nunavut recognized two different groups of wolverine: one variety that is larger and lighter-coloured ("greater wolverine"), and another variety that is smaller and darker ("lesser wolverine") (Participant #401, Arviat NU; Participant #404, Arviat NU). As one knowledge holder stated:

There are two kinds of wolverines, some that perhaps could be seen as a lesser wolverine, and some larger size. Same way that there are grizzlies and barren-ground bears, stuff like that, they're a little different. Two sets of species it appears. (Participant #404, Arviat NU)

Some stated that the greater wolverine variety may just be older individuals and the lesser wolverines are just younger ones. However, one knowledge holder in Arviat stated that the teeth and claws of some of the lesser variety that he had caught indicated that they were older individuals (Participant #401, Arviat NU). This would suggest two different varieties. He described finding more of the lesser variety towards Yellowknife. Another knowledge holder described the lesser variety as being more thieving, and more apt to break into one's meat caches. Without more research, it is difficult to discern whether there are actually two different varieties, or whether the differences can be attributed to another factor such as age or sex.

DISTRIBUTION

Canadian range

All thirty knowledge holders reported finding wolverines in their own respective regions throughout Nunavut (Arctic ecological area), NWT (Boreal ecological area), and the Yukon Territory (North Mountain ecological area). Knowledge holders in the Kivalliq region of Nunavut reported catching wolverines closer to the treeline in the western portion of the region near the NWT/Nunavut border, and also in the northwestern portion. Wolverines were also seen and caught near both the communities of Baker Lake and Arviat. No knowledge holders reported catching wolverines in the northeastern portion of the Kivalliq region. Knowledge holders in the Kitikmeot region caught wolverines in all the surrounding areas, but prime areas with high wolverine abundance occurred to the west and southwest of Kugluktuk towards the treeline. Knowledge holders in the North Slave region reported harvesting wolverines in areas north of Yellowknife. In another study, elders in the Gwich'in Settlement Area reported that many wolverines can be seen along the Mackenzie River south of Aklavik, and on the eastern side of the Richardson Mountains west of Aklavik and Fort McPherson (GRRB 2001). In Inuvik, good areas for wolverines were reportedly towards Aklavik, closer to the treeline

and mountains. Knowledge holders in Tuktoyaktuk indicated that wolverines were abundant in areas east of the community, between Tuktoyaktuk and Paulatuk, and all the way to Kugluktuk. One knowledge holder in Tuktoyaktuk stated that wolverines could be harvested “all over the place. Right from around here to Coppermine [Kugluktuk] area. All over” (S. Gruben Sr., Tuktoyaktuk NU). Knowledge holders in Tuktoyaktuk also indicated that wolverines are often “coming out of” this area, suggesting that this is an area of refugia for wolverines, and a source of migrating wolverines. In the Yukon, wolverines were reportedly found in mountainous areas, but utilized all elevations.

Knowledge holders acknowledged that wolverines occur in the same areas where they were found in the past. As one knowledge holder noted:

A lot of elders say that some of those areas that we still hunt to this day will always maintain themselves because the animals, you never, ever can kill them off there, because they always escape or have some place to hide, which, you know, I'm finding so true. (A. Niptanatiak, Kugluktuk NU)

Knowledge holders in all regions reported that their parents or other elders harvested wolverines in the same areas that are used today: e.g., grandparents of three knowledge holders in the Kitikmeot, ISR, and Kluane (A. Niptanatiak, Kugluktuk NU; Participant #901, Tuktoyaktuk NU; Participant #1005, Haines Junction YT) regions and one knowledge holder in Tuktoyaktuk. The latter reported his granddad harvested significant numbers of wolverine near the same area that he harvests wolverine:

My granddad used to live in Horton River long ago. And some years, he said he get ten wolverines, ten to twelve wolverines a year, in Horton River. (Participant #901, Tuktoyaktuk NWT)

Two knowledge holders in the Kitikmeot region reported wolverines being found on Victoria Island (R. Hitkolok, Kugluktuk NU; A. Niptanatiak, Kugluktuk NU), and two others in the Kitikmeot and ISR regions noted a general northward expansion of wolverines (S. Gruben Sr., Tuktoyaktuk NWT; A. Niptanatiak, Kugluktuk NU). One knowledge holder described this trend as follows:

We're starting to see more of a trend, that they seem to be moving north, northward a little bit. Starting to see them on Victoria Island, compared to the past there were not as much down there. (A. Niptanatiak, Kugluktuk NU)

A study on community knowledge in Baffin Island by Mallory, Akearok, and Fontaine (2001) commented that one participant reported seeing a wolverine, and a couple of other participants reported seeing wolverine tracks.

HABITAT

Habitat Requirements

The majority of knowledge holders often connected locations of wolverines more to food availability than to any particular habitat type. Nine knowledge holders noted that

wolverines could be found “where the food is” (Participant #301, Tuktoyaktuk NU). Many knowledge holders reported that those areas with wolves and/or caribou are especially critical for wolverines. However, one knowledge holder in the Kivalliq region connected wolverine occurrence more with rocky habitat in the area than any specific food source such as caribou (J. Savikatmaq, Arviat NU).

Knowledge holders in all regions stated that wolverines could be found in a variety of habitats but that they did prefer specific habitat types in certain regions (see table 1). Knowledge holders observed wolverines in any terrain, from hilly, forested areas to areas of open ice (S. Gruben Sr., Tuktoyaktuk NWT). In the relatively treeless area of the Kivalliq region, eight of the nine knowledge holders described wolverines preferring areas that are hilly and rocky. Knowledge holders in the Kitikmeot region also noted that wolverines prefer rocky or hilly terrain. Knowledge holders felt that rocky outcrops offered increased security, denning sites, and food availability. Few people in these regions reported finding wolverines on the open tundra. Wolverines that were tracked on open tundra often ran to the closest set of hills or boulders. One knowledge holder described preferred habitat as follows:

If he’s gonna trap wolverine he put his traps on a hill with a lot of rock boulders instead of a smooth area. If he were to trap wolverine. That he knows, they prefer a rougher, hilly terrain, rocky. (S. Itauq, Baker Lake NU)

Table 1. Wolverine habitat use described by participants

Habitat	Nunavut (13 participants)			NWT (9 participants)	Yukon (6 participants)	Total
	Kivalliq region (9 participants)	Kitikmeot region (4 participants)	Nunavut Total			
Mountains, hills	0	1	1	1	6	8
Forested areas, thick bush	2	3	5	6	2	13
Rocks, rocky outcrop	8	2	10	0	1	11
Creeks, rivers	1	2	3	5	4	12
Tundra, flat	1	0	1	1	0	2
Where the food is	1	1	2	2	4	8
Follow caribou	2	1	3	3	1	7
Follow wolves	3	2	5	2	3	10

While two knowledge holders reported open tundra as good places for wolverines, the majority of knowledge holders reported such areas to be poor habitat. In the Kivalliq and Kitikmeot regions, where large areas of flat, open terrain are common, seven knowledge holders described such terrain as poor habitat for wolverines. Knowledge holders did find wolverines in such areas, but they were thought to be just traveling through. Such areas provided little cover for wolverines, and “when it’s open season and they come out into the barrens and close to town, that’s it, they’re going to get caught” (P. Gruben, Tuktoyaktuk NWT).

In the boreal areas of Nunavut and NWT, knowledge holders reported finding and catching the majority of wolverines in or near the tree line, which some knowledge holders connected to increased security, denning sites, and/or food availability. One knowledge holder reported that there is “usually some concentration of wolverines

cause there's treeline eh? Seem to be more when you get into the tree line; always would come across a track or two" (Participant #401, Arviat NU).

In the mountainous areas of the Yukon and NWT, knowledge holders associated wolverines with higher elevation areas, but noticed that they utilized all elevation levels. All six knowledge holders in the Yukon reported finding wolverines in higher elevation areas in the mountains. In another study, elders in the GSA reported wolverines to be more common near the Richardson Mountains (GRRB 2001). In a study on the Yukon North Slope, the area in the Yukon north of the North Yukon region, participants also reported wolverines to be more common in the mountains and foothills (WMAC (NS) and Aklavik HTC 2003). Some knowledge holders in these regions stated that female wolverines prefer higher elevation areas, which provided increased safety for their offspring. One knowledge holder reported that males are found more in lower elevation areas, where larger prey species are often available (Participant #902, Dawson City YT). Wolverines would commonly use all elevations, but "mostly they go up in the mountain too, up in the high ridge.... Even now they travel back and forth [in elevation] to survive" (Participant #902, Dawson City YT). One knowledge holder described the varying elevational use of wolverines like so:

They come down off the high mountains, in the summer, they're way up high, that's where the wolverine go up there, that's where the wolves concentrate up high. Then of course they're down in the timber areas, on the rivers and down in the lake, where the moose goes. (A. van Bibber, Haines Junction YT)

Knowledge holders in the Kivalliq region noted that wolverines in the eastern Arctic preferred dens in rocks and boulders, while knowledge holders in the Kitikmeot and ISR regions described wolverine dens in snow banks and along streams throughout boreal regions. All knowledge holders in the Kivalliq region who described denning sites stated that they occurred in rocky outcrops. One knowledge holder stated that wolverines "like staying in rock boulders, and during the summer they get chased, they can hide in the rocks boulders and nobody can find them" (I. Kingilik, Baker Lake NU). Three knowledge holders in the ISR commented that wolverines will den in the snow and snow banks, and four other knowledge holders in the region stated that wolverines den in banks along creeks and riverbeds. In a different ATK study conducted on the northern Yukon, one hunter from Aklavik reported finding wolverine burrows in gulleys with willows and creeks, and another hunter reported finding burrows at the end of a valley where the snow builds up (WMAC (NS) and Aklavik HTC 2003). In a study conducted in the GSA, elders reported that wolverines build their dens in banks, the sides of cliffs, in rocks, and under snowdrifts and trees (GRRB 2001). Two knowledge holders in the Kitikmeot regions also noted that wolverines prefer south-facing hills as denning sites in the winter (A. Niptanatiak, Kugluktuk NU; J. Pokiak, Tuktoyaktuk NU), because of the increased amount of warmth received from the sun.

Knowledge holders in the Yukon described wolverines using a variety of habitat types for dens. Two knowledge holders in the Kluane and Dawson regions reported wolverines denning under fallen trees, stumps, and bushes (A. van Bibber, Haines Junction YT; participant #903, Dawson YT). Similar to the ISR, two knowledge holders also stated that wolverines use stream banks and creeks as denning sites. One knowledge holder (Participant #902, Dawson YT) reported a wolverine using a beaver

dam as a den. All dens described provided a combination of refuge from predators and good levels of food availability nearby, such as from rabbits and ptarmigans.

Some knowledge holders also described the natal dens of wolverines. Natal dens are those dens where wolverines have their young and/or raise their young. In the Kivalliq region, wolverines with their young were seen denning in cracks in boulders (Participant #404, Arviat NU). One knowledge holder in the Kitikmeot region reported that female wolverines prefer thick willow outcrops in dry, isolated creek beds as natal den sites (A. Niptanatiak, Kugluktuk NU). Another knowledge holder in the Kitikmeot region found a wolverine kit in a snow den in March (R. Hitkolok, Kugluktuk NU). In the North Mountain ecological area, females were thought to give birth higher up in the mountains (A. van Bibber, Haines Junction YT). While natal dens were found in a variety of habitats and in similar places as regular den sites, all natal dens featured safety, warmth, and isolation as important characteristics.

Trends

Almost no knowledge holders made any comments about habitat loss in relation to wolverines. When asked about certain threats, knowledge holders stated that there was relatively little development occurring in their regions; consequently, people recognized few threats to wolverine habitat. One knowledge holder in Inuvik did highlight development of habitat from seismic activity for oil and gas exploration as a threat to wolverine habitat (D. Joe, Inuvik NWT). Three knowledge holders also raised concerns about the effect that development may have on wolverines, if it were to occur, such as increased road access bringing more hunters, and the degradation of habitat (Participant #1003, Teslin YT; Participant #1005, Haines Junction YT; A. Niptanatiak, Kugluktuk NU).

Protection/ownership

There are some natural and planned protected areas that help to sustain wolverine populations in the North. Knowledge holders identified several different areas of refugia where relatively little harvesting occurred. These are described as remote areas with adequate food and habitat availability that function as refugia from harvesting. Several of these areas are protected by national parks, and most are situated away from major communities.

In terms of planned protected areas and sustainable resource management, one knowledge holder in the ISR commented that, through the Inuvialuit Final Agreement, the local people would be able to manage the resources in their settlement region sustainably (R. Gruben, Inuvik NWT). Therefore, people could ensure adequate protection for wolverines through proper management. Yet, while current protected areas may help to protect wolverines and their habitat, one knowledge holder in the Kluane region commented that wolverines commonly cross these boundaries into trapped areas (Participant #1005, Haines Junction YT).

BIOLOGY

General

Nearly all knowledge holders commented that wolverines are a naturally uncommon and solitary species. In a study on the Yukon North Slope, hunters from Aklavik also reported that wolverines are uncommon, with fresh wolverine tracks only being seen every forty to eighty kilometres of snowmobiling, with no apparent trend (WMAC (NS) and Aklavik HTC 2003). No harvesters actually targeted wolverines since they are rare to see and difficult to track. One knowledge holder described the natural rarity of wolverines as follows:

You don't go out, go out walk, like, oh, there's one wolverine, there's two wolverine, there's three wolverine. No, they're a very touchy animal, pretty well on their own. And once in a while you see them. (Participant #1003, Teslin YT)

Wolverines were the second animal of choice for two hunters; but for most harvesters, harvesting of wolverines is incidental.

The amount of knowledge that harvesters have about wolverines is ultimately dependent on their familiarity with the species. Because the wolverine is so rare, and is only used for limited purposes by community members, the majority of wolverine ATK was held by harvesters that encountered wolverines. The extent of wolverine ATK is dependent upon such factors as the number of years a harvester has been active, the frequency of harvesting and the harvesting regions. Those knowledge holders who were full-time hunters or trappers were more knowledgeable about wolverines than those hunters who hunt caribou a couple of times a year. Therefore, while harvesters do have substantial knowledge on the species, this knowledge is neither shared among all harvesters, nor is it known to the same extent as it is for more common or important species, such as caribou.

Reproduction

Knowledge holders across all regions of the North thought breeding for wolverines to occur for a few weeks between March and April. Breeding season was indicated by an increase in wolverine activity. During this time, knowledge holders reported wolverines to be traveling around their home ranges more often and tracking each other. Gwich'in elders participating in another study noticed wolverine tracks going together in late March, and reported seeing increased movement of wolverines in April (GRRB 2001). Similar to knowledge holders in the wolverine ATK study, they also stated that this indicated mating season.

Knowledge holders noted wolverines to be shy and solitary except for a few weeks during breeding season. Some knowledge holders reported seeing between two and four male wolverines tracking a single female (S. Gruben Sr., Tuktoyaktuk NWT). One knowledge holder reported that one male's home range will overlap with four or five female home ranges (A. Niptanatiak, Kugluktuk NU), and an elder stated to one knowledge holder that "if you get a female, you know that there's gonna be a big male around too somewhere.... Sure enough, you know, you run into tracks, a big male is coming behind sooner or later" (P. Gruben, Tuktoyaktuk NWT). One hunter reported

finding an area where male wolverines had been fighting, likely over breeding opportunities with a female (A. Niptanatiak, Kugluktuk NU). One knowledge holder described wolverines breeding behaviour as follows:

The only time [you see them together] is breeding season.... If you have a couple of females and two males, just on the outside or in their home range, you start seeing them together, you know, wrestling or biting... during February. (A. Niptanatiak, Kugluktuk NU)

After this short breeding season, wolverines are once again solitary.

It is interesting to note that the observations regarding the timing of the breeding season for wolverines is different than indicated by scientific studies. Scientific literature commonly reports wolverines mating to occur later in June and July rather than in March to April, as reported by knowledge holders. However, wolverines begin conducting a number of activities in late February, such as males moving over larger areas, 'visiting' other wolverines, rolling around in the snow together, and perhaps traveling together; activities that may be construed as mating (A. Magoun, pers. comm. 8 September 2004). Therefore, it is possible that knowledge holders are observing this preliminary increase in socialization between normally solitary wolverines, and not actual mating season. But, as one North American wolverine researcher noted, "I would never say it is not possible to have mating occur earlier because there isn't a lot of observations out there. It's just that as far as I know, no one has reported seeing lengthy copulation that indicates mating for any months other than May – August" (A. Magoun, pers. comm. 8 September 2004). In addition, researchers are beginning to suspect that in February to May, "resident males become more antagonistic towards subadult transient males that are in the territory of a resident female. Not necessarily because they are rivals for breeding, but because they may be responsible for killing kits at den sites when the female is away hunting" (A. Magoun, pers. comm. 30 September 2004).

Only eight of the knowledge holders had personally seen a wolverine with young (see table 2). Sightings of wolverines with young often occurred during the summer or fall; no knowledge holders reported seeing a wolverine with young in the winter. One knowledge holder reported that in the fall, the young would be fatter because they would be fed by their mother in preparation of their leaving home, and the parents would be leaner because they were spending more time hunting for their young (A. Niptanatiak, Kugluktuk NU).

Table 2. Participants' responses to questions about wolverine young

Seen wolverine with young?		If so, how many offspring?	# of participants	What time of year?
Yes	8	1 offspring	1	March
No	18	2 offspring	4	April(2), July, August
		3 offspring	1	
		4 offspring	1	Summer
		5 offspring	1	July

All knowledge holders who were asked about seeing wolverines with young commented that it is very rare. This is likely due not only to the solitary nature of wolverines, but also due to the reduced amount time knowledge holders spend

harvesting wolverines during the spring and summer months. The harvesting season for wolverines ends at the end of February, and because the wolverine's fur becomes faded in the spring, it is less desirable for parka trim at this time. Therefore, few harvesters are interested in wolverines after February. In addition, female wolverines also will travel shorter distances during these months so as not to travel too far from their young. This further reduces the chance that a hunter will come across her tracks. The mother is extremely shy and protective of her young, keeping them away from people until they have matured, and she is aggressive to any people who approach her young (D. Frost, Old Crow YT; Participant #404, Arviat NU). Wolverine kits do not stay with the mother for very long and separate as soon as they are old enough (S. Gruben Sr., Tuktoyaktuk NU), which is usually less than twelve months of age.

Females were thought to give birth early in the spring, usually having litters of two to four young (see table 2). One knowledge holder in the Kivalliq region reported seeing a mother with five young (Participant #404, Arviat NU), a litter size which has not been documented in the wild before. One knowledge holder in the Kitikmeot region saw a mother with three young (A. Niptanatiak, Kugluktuk NU), and another in the Dakh Ka region saw a mother with four young (Participant #1003, Teslin YT). Four other knowledge holders reported seeing litters of one to two young during April, August, and July. In another study, Elders in the GSA stated that wolverines have two to three young in June, and then keep them in their den for the first few months (GRRB 2001). Females raise the young on their own during the spring and summer months. One knowledge holder stated that the female was intolerant of the male when the kits are quite young, but would allow the male to interact briefly with the young during the following fall months, after the young had reached a larger size (A. Niptanatiak, Kugluktuk NU).

Survival

Almost all knowledge holders commented that all the wolverines they had caught were in good health, the majority having a good layer of fat on them. Such comments are in part an indication of the wolverine's ability to survive in various habitat types and through food shortages. When asked about the health of wolverines, one knowledge holder stated succinctly:

I never ever skinned a skinny wolverine. Always well-fed. Pretty healthy. (Participant #1003, Teslin YT)

In a study about the Yukon North Slope, Aklavik Inuvialuit also reported that wolverines they caught were in good shape with a good layer of fat (WMAC (NS) and Aklavik HTC 2003). It is likely that survival of young wolverines in their first year is low, since most knowledge holders indicated that the majority of wolverines they harvested were over the age of one. However, once wolverines have lived through a year alone, survival rates likely increase as they have learned how to stay alive (A. Niptanatiak, Kugluktuk NU). These facts indicate that the bulk of wolverines are successful hunters and scavengers, and those wolverines that are unable to survive die at a very young age. As one knowledge holder stated, wolverines "have a pretty rough life, so if they are not healthy, I don't think they would survive" (J. Savikatmaq, Arviat NU). It is likely that the main source of wolverine mortality is from harvesting.

Movements/dispersal

Some knowledge holders thought that wolverines have home ranges, and some knowledge holders thought that they did not. Some knowledge holders did not think that wolverines had home ranges because of the fact that wolverines were constantly on the move, and never seemed to stay in the same area. One knowledge holder described the confusion as follows:

it's like they didn't have an area, but they must..., they have their own area that they patrol. (D. Joe, Inuvik NWT).

However, the majority of knowledge holders did think that wolverines have home ranges (see table 3), but that they had to be extremely large since wolverines constantly traveling, looking for any source of food. One hunter noted wolverines moving across their trapline every two to three weeks in opposite directions, indicating a wolverine to be regularly traveling through his/her home range (Participant #1005, Haines Junction YT). When asked if wolverines have home ranges, one knowledge holder stated:

Oh yeah, yeah [they have a home range], I see where they make their marks too eh. So, when you run into a track, when it's not fresh, you usually just wait... and you go back and check. It's gonna go around again. (P. Gruben, Tuktoyaktuk NWT)

Table 3. Participants' responses regarding wolverine home range

Region	Community	Have home range?	Do not have home range?	Both
Knowledge holders reporting that wolverines do not have home ranges indicates that wolverine home ranges are likely very large (too large to discern any relevant home range), and/or that some of the wolverines are transients. These are usually young wolverines who are dispersing from their natal areas looking to establish their own home range. One	Kivalliq	Arviat	3	
		Baker Lake	1	3
	Kitikmeot	Kugluktuk	1	2
	Nunavut total		5	3
				2
	North Slave	Yellowknife	1	
	ISR	Inuvik	1	1
		Tuktoyaktuk	2	1
	NWT total		4	2
	C. Yukon	Dawson City	1	1
	N. Yukon	Old Crow	1	
	S. Yukon	Teslin	0	1
	S. Yukon	Haines Junction	1	1
	Yukon total		3	3
Total			12	8
				2

knowledge holder recognized that the majority of younger wolverines did not have an established home range, while older wolverines did (A, Niptanatiak, Kugluktuk NU). Consequently, younger wolverines were more transient. He stated that these transient wolverines will migrate to an area where food is available, in some cases following the wolves and caribou. Many knowledge holders also noted this, commenting that wolverines were often found following caribou. Wolverines would continue migrating to areas of high food availability until they come across an unoccupied area in which they

could establish a home range. One knowledge holder described the movement of wolverines as follows:

We found that [wolverine] are always moving in. When there's no dominant males or females, other young would move in and start, "hey this is my home now". And with the caribou moving in that area when they're traveling through, I think that is a way of them just following them and saying, oh there is nobody here, we'll just build a home. (A. Niptanatiak, Kugluktuk NU)

In support of this notion, knowledge holders reported that wolverines would regularly migrate to areas of higher food availability, remaining until there was no more food available (Participant #902, Dawson YT; J. Pokiak, Tuktoyaktuk NWT; Participant #601, Yellowknife NWT). This indicates that food availability is likely an overriding factor for wolverine presence. The majority of knowledge holders in Baker Lake reported that wolverines did not have home ranges, which would indicate that wolverines in the area have very large home ranges or that there is a high proportion of transient wolverines in the area.

The comments shared about the large home ranges and the fact that they are always moving and following food also may support the fact that a portion of wolverines are transients. These wolverines could be moving in from refugia and other areas to fill those home ranges left vacant by a wolverine who has died or been killed. In areas where caribou form a major portion of a wolverine's diet, a larger portion of the overall population may also be transient because they are following the wolves and caribou. However, this may be difficult to determine, since because of the wolverine's immense home range, it would be difficult for harvesters to track wolverines and definitively determine if the animal is transient or just making exploratory movements within its home range.

Knowledge holders thought male wolverines travel more than females and have larger home ranges (P. Gruben, Tuktoyaktuk NWT). This is supported by the fact that the majority of harvesters reported catching mostly males. Two Aklavik Inuvialuit hunters participating in another study also reported catching more males (WMAC (NS) and Aklavik HTC 2003). While traveling on a snow machine, a hunter would be more likely to come across a male's track than a female's, since males have larger home ranges and are consequently covering greater distances than females are. In addition, female wolverines "stick not too far from where their den is, but, but males are always traveling around" (Patrick Gruben, Tuktoyaktuk). Subsequently, hunters would more likely track and catch more males than females because hunters will come across their tracks more often.

Some knowledge holders reported that wolverine range is similar for both winter and summer months. Many knowledge holders did not see wolverines in the summer, likely because knowledge holders did not travel as much or as far as they did in the winter, and that wolverines are more difficult to see in the summer. Most knowledge holders that did see wolverines in the summer reported that they could readily be found in the same areas they are found in the winter. However, some knowledge holders did report slight differences between summer and winter locations. One knowledge holder in the Kivalliq region reported that wolverines prefer flatter areas in the summer to catch lemmings (I. Kingilik, Baker Lake NU). Another knowledge holder in the ISR reported

finding more wolverines near water bodies in the spring and summer (J. Pokiak, Tuktoyaktuk NU). Two hunters reported seeing wolverines closer to the coast in the spring and summer. One knowledge holder reported wolverines feeding at gull colonies (Participant #301, Tuktoyaktuk NU) and another thought they might be traveling to the coast to prey on young seals (Participant #603, Kugluktuk NU). However, in another study, hunters from Aklavik reported that wolverines were rarely seen on the coast in the summer (WMAC (NS) and Aklavik HTC 2003).

Nutrition and interspecific interactions

Knowledge holders reported that wolverines are mainly scavengers but are also predators, and have a large and varying diet (see table 4). Knowledge holders noted wolverines to be opportunistic feeders, always looking for food, and would often leave areas where food availability was poor. Areas of good habitat for wolverines were commonly described as areas “where the food is”. Wolverine abundance was often connected to the presence of caribou and the subsequent carrion made available from wolf kills. One knowledge holder described it was common for wolverines to follow wolves:

Two wolves ahead, four wolverines in the back.... Just following the wolves, middle of winter. (Participant #603, Kugluktuk NU)

Table 4. Wolverine diet as described by participants

Food	Nunavut (13 participants)			NWT (9 participants)	YT (6 participants)	Total
	Kivalliq (9 participants)	Kitikmeot (4 participants)	Nunavut Total			
Caribou	7	3	10	7	1	18
Moose		1	1	3	2	6
Mountain sheep					1	1
Muskox	1	1	2	2		4
Rabbit		2	2	4	4	10
Ptarmigan		1	1	4	5	10
Mice, lemmings	1		1	2	3	6
Other birds				2	2	4
Muskrat, beaver					1	1
Squirrel					2	2
Other animals (porcupine, fish, weasel)	1		1	1	1	3
Bone	1		1	1	1	3
Carrion (scavenger)	6	2	8	7	4	19
Vegetation	2	2	4	3		7

Seven knowledge holders stated wolverines follow caribou or other game, while ten knowledge holders noted wolverines follow wolves to scavenge off their kills. Two different knowledge holders described the importance of wolves and caribou to wolverines as follows:

I could bet anyone, I follow a wolf trail and I find a kill, there's going to be wolverine tracks there. They pick up what's left. (Participant #1003, Teslin YT)

They follow the caribou too, eh? They follow the caribou. Well, the wolves are first, sometimes wolves will kill more than one caribou, and they don't eat all the kill.... And the wolverine will come behind, and he'll chase the wolves away. (Participant #902, Dawson YT)

In regions where caribou were present (northern Yukon, ISR, North Slave, Kitikmeot, and Kivalliq regions), over two-thirds of knowledge holders reported barren-ground caribou as the main carrion species. Knowledge holders in Kugluktuk also described seeing whole moose neatly cached inside wolverine dens (R. Hitkolok, Kugluktuk NU). In those regions with little or no caribou (Kluane, Dakh Ka and Dawson regions), moose and mountain caribou were noted as important carrion species. Knowledge holders also reported that muskox and mountain sheep carcasses were utilized as carrion where available. These findings indicate that it is large mammal carrion that is critically important for wolverines, rather than any particular habitat type.

In the Boreal and Arctic ecological areas (NWT and Nunavut), the majority of knowledge holders reported that the wolverine's main food source was caribou, and people reported finding wolverines where the caribou are. Wolverines in the North Mountain ecological area (Yukon) had a more varied diet, but most knowledge holders reported that wolverines were also dependent on larger animals as prey or carrion. Knowledge holders in the Kluane, Dakh Ka, and Dawson regions all reported wolverines relying heavily on moose, mountain sheep, and mountain caribou carrion left behind by wolves. One knowledge holder in the Kluane region described wolverines as "scavengers. I mean they don't kill too much themselves, they follow the wolf herds around, and they take what the wolves leave behind, summer and winter" (A. van Bibber, Haines Junction YT). Knowledge holders across the North also reported wolverines scavenging off of polar bear kills, and off of grizzly bear kills in the summer.

Large animals were important for the wolverine, but most often they came in the form of carrion rather than prey. While wolverines occasionally hunt and catch large prey, it was not described as their main method of obtaining food. Seven hunters reported seeing wolverines catch caribou, although most of these knowledge holders stated that wolverines rarely caught and killed caribou, being too slow. Consequently, knowledge holders reported wolverines as being largely dependent on wolves or another large predator to obtain large mammal carrion such as caribou. In addition to catching caribou, hunters in the ISR, Kivalliq, and Kitikmeot regions reported wolverines scavenge but also kill muskox (Participant #301, Tuktoyaktuk NU; S. Quinangnaaq, Baker Lake NU). In the Dawson region, one knowledge holder reported seeing wolverines catch and kill mountain sheep (Participant #903, Dawson YT). Wolverines reportedly caught larger animals mainly by charging them and ripping their necks. Some wolverines chased and/or harassed some animals until the exhausted caribou or

muskox finally succumbed. One knowledge holder described a wolverine's successful hunt as follows:

There's a herd of muskox lying down, resting, and the wolverine went downwind from them. And you know the muskox have a big hump. There, that's where the wolverine, the muskox tried to get up, but the wolverine jumped on and kept biting and biting and biting, and eventually caught the muskox. (S. Quinangnaaq, Baker Lake NU)

Wolverines are not effective predators, bluntly charging and attacking its prey, followed by a short or long chase. One knowledge holder stated that "when [wolves] see caribou, they sometimes stalk and wait for them, but a wolverine will just go after them and try to get them" (A. Niptanatiak, Kugluktuk NU). Consequently, wolverines are neither an effective predator of large game, nor a serious competitor with other predators.

In addition to large animals as prey or carrion, wolverines would feed on whatever food source was available. Rabbits and ptarmigans were identified as other important food sources in the North Mountain and Boreal ecological areas, respectively. Some knowledge holders in the Kluane, Dakh ka, and Dawson regions felt that wolverines abundance may be affected by the availability of snowshoe hares (Participant #902, Dawson YT; Participant #1003, Teslin YT; Participant #1005, Haines Junction YT). Knowledge holders also reported wolverines eating porcupine, mice, beaver, fish, ducks, seals, gulls and gull eggs, and lemmings. Knowledge holders described wolverines feeding on antlers, bones, and skulls. Some knowledge holders stated that wolverines would also feed on berries and vegetation. Wolverine also obtain food by taking animals from people's traplines and "stealing" food from meat caches. Knowledge holders in the Kitikmeot region reported that wolverines preferred stealing red foxes to white foxes from his trapline (A. Niptanatiak, Kugluktuk NU), and one knowledge holder in the Kluane region reported them preferring to eat lynx (Participant #1005, Haines Junction YT).

While normally solitary, knowledge holders observed wolverines feeding in groups. This occurred during winter around large animal carcasses, such as muskox, caribou, and moose. Seven knowledge holders reported seeing groups of between two to four wolverines feeding at the same carcass. It is likely that wolverines will be more tolerant of each other during the winter months when less fresh food is available, and there are more large carcasses available. One knowledge holder commented about wolverines gathering around carcasses as follows:

I've seen a kill of course, when I get there the wolverine were there, but they run away because they here you coming.... Oh yeah, I seen a kill where there's two, three wolverine there. (D. Frost, Old Crow YT)

Some knowledge holders noted a difference between the summer and winter diets of wolverines. One knowledge holder described that meatier foods such as caribou carrion were eaten in the winter, and that fresher foods such as live rabbits and ducks and vegetation were eaten more in the summer months (J. Pokiak, Tuktoyaktuk NWT). Large animals as carrion are likely less available in the summer because they are more difficult for a wolverine to catch when there is no snow. One knowledge holder in the Kitikmeot reported finding wolverines near the coast in the spring, and thought they may be after young seals (Participant #603, Kugluktuk NU). Another hunter in the ISR also

reported finding wolverines closer to the coast in the summer, feeding on gulls and gulls' eggs (Participant #301, Tuktoyaktuk NU). Knowledge holders reported seeing wolverines feed on berries and vegetation in the summer months (J. Pokiak, Tuktoyaktuk NU), or when no big game was present (R. Hitkolok, Kugluktuk NU). One knowledge holder stated lemmings were also reported as being an important summer food source (I. Kingilik, Baker Lake NU). Another knowledge holder reported that wolverines also will eat more food in the summer, since they are not as heavily dependent on scavenging from wolf kills because there are more animals available, and there are also bears around who leave carrion behind (A. van Bibber, Haines Junction YT).

Eight knowledge holders throughout the North noted that wolverines would cache food. Wolverines would periodically return to either check on their cache to ensure food was still there or to add more food. One knowledge holder reported that wolverines prefer to cache food on north-facing slopes to ensure that cached items would stay cool (Participant #903, Dawson City YT). One knowledge holder described the importance of food caches to wolverines as follows:

They always go back to some of their old caches to try surprise foxes or something that's there. I've tracked them before where they've caught a fox or ptarmigan enroute to where they are going, and, at one of their caches, they'll look at it, and a fox may have been at it, so they'll scent it up again so other animals don't try to eat it. (A. Niptanatiak, Kugluktuk NU)

Behaviour/adaptability

Several knowledge holders felt that wolverines were somewhat sensitive to human development and human presence. Knowledge holders described wolverines as being shy, and noted that they tended to move away from areas of activity and development. Wolverines were found with increasing frequency as knowledge holders traveled further away from the community. This suggests that wolverines stay away from areas of human habitation and development. However, knowledge holders also noted that some wolverines will return to areas of development if they are not threatened, or if the development activities are halted. Two knowledge holders in the Kivalliq region also reported that wolverines come closer to communities during fall caribou migration, most likely attracted by the high amounts of caribou carcasses in town (Participant #401, Arviat NU; S. Quinangnaaq, Baker Lake NU). One knowledge holder reported wolverines could be found at the local garbage site, although they generally do not form a dependence on human food. These facts, coupled with the description of wolverine recovery from a wolf poisoning program in the eastern Arctic, suggest that wolverine populations may be able to recover from population declines if given a large enough area free of human involvement and time to recover.

POPULATION SIZES AND TRENDS

A wolverine is not a common animal to be seen in the wild, and the majority of wolverines were caught either unintentionally in a trap, or opportunistically when a hunter came across a fresh track. Knowledge holders commented that people are lucky to catch a wolverine. Despite their rarity, knowledge holders were able to comment on

general trends in wolverine abundance because of the many years spent hunting and trapping wolverines. The majority of knowledge holders described wolverine populations as either stable or increasing (see table 5). Only in Yellowknife did people report that wolverines might be decreasing.

Table 5: wolverine trends, described by participants

Region (see figure 5)	Population increasing	Population stable/fluctuating	Population decreasing
Kivalliq (9 responses)	9		
Kitikmeot (4 responses)		4	
NU Total	9	4	
North Slave (2 responses)		2	2
ISR (8 responses)	3	5	
NWT total	3	7	2
N. Yukon (1 response)	1		
Dawson (2 responses)		2	
Dakh Ka (1 response)		1	
Kluane (2 responses)		2	
YT total	1	5	
TOTAL	13	16	2

The following sections describe the population sizes and trends (outlined in table 5) in depth according to each territory.

Nunavut

All knowledge holders in the Kivalliq region reported local wolverine populations to be significantly increasing over the past twenty years. Many of the knowledge holders in this region commented that twenty-five to thirty-five years ago, the local wolverine population crashed and was virtually extirpated from the area. Three of the knowledge holders in Arviat attributed this to a wolf control program that was conducted in the area during the mid-1900's. In the 1950's, aerial surveys indicated that barren-ground caribou populations were well below expected values (Heard 1983). A wolf control program, which involved the use of strychnine-laced baits placed in caribou winter ranges, was instituted in NWT (which Nunavut was a part of until 1999) in 1951 and pressure remained high until 1960/61. Kelsall (1968) states that from 1955 until 1961, over 900 wolves were killed per year on average in the NWT. Symington (1965) states that 5,166 wolves were killed between 1953 and 1959 in the NWT. Wolf poisoning finally ended in NWT in 1963-64. This control program not only impacted wolves, but also wolverines. Wolverine mortality was caused by a combination of poisoning, from eating baited meat meant for wolves, and starvation, since fewer wolf-killed carcasses were available for scavenging. During wolf control operations, 367 wolverines poisoned by wolf baits were documented for three years in 1955/56, 1957/58, and 1959/60 (Kelsall 1968). There are no estimates of indirect wolverine mortality due to the loss of wolves as carrion-providers. Such a massive wolf control program would have dramatically affected local wolverine populations. One knowledge described the effect of the wolf control program as follows:

Early 60's, they were poisoning wolf. At the same time I guess, wolverine and foxes and that go with it as well, and the population went really, really down to about nothing. And I guess over the last thirty-five years they have come back to this day, and there have been sightings more often, and more tracks being sighted on or near areas of Arviat. (Participant #401, Arviat NU)

All nine of the knowledge holders in the Kivalliq region commented that wolverine abundance in the region had increased over the past ten to twenty-five years. Knowledge holders reported that twenty years ago it was rare to see even a wolverine track, but now people are seeing many tracks and catching significantly more wolverines. One knowledge holder reported that wolverines do not seem as numerous as they were before the wolf kill program, but that present levels of abundance are also much higher than in past years (Participant #404, Arviat NU). This would indicate that the local wolverine population is still recovering from such a drastic loss of individuals.

Some knowledge holders also attributed the increase in wolverines to the fact that people were no longer nomadic (J. Iksakituq, Baker Lake NU; M. Akalak, Baker Lake NU). Since people are now settled in communities there are fewer people hunting and trapping for food. The settling of the nomadic Inuit into regional centres during the Twentieth Century likely had a dramatic impact on harvesting patterns on all species, including wolverines, across the North. This may have played a role in the recovery of wolverines in the area. However, the replacement of dog teams with snow machines in recent years has allowed harvesters to travel much further and faster. Three hunters in the ISR noted that the introduction of snow machines has changed harvesting practices and patterns, allowing people to travel farther and faster: "snowmobiles, you know, my dad used to always tell me what took him a week to travel we could travel in a day" (P. Gruben, Tuktoyaktuk NWT). Some knowledge holders alleged that snow machines have resulted in increased harvests of wolverines (P. Gruben, Tuktoyaktuk NWT; R. Gruben, Inuvik NWT). One Aklavik Inuvialuit hunter in another study believed wolverine numbers to be declining since snow machines replaced dog teams (WMAC (NS) and Aklavik HTC 2003). Therefore, the effect that the gathering of Inuit in regional centres had on harvesting pressure was probably offset by the increased ability of harvesters to travel much further and faster than they could have when they were nomadic.

Knowledge holders in the Kivalliq region did not consider wolverines to be as important as some other species, such as wolves. Few knowledge holders commented extensively on the importance of wolverines, stating that they were not sure how important wolverines are because populations are just starting to increase. Because of the lack of wolverines in the area during the time when knowledge holders were active on the land, people did not utilize them as much. Consequently, knowledge holders are less familiar with wolverines today. As a result, wolverines were considered less important. One knowledge holder in the Kivalliq region did report that wolverines were culturally important because it is a prized fur for parka trim (Participant #401, Arviat NU). Most knowledge holders stated that wolverines were only important for the money they could obtain from the pelt, which was often used to buy subsistence items, such as bullets and kerosene (M. Akalak, Baker Lake NU; I Kingilik, Baker Lake NU).

Those people in the Kivalliq region usually sold most of the wolverines they caught. However, because so few wolverine pelts were caught, the earnings generated from the

sale of wolverine pelts made up less than ten percent of a hunter's overall income (Participant #401, Arviat NU; J. Savikatmaq, Arviat NU). If knowledge holders caught one or two wolverines, they would generally keep them, but if a knowledge holder caught more, they would sell three-quarters to four-fifths of the pelts they had caught. Most knowledge holders caught between one and four wolverines per year, and the estimated total number of wolverines harvested by each community in the Kivalliq region was between ten and thirty per year. Most residents in the Kivalliq region stated that they sold most of the pelts they caught to the Department of Sustainable Development (DSD), and would only keep a few (see table 6). The DSD buys furs at a set price, usually higher than the price paid if harvesters sold the wolverine pelt to a fur auction house. The DSD then sells the furs to the fur auction.

Table 6. Information regarding participants' individual wolverine harvest

Region	Community	Wolverine Catch Individual (average) per year	Selling vs. keeping	Sell locally or to DSD/ fur auction?	Wolverine catch community per year
Kivalliq	Arviat	2	Keeps 1/5, sells 4/5	Locally or to DSD	15-20
Kivalliq	Arviat	2	Keeps all, sells none		10
Kivalliq	Arviat	2-3	Keeps ¼, sells ¾	DSD	30
Kitikmeot	Kugluktuk	3-4		Locally	100
Kitikmeot	Kugluktuk	10-15	Keeps ¼, sells ¾	Locally	80-100
Kitikmeot	Kugluktuk	17-18		Locally	80 in good year
Kitikmeot	Kugluktuk	2-3	Sells some	Locally	30+
North Slave	Yellowknife	3-4	Keeps most	Auction	Doesn't know
North Slave	Yellowknife	2-3	Sells ½, keeps ½	Auction	Doesn't know
ISR	Inuvik	1	Keeps most	Locally	5-6
ISR	Inuvik	0-1	Sells some	Locally	5
ISR	Tuktoyaktuk	4-5		Locally	30-40
ISR	Tuktoyaktuk	1-2	Sells most	Locally	20-30
ISR	Tuktoyaktuk	3-4	Hardly sells any	Locally	30-40
ISR	Tuktoyaktuk	1-2	Sells some	Locally	>5
ISR	Tuktoyaktuk	10	Sells most	Locally	20
Dawson	Dawson City	3-4	Sells most	Locally	
N. Yukon	Old Crow	2	Sells most		10
Kluane	Haines Junction	4-5	Sells all	Rarely to auction	
Kluane	Haines Junction	2-4	Sells almost all	Auction	
Dakh Ka	Teslin	4-5	Sells all	Locally	

Wolverine populations in and around the Kitikmeot region were reportedly stable, and were of significant size to support strong harvest pressure. Knowledge holders thought populations in the area to be fairly stable and robust with a slight cycle, most likely due to the amount of food available. Three of the knowledge holders in the region also commented that their parents or grandparents had caught wolverines in the surrounding area, and the populations then had also seemed fairly stable. One

knowledge holder described the wolverine populations “to be pretty stable in a lot of our areas where people hunt them today cause of the large territory with no people around, and there, the tundra’s so vast” (A. Niptanatiak, Kugluktuk NU).

When asked if wolverines were important, knowledge holders in the Kitikmeot region reported that wolverines are highly valued by local people and are considered very important. The wolverine was considered important mainly because the fur is highly desired by local people for parka trimming and would also be used occasionally to make special pairs of mitts or boots. Because of the intense local use of wolverines, almost all of the animals caught by people in the community was sold to meet local demand (see table 6). Some harvesters would also keep some pelts for themselves and give them to family members when they were asked. No knowledge holders reported selling wolverines to fur auction because more money could be made selling a wolverine pelt locally. Knowledge holders could obtain a much higher price for their pelt by selling it within the community (\$500-800) rather than to fur auction (\$200-400). As one knowledge holder stated, “you can make so much more off of people in town” (D. Joe, Inuvik NWT). In addition, some knowledge holders reported that it was their obligation to elders and other people in the community to provide them with wolverine fur. One knowledge holder described the local use and demand for wolverines:

We usually use it for ourselves eh, for our clothing, or parkas and that. If not, we sell them. People are asking for them.... I haven’t sold one for a fur auction before. Just mostly locally here in town, or just outside of town. (R. Elgok, Kugluktuk NU)

Only one of the four knowledge holders in the Kitikmeot region actively trapped wolverines (Participant #603, Kugluktuk NU). The rest of the knowledge holders caught wolverines while hunting from snow machine, but would occasionally trap recreationally. However, trapping of wolverines was reported to be more common in the past when people were nomadic; dog teams were too slow to chase wolverines. Harvesters usually did not target wolverines, but if they saw wolverines or a fresh wolverine track while out hunting other animals, they would either shoot it from their snow machine or track them down. Knowledge holders also reported that most hunters in the community would only catch one to two wolverines per year, if any. Only those people that constantly hunted and trapped would catch more. Knowledge holders in the Kitikmeot reported catching between two to eighteen wolverines a year (see table 6), depending on various factors such as time spent hunting and experience of the harvester. Knowledge holders estimated that total community harvest was approximately eighty to one hundred wolverines per year. In comparison, fur auction data for the entire territory of Nunavut rarely reports a harvest of more than thirty wolverines (see table 1 in COSEWIC 2003). The discrepancy between the amount of wolverines actually caught and the amount that is sold to fur auction shows that harvest statistics for the Kitikmeot region are grossly underestimated. A carcass collection program started recently in the region is helping to develop more accurate statistics and has indicated similar findings.

Northwest Territories

Both of the knowledge holders reported wolverine populations in the North Slave region to be either stable or decreasing. As one knowledge holder stated: “the number’s not going up or down, as far as I know” (Participant #601, Yellowknife NWT). While both knowledge holders reported that wolverines appear to be abundant and the population

stable, they also suggested the population may be decreasing. However, it is difficult to draw conclusions with only two participants. A decreasing wolverine population may be a result of the extensive level of development that is occurring in the North Slave area. Both knowledge holders reported that their parents had also trapped wolverines in the same areas, indicating wolverines to be both present in the area and subject to harvest pressure for a number of decades. Wolverine pelts were either used for parka trimming or sold to fur auction (see table 6). One knowledge holder reported that, on average, he sold half his pelts and either kept or gave away the other half, depending on how many he would catch and the demand from relatives (Participant #701, Yellowknife NWT).

Knowledge holders in the ISR described local wolverine populations to be stable or increasing. Five knowledge holders in the ISR indicated that the population was stable. One knowledge holder stated that the population fluctuates up and down slightly due to food availability (G. Kasook, Inuvik NWT). Two knowledge holders described the wolverine population as increasing. One knowledge holder attributed the increase to an increase in caribou (Participant #901, Tuktoyaktuk NWT), and the other thought that fires in the south are forcing wolverines to migrate northward (S. Gruben Sr., Tuktoyaktuk NWT). Many knowledge holders also reported that their parents and grandparents hunted or trapped wolverines at similar levels to present-day harvest levels. Some knowledge holders indicated that while the population is in fact stable, harvest may be rising due to the increased ease of transportation with snow machines. One knowledge holder stated: “no, I don’t think [there are more wolverines], just, we have it easier getting around” (P. Gruben, Tuktoyaktuk NWT). Knowledge holders in Inuvik reported that few people harvested wolverines, and harvesters may catch between one and three wolverines per year. In Tuktoyaktuk, local harvests were reportedly higher, with people harvesting an average of two to five wolverines per year. Knowledge holders in Inuvik estimated the total number of wolverines caught by all harvesters in the community to be between five and six, while in Tuktoyaktuk, knowledge holders reported the local harvest to be between twenty and forty animals (see table 6).

Knowledge holders in NWT reported wolverine harvesting to be mostly opportunistic. Most people in NWT caught wolverines when they came across fresh tracks while hunting other animals such as caribou or wolf. Few knowledge holders were actively trapping any more because it was no longer economically feasible. Similar to Nunavut, knowledge holders in NWT reported that in the past, when people caught wolverines, it was mainly from a set trap. Knowledge holders in both the North Slave region and the ISR described that in the past, wolverines were harvested mainly using a deadfall trap, which is a small box built out of logs (see figure 1). Food was placed inside the box to attract wolverines, and when they entered the front of the trap, a lever would be triggered, causing a large log to drop and crush the wolverine’s skull. This was identified by many knowledge holders in the area as the only effective way of catching wolverines; one knowledge holder reported that he still used deadfall traps. Most people who did trap had switched to using more

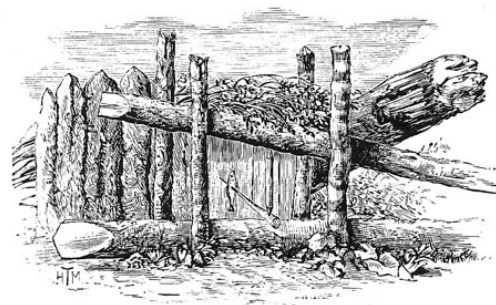


Figure 1. A deadfall trap
© Glenbow Archives NA-1532-6

modern traps because they were easier to set up and remove, and trappers could set more of them.

While fewer wolverines were caught in these regions than compared to the Kitikmeot region of Nunavut, wolverines were still considered very important for the local people. Similarly, wolverines were mainly used locally for parka trim. Knowledge holders in the NWT considered the wolverine to be a traditional animal for people in the North. One knowledge holder stated that the wolverine is

Really important for, the traditional animal for a lot of people who use the fur for the decoration of their parkas (D. Joe, Inuvik NWT).

Similar to the Kitikmeot region, no knowledge holder in the ISR reported selling wolverine pelts to fur auction. Knowledge holders in the North Slave indicated that only a portion of their wolverine harvest would be sold to fur auction. Consequently, fur harvest statistics for NWT are an underestimate of actual harvest in the territory.

Yukon Territory

Knowledge holders reported wolverine populations in the Yukon Territory to be increasing or stable. One knowledge holder in North Yukon felt that wolverines in the region were increasing due to there being fewer active trappers in the area (D. Frost, Old Crow YT). In a study of the Yukon North Slope, two hunters thought wolverines numbers to be stable and one hunter thought numbers were increasing (WMAC (NS) and Aklavik HTC 2003). One participant in the study thought numbers were decreasing since snow machines had replaced dog teams. Knowledge holders in the Dawson region reported wolverine populations to be stable. One knowledge holder in the Dawson region observed small fluctuations in the local population, which they attributed to total food availability (Participant #903, Dawson YT). Knowledge holders in the Kluane and Dakh Ka regions also described wolverine populations as stable but with slight fluctuations. Knowledge holders in all regions of the Yukon also noted that there are more wolverines where food availability is high. One knowledge holder stated that wolverines “go from place to place where the food’s plentiful” (Participant #1003, Teslin YT). Knowledge holders stated that wolverine numbers will fluctuate slightly, but not to the same extent as with other animals such as rabbits, whose numbers cycle dramatically.

All knowledge holders in the Yukon were trappers; no knowledge holders hunted or tracked wolverines due to the extreme difficulty of doing so in the mountainous terrain. Most knowledge holders described trapping as a lifestyle choice rather than a source of income, and sold most of the pelts they had caught (see table 6). All knowledge holders reported the wolverines they had caught on their trapline to government officials because of trapline licensing requirements. Knowledge holders in the Yukon would occasionally keep some pelts for their own use, mainly for parka trim, but this was not as common as in the NWT or Nunavut and was reported to government officials. Depending on demand, wolverines were also given to family members, and knowledge holders would sell wolverines for mounting, use the pelt in a cottage industry, or would sell some locally or to auction.

In summary, based on knowledge holder information, there are high, relatively stable levels of wolverines in the Yukon. Wolverines also occur at high levels in the North Slave region, but population levels are stable to decreasing. In the ISR and Kitikmeot regions, there are high levels of wolverine along forested areas in the northern portions of the mainland. Wolverines are increasing in the Kivalliq region of Nunavut, but are currently at lower levels than populations in the Boreal and North Mountain ecological areas. Wolverines are least abundant in the northeastern corner of Nunavut and the Arctic Islands.

LIMITING FACTORS AND THREATS

While some knowledge holders across northern Canada noted that wolverines are sensitive to developments and human presence, few of them identified active threats to wolverines. Most knowledge holders in all regions reported wolverine populations to be fairly stable and the wolverines themselves to be fairly healthy. Low food availability was one threat highlighted by knowledge holders. Some knowledge holders believe wolverine numbers are tied to total food availability, and that when food availability is low, wolverine populations are also low. One knowledge holder described this relationship by stating that wolverines would be threatened if caribou populations crashed:

If there are a lot of caribou or whatever, the wolverine are healthy. But where there's no caribou wherever, you know, wolverine, they wandering around, they're not too healthy. (Participant #601, Yellowknife NWT)

One knowledge holder recognized that global warming may also be a threat by affecting the wolverine's hunting ability. One hunter stated wolverines were threatened "only from people. If people start for some reason to go after them a lot... They can pretty well carry their own against, among other wildlife" (Participant #404, Arviat NU). Knowledge holders also stated that currently there is little active development occurring in many communities in the North: little active drilling for oil or pipeline development, few roads, and few natural resource industries such as mining or forestry, with the exception of the Yellowknife and southern Yukon areas. Consequently, while wolverines may be sensitive to certain threats, such as land development, since many of these threats are not present near many of the communities, wolverines were not vulnerable to them. While noting that there was little development going on, knowledge holders were concerned about what the impacts would be if such development were to occur.

It is interesting to note that few knowledge holders identified any threats to wolverines, especially in areas such as Inuvik where there is extensive pipeline development for oil and gas. This may indicate a number of points. First, it may be difficult for knowledge holders to discern any effect on wolverines because of the wolverine's large home range and constant travel. This is unlikely because of the careful attention that knowledge holders pay to local wildlife and would notice any subsequent changes in population or distribution. Second, since such activities only occur in relatively small areas, development may not have a significant impact on the overall wolverine population. Third, it may indicate that wolverines are not as sensitive to such developments as originally thought. This is supported by the fact that knowledge holders reported wolverines will return to development areas if they were not bothered. Fourth, it

may also indicate that knowledge holders do not completely understand the effect that such developments may have on local wolverine populations, or may be underestimating the impacts. It is likely a combination of all factors because of the natural characteristics of wolverines (large home range, naturally rare) and the surrounding geography (vast wilderness with pockets of development), which prevent a complete understanding of wolverines.

The main causes of mortality for wolverines, and consequently the main threats to wolverines, are hunting and trapping. With few roads in much of the Arctic and northern Boreal areas, it is unlikely that road kills account for many wolverine deaths, but this may be more of a factor in southern NWT and the southern Yukon where roads are more common. For the three territories, harvest statistics are used to help manage wolverine populations, and wolverine harvest is managed by controlling season length. However, for some regions in NWT and portions of Nunavut, harvest statistics are a severe underrepresentation of the actual wolverine harvest. This is especially so in communities such as Kugluktuk which have reportedly high harvests of wolverines, and where relatively few wolverine pelts are sold to auction. This underrepresentation of the actual harvest is also recorded by Boles (1975) and Dumond (see table 1 in COSEWIC 2003). In addition, some of the pelts are not even sold; rather, they are kept by harvesters or given to family members. Those hunters that caught only one to two wolverines per year would often keep the wolverine pelts for their own use: “you catch one, you keep, but you catch two or three, you keep one” (Participant #401, Arviat NU). In contrast to the Kitikmeot region, hunters in the Kivalliq region often sold wolverines to fur auction either directly or via the DSD. For this region, fur harvest statistics are likely not as dramatic an underrepresentation as for other areas of the territory.

While trapping is a major source of wolverine mortality, it is not as important as hunting. In the Yukon, where most of the trapping for wolverines occurs, traplines are closely monitored, and estimates of wolverine abundance are likely accurate. For NWT and Nunavut, trapping was not a major activity, and only a few people in the Arctic and Boreal ecological areas knew of anyone who had caught a wolverine in a trap. Consequently, trapping is a minor source of wolverine harvest in these areas. Those knowledge holders who continued to trap did so more as a way of life than as a way for income. In most regions in the North, knowledge holders reported a decline in the overall number of active trappers. Knowledge holders in both regions of Nunavut, the ISR, and in the north Yukon all reported that either they trapped less than they had in past, and/or that there were less people trapping overall. This is similar to findings in an ecological knowledge study of wolverines in northern Ontario, where Aboriginal participants reported that the number of active trappers has decreased over the past twenty years (Magoun et al. 2004). Some knowledge holders in Nunavut and the ISR, as well as participants in the ecological knowledge study in northern Ontario, also reported that trapping was no longer economically feasible due to high gas and food costs. One knowledge holder stated that he used to have a trap line, but it was “just not feasible for us to go out and trap because the gas is so expensive.... We haven’t been trapping like ten, fifteen years ago when we did” (R. Gruben, Inuvik NWT).

While harvest statistics in NWT and Nunavut may be an underrepresentation of actual harvest, the majority of wolverines harvested in these areas were caught incidentally when people are out hunting other animals such as caribou. In addition, few people were actively trapping. Hence, overall harvest of wolverines is likely minimal. Not

many people actually harvest wolverines, and most people rarely catch one. Only active hunters who frequently hunt catch more than one wolverine per year. Only two hunters stated that they actively looked for wolverines. One hunter described this harvest pattern as follows:

If they see a wolverine track they might track one, try to track it down, or if they see one they might try to chase it, but no one actually – in this community no one actually says I am going wolverine hunting. It's just if the opportunity exists.... People will say I'm going wolf hunting, I'm going caribou hunting, but no one says they are going wolverine hunting. (Joe Savikatmaq, Arviat NU)

Still, with better transportation, it is likely that harvesting pressure is greater than many knowledge holders believe, especially for a species like wolverine which have low density and fecundity.

While snow machines have provided better access for hunters and trappers and have likely resulted in increase harvests, harvesters are still exploiting relatively small, concentrated areas in the North. Knowledge holders commented that hunting and trapping is restricted to certain areas, allowing for large areas of refugia where there is little development to exist. Since hunting and trapping is concentrated in certain areas with large regions of refugia, it is likely that harvest pressure is sustainable in most areas. Migration of young wolverines from areas of refugia sustain harvested populations that are subject to moderate to strong harvest pressure. One knowledge holder described the localized harvesting pressure as follows:

Only certain people hunt in those areas, and then you have between here and Yellowknife, if you have all those big areas with the mines and that, but you only hunt in those little zones. And if you have that big middle buffer, those animals always move around, moving away. [Elders] say well, as long as you have those, you'll never have problems. (A. Niptanatiak, Kugluktuk NU)

These areas of refugia, as long as they are undisturbed, will continue to produce wolverines. These wolverines will migrate to hunted areas to fill the empty home ranges of dead and harvested wolverines.

A number of other factors help to make wolverine harvests more sustainable. First, most knowledge holders in the Boreal and Arctic ecological areas reported catching older male wolverines, further implying that harvests are sustainable. In the Yukon, however, three knowledge holders reported catching the same amount or more females than males, which may affect the breeding population in the Yukon. However, the wolverine harvest is more closely monitored and managed in the Yukon. Second, wolverine pelts fade with increasing sunlight in the spring, making them less desirable for parka trimming. Consequently, from February onward, knowledge holders stated that they will examine a wolverine's pelt prior to killing it to determine whether it is worth catching. This is advantageous for wolverines, as this occurs prior to their breeding season. Finally, knowledge holders noted that the wolverine is a culturally important animal and is treated as such; people will only catch what they need, and will cease harvesting in an area if they notice there to be fewer animals. These are lessons that they have learned and have been taught to them by their elders.

SPECIAL SIGNIFICANCE OF THE SPECIES

Wolverines are a highly prized species, both from a subsistence and cultural standpoint. Wolverine fur is cherished for parka trim because of its frost-resistant properties, warmth, and because it is long lasting. As one knowledge holder stated:

The fur is mainly used for the trimming on the parkas. It's a real special fur up here. (J. Pokiak, Tuktoyaktuk NU)

Wolverines was used as parka trim also because of its cosmetic appeal, with attractive dark hairs highlighted by a golden band. The section of the wolverine's pelt that runs up one limb, across the back, and down another limb is used for trimming around parka hoods. Traditionally, the section of fur on the front limbs was put on a man's parka, often with the claws still remaining. Fur from the hind limbs, with the golden band across the back, was used on the women's parka. However, knowledge holders reported that this tradition does not matter today. Selling the fur provides much-needed income for harvesters, so it is "a great help" to the harvester (A. van Bibber, Kluane YT). Knowledge holders would often sell wolverines to buy such things as gas and bullets to allow them to go out hunting again.

Knowledge holders only used the wolverine's pelt. The carcass was either discarded or fed to their dogs. Knowledge holders reported that long ago, wolverines, like all animals, were an important source of meat when food was scarce. Today, no knowledge holders reported eating the meat, but they had heard from their parents who have eaten wolverines that the meat was rather tough and gamy. Gwich'in elders reported in another study that Gwich'in people only eat wolverine meat if faced with starvation (GRRB 2001). Both Briggs (1970) and Boas (1964), in their studies of Inuit in northern Canada, mention people eating wolverine meat.

From a cultural perspective, wolverines were considered important by knowledge holders. Traditionally, strips of wolverine hide were worn around a young man's head when they went to war, believing that the wolverine's strength and ferocity would be transferred to them (GRRB 2001). Wolverine gall bladders were also used to treat infections (GRRB 2001). The wolverine is a highly admired species and is personified in stories as a trickster, thief, and intelligent animal. One knowledge holder shared the following story that he knew about wolverines:

One story that I've heard is about a gathering, a legend, of wolverines, all sitting in a circle. There's this one wolverine who brings up a caribou leg up to a bowl. [The wolverine] went in to the middle of the circle, put it on the mat, and says "here is what I stole today" is how he told his other wolverines. (S. Quinangnaaq, Baker Lake NU)

Knowledge holders respected wolverines for their place in the environment and its ability to survive. Several harvesters commented on the biological importance of

wolverines, and how they are important to all things and all species. One knowledge holder explained the biological importance of the wolverine as follows:

It is part of our animal species structure.... And all of our elders always said you have to look after everything, you know, because they'd all link together. (A. Niptanatiak, Kugluktuk NU)

SUMMARY OF STATUS REPORT

Wolverines were readily found throughout the northern territories in a variety of different habitats, but knowledge holders noted that wolverines were naturally uncommon. Wolverines appeared to be more common in rocky outcrops in the eastern Arctic, preferred hilly, and dense areas of forest throughout the Boreal ecological area, and preferred mountainous terrain in the North Mountain ecological area. In most regions, knowledge holders indicated that wolverine populations were either stable or increasing. In the eastern Arctic, wolverines have significantly increased after a wolf control program in the mid-1900's resulted in virtual extirpation of wolverines in the area. Wolverine populations were described as stable throughout the North Mountain and northern portion of the Boreal ecological areas. Knowledge holders in the southern portion of the Boreal ecological area (North Slave region) indicated the population of wolverines to be stable, but may perhaps be decreasing. Wolverine abundance in the ISR and Kitikmeot regions is likely higher than previously thought, as indicated by knowledge holders and local levels of harvest. Knowledge holders in the North Mountain and Boreal ecological areas noted slight population fluctuations, most likely due to total food availability in the area.

In most regions wolverines are very important to local people. Wolverine fur is heavily used by local people for parka trim because of its warmth, longevity, and frost-resistant qualities. Consequently, much of the wolverines harvested in Nunavut and NWT is used internally within communities. Wolverines were admired by hunters and trappers for the ferocity, intelligence and ability to survive. Knowledge holders respect the wolverine and take steps to ensure its survival.

While hunting and trapping is the main source of wolverine mortality, a combination of factors enables wolverine populations and harvest to remain sustainable. Harvest pressure in localized areas is higher than indicated in harvest statistics for NWT and Nunavut since a large portion of catch is used locally and goes unreported. However, since harvest pressure is concentrated in certain areas it leaves large areas of refugia with little disturbance. Transient wolverines migrate from these source areas to other areas, sustaining harvested populations of wolverine. Knowledge holders also commented that fewer people were trapping, in part because it was no longer economically feasible. In addition, fewer knowledge holders were harvesting female wolverines, allowing the breeding population to remain relatively unaffected. Local people's respect for wolverines, combined with both harvesting and species characteristics help to ensure the stability of wolverine populations.

While there were few threats to wolverines, there is potential for harm. Wolverines require large areas of relatively undisturbed habitat free from harvest pressure in order to maintain the overall population across the North, including those populations subject to strong harvest pressure. Future development may be a concern for local wolverine

populations, since there is extensive exploration for natural resources such as oil and gas, and diamonds. Development of such projects may directly or indirectly affect wolverine habitat and/or populations, and consequently result in unsustainable harvests. Wolverine in the Arctic and Boreal ecological areas are closely associated with both caribou and wolves; therefore, actions that affect either of these animals will also likely affect wolverine.

ACKNOWLEDGEMENTS

I am indebted to Lucie Métras, and especially Gloria Goulet, for without their help, determination, and support, this project would not have occurred. I acknowledge the support of Barney Smith, Mathieu Dumond, and Robert Mulders for their support in my travels. I would like to thank all the Wildlife Management Boards, local HTC's, and government wildlife organizations, and the numerous wildlife officers for their support and help with contacts. A large thank you is extended to the knowledge holders who I had the honour to interview and who this report truly belongs to.

LITERATURE CITED

- Boas, F. 1964. The Central Eskimo. University of Nebraska Press, Lincoln.
- Boles, B.K. 1975. Report on Furbearers. Background study for furbearer management in the Mackenzie Valley, NWT. Unpubl. report, Environmental Social Program, Northern Pipelines, Task Force on Northern Oil Development. 229pp.
- Briggs, J.L. 1970. Never in Anger: Portrait of an Eskimo Family. Harvard University Press, Cambridge.
- COSEWIC. 2003. COSEWIC assessment and update status report on the wolverine *Gulo gulo* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 41pp.
- Heard, D.C. 1983. Historical and present status of wolves in the Northwest Territories. Pp. 44-47 in L.N. Carbyn (ed.). Wolves in Canada and Alaska: their status, biology, and management. Proceedings of the Wolf Symposium held in Edmonton, Alberta 12-14 May, 1981. Canadian Wildlife Service, Ottawa, Ontario.
- Gwich'in Renewable Resource Board. 2001. More Gwich'in words about the land. Gwich'in Renewable Resource Board, Inuvik, Northwest Territories. 184pp.
- Kelsall, J.P. 1968. The migratory barren-ground caribou of Canada. Department of Indian Affairs and Northern Development, Canadian Wildlife Service, Ottawa, Ontario. 340pp.
- Magoun, A.J., N. Dawson, J. Ray, J. Bowman, C. Lipsett-Moore, and G. Lipsett-Moore. 2004. Boreal wolverine: a focal species for land use planning in Ontario's northern boreal forest. Project report – July, 2004.
<www.wolverinefoundation.org/research/Ontario%20Wolverine%20Project%20Report_July_04.pdf> (accessed 17 September 2004).

- Mallory, M.L., Akearok, J.A., and Fontaine, A.J. 2001. Community knowledge on the distribution and abundance of species at risk in southern Baffin Island, Nunavut, Canada. Canadian Wildlife Technical Report Series No. 363. Canadian Wildlife Service, Prairie and Northern Region, Iqaluit.
- Sherry, E., and Vuntut Gwitchin First Nation. 1999. The land still speaks: Gwitchin words about life in Dempster country. Vuntut Gwitchin First Nations and Erin Sherry, Old Crow, Yukon. 322pp.
- Symington, F. 1965. Tuktu, the caribou of the northern mainland. Canadian Wildlife Service, Natural and Historic Resource Branch, Department of Northern Affairs and National Resources, Ottawa, Ontario. 92pp.
- Wildlife Management Advisory Council (North Slope) and the Aklavik Hunters and Trappers Committee. 2003. Aklavik Inuvialuit describe the status of certain birds and animals on the Yukon North Slope, March 2003. Final Report. Wildlife Management Advisory Council (North Slope), Whitehorse, Yukon. 60pp.

BIOGRAPHICAL SUMMARY OF CONTRACTOR

Nathan Cardinal is a Masters of Environmental Studies candidate at the School for Resource and Environmental Studies in Dalhousie University, where he is writing his thesis on the use of traditional knowledge in species assessment. A Metis, Nathan has worked with Aboriginal fishers in B.C.'s Fraser River. Obtaining his B.Sc. from the University of British Columbia, he learned both the theoretical and practical applications for species conservation.

KNOWLEDGE EXPERTS CONSULTED

Participant	Location
Participant #401	Arviat, NU
Noah Muckpah	Arviat, NU
Joe Savikatmaq	Arviat, NU
Participant #404	Arviat, NU
Moses Akalak	Baker Lake, NU
Silas Itauq	Baker Lake, NU
Ida Kingilik	Baker Lake, NU
Samson Quinangnaaq	Baker Lake, NU
John Iksakituq	Baker Lake, NU
Roger Hitkolok	Kugluktuk, NU
Allan Niptanatiak	Kugluktuk, NU
Participant #603	Kugluktuk, NU
Ron Elgok	Kugluktuk, NU
Participant #601	Yellowknife, NWT
Participant #701	Yellowknife, NWT
Dougie Joe	Inuvik, NWT
Gilbert Kasook	Inuvik, NWT
Ronnie Gruben	Inuvik, NWT
Sandy Wolki	Tuktoyaktuk, NWT
Patrick Gruben	Tuktoyaktuk, NWT
Sammy Gruben Sr.	Tuktoyaktuk, NWT
James Pokiak	Tuktoyaktuk, NWT
Participant #301	Tuktoyaktuk, NWT
Participant #901	Tuktoyaktuk, NWT
Participant #902	Dawson City, YT
Participant #903	Dawson City, YT
Donald Frost	Old Crow, YT
Participant #1003	Teslin, YT
Alex van Bibber	Haines Junction, YT
Participant #1005	Haines Junction, YT

Figure 2. Map of regions and communities of knowledge holders visited. Regions adapted from Yukon Region Planning, NWT Government, Inuvialuit Settlement Region, and Nunavut Government.

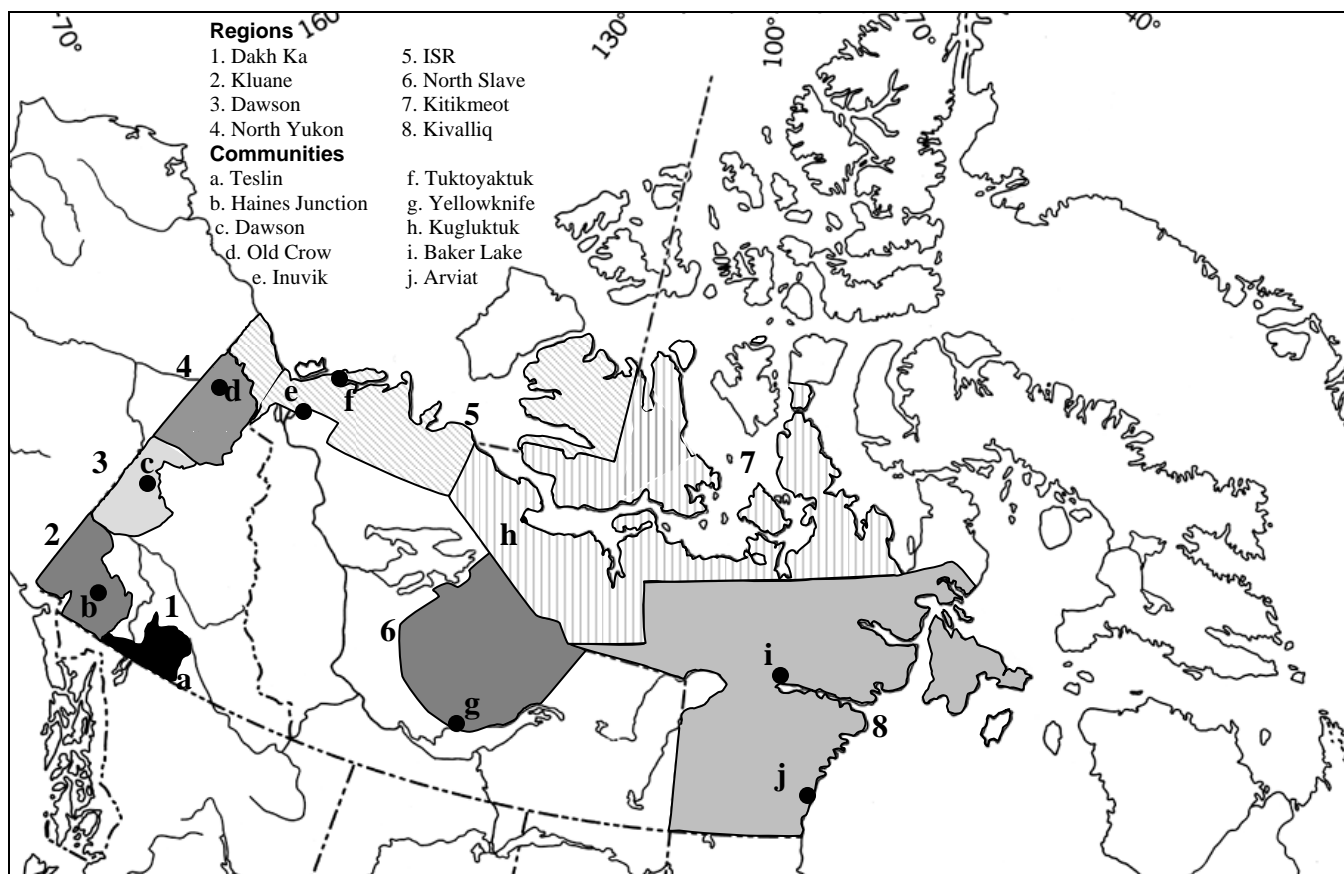
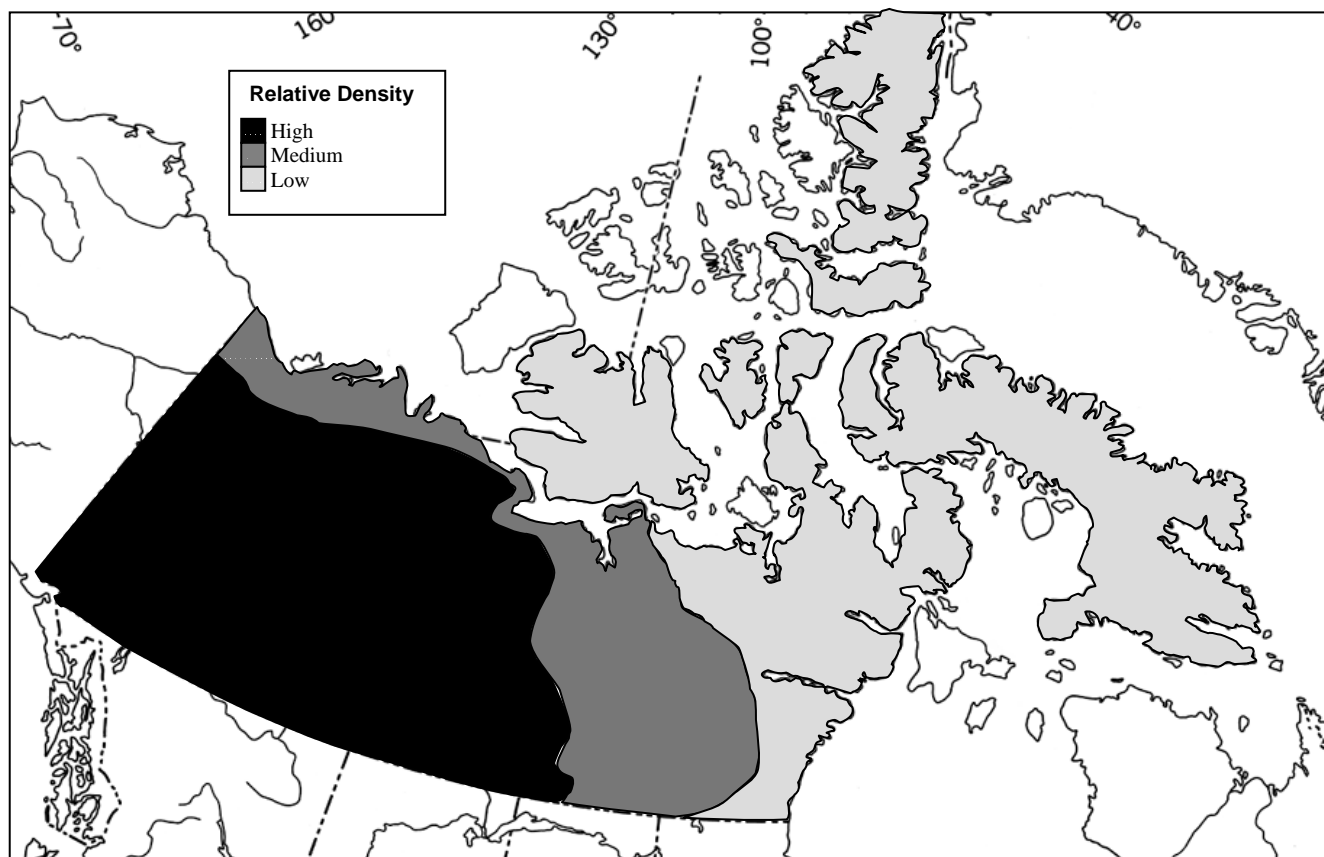


Figure 3. Canadian distribution of wolverine. Adapted from COSEWIC (2003), and based on information from knowledge holders in Arviat, Baker Lake, Kugluktuk, Inuvik, Tuktoyaktuk, Yellowknife, Old Crow, Dawson City, Teslin, and Haines Junction.



Wolverine ATK Summary – Similarities and differences between ATK and information in the 2003 COSEWIC status report

Similar Information

Species Information – Knowledge holders provided an appearance consistent with that in the status report, including average weight and sexual dimorphism.

Distribution – Knowledge holders indicated wolverines could be found all across the North, and in any habitat type. Wolverines were also observed on the Arctic Islands, including Baffin and Victoria Island.

Habitat – Most hunters also agreed that habitat is defined more by food supply (availability of large carrion, abundant animals) than any particular topography or plant association. Wolverines were noted to prefer areas relatively free of human disturbance.

Biology – Some knowledge holders commented on overlap in home ranges, especially for males and females during the breeding season, and that migrant wolverines were important for maintaining populations in harvested areas.

Population Sizes and Trends – Wolverine populations in the Yukon and Northwest Territories (NWT) were generally described as stable, with a possible instability in more southerly areas of NWT.

Limiting Factors and Threats – While the wolverine is both a scavenger and predator, loss of large species such as caribou as carrion, or loss of carrion providers (e.g. wolves) was seen as a threat to wolverines. Knowledge holders agreed that reproductive rates for wolverines are quite low, and they have very large home ranges, making them a naturally rare species.

Special Significance of the Species – Throughout NWT and Nunavut, wolverine pelts were highly prized and sold locally, indicating a large discrepancy between actual and reported harvests.

New Information

Appearance – Knowledge holders in the Kivalliq region reported recognizing two different types of wolverines, a “lesser” variety and a “greater” variety, although some knowledge holders attributed this difference in sizes to either sex or age. Without further study, it is difficult to tell whether there is actually two different varieties, or if the differences in appearance can be attributed to some other characteristic such as age.

Distribution – Some knowledge holders commented that there was a general northerly trend to wolverine distribution.

Biology – Knowledge holders across the North indicated an important relationship between wolves and wolverines, and in the Arctic ecozone, hunters indicated a critical relationship between caribou, wolves, and wolverines. One knowledge holder reported seeing a litter size of 5, which has never been documented in the wild before.

Population Sizes and Trends – Knowledge holders in the eastern Arctic provided much new information since relatively few studies have been conducted there. New information was provided on habitat use and population trends dating back to the mid-1900's. Here, wolverines have been increasing significantly since the mid-1900's when a wolf control program virtually extirpated the wolverine in the region.

Limiting Factors and Threats – Knowledge holders identified important areas that function as areas of wolverine refugia where hunting pressure is low. Wolverines disperse from these areas to regions where hunting pressure is higher.

Special Significance of the Species – Wolverines are culturally important to Aboriginal Peoples across the North, but to varying degrees. In the eastern Arctic, the wolverine is important, but people were not sure how important because there had been almost no wolverines around for a long time. In the northern Arctic and Boreal ecozones, wolverines are extremely important and their fur is highly prized, demanding a high price, which makes it both culturally and economically valuable. Aboriginals in the Yukon also considered wolverines important.

Differing Information

Biology – In the literature, breeding season is indicated to occur May-July. Knowledge holders across the North reported breeding to be a several-week period in February-April. This runs contrary to a gamut of scientific information that includes breeding observations of wolverines in captivity as well as physiological studies.

Population Sizes and Trends – Knowledge holders reported significantly increasing populations in the eastern Arctic, where populations are normally thought to be small and relatively stable.

Overall, information contained in the ATK report is similar to that in the COSEWIC status report. Wolverine populations are generally stable and are generally doing well in the North. Both studies agree that large areas relatively free of human disturbance and a continuing supply of carrion and their providers are the key factors to sustainability of wolverines in the North. Knowledge holders were able to provide finer-scale details about wolverines, including habitat use, local diets, and appearance. While much of this has been described in various studies in the literature, these studies were often fragmented and covered only a small region; interviews with knowledge holders across the North provided a more complete and holistic picture.