

**Ontario Species at Risk Evaluation Report**  
**for**  
**Wolverine (*Gulo gulo*)**

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Committee on the Status of Species at Risk in Ontario (COSSARO)

Assessed by COSSARO as THREATENED

December 2014

**Final**

## Carcajou (*Gulo gulo*)

Le carcajou est un animal à fourrure de la famille des belettes, qui a une réputation légendaire de force et de férocité. Les carcajous ont déjà occupé presque tout le territoire ontarien, mais leur aire s'est amenuisée pour ne couvrir plus que le nord et l'ouest entre les années 1800 et le milieu des années 1900. Ils sont maintenant principalement confinés à la forêt boréale, sur une superficie délimitée au nord aux alentours de la latitude 50° N et à l'ouest aux alentours de la longitude 85°O, même si des individus s'aventurent souvent au sud et à l'est. Ils ont besoin de grands domaines vitaux et se déplacent sur de grandes distances à la recherche de leurs proies et de charogne. Les carcajous ont une faible capacité de reproduction par rapport à d'autres carnivores, eux dont les femelles arrivent à maturité entre 2 et 3 ans, portent seulement 2 petits et ont de petites portées tous les 2 à 3 ans. La perte et la fragmentation de l'habitat ont contribué au déclin historique de l'espèce en Ontario et continuent de la menacer dans la bordure australe de son aire de répartition. On ne connaît pas le nombre d'individus tués par piégeage, mais la vaste étendue de leur aire de répartition qui leur est habituelle les expose à un risque plus élevé de se faire prendre au piège et d'être tués par des véhicules que d'autres espèces plus sédentaires. Même si les carcajous sont protégés du piégeage non autochtone, leur faible densité, l'attraction par des pièges appâtés et la faible capacité de reproduction des populations exposent les populations à un risque de mortalité accrue par piégeage aux endroits où les routes se prolongent dans des parties de leur aire de répartition anciennement inaccessibles. Malgré de récentes données probantes qui donnent à croire à une possible croissance de la population de carcajous en Ontario en raison de son expansion dans l'est où elle recommence à occuper des parties de son ancienne aire de répartition, la taille de cette population demeure petite (composée, selon les estimations, de 458 à 645 individus) et atteint le seuil de la catégorie des espèces menacées, selon le critère D1. Le carcajou est classé dans la catégorie des espèces menacées en Ontario.

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## Executive summary

Wolverine is a furbearer and member of the weasel family with a legendary reputation for strength and ferocity. Wolverines were once found throughout most of Ontario, but their range receded north and west between the 1800s and mid-1900s. They are now mostly confined to the boreal forest north of about 50° N latitude and west of about 85° W, although individuals often wander to the south and east. They require large home ranges and travel great distances seeking prey and carrion. Wolverines have low reproductive potential compared to other carnivores, with females maturing at 2 to 3 years, bearing only 2 young, and having litters every 2 to 3 years. Habitat loss and fragmentation contributed to the historical decline in Ontario and is a continuing threat at the southern edge of their range. Numbers killed by trapping are unknown, but their wide-ranging habits put them at higher risk of encountering traps and being killed by vehicles than more sedentary species. Although protected from non-native trapping, their low density, attraction to baited traps, and low reproductive potential put populations at risk of increased trapping mortality where roads push into formerly inaccessible parts of the range. Although there is recent evidence suggesting that Ontario's Wolverine population may be growing as the species expands east to reoccupy parts of its former range, the population remains small (estimated at between 458 and 645 animals) and it meets the threshold for Threatened under Criterion D1. Wolverine is classified as Threatened in Ontario.

# 1. Background information

## 1.1. Current designations

- GRANK: G4
- NRANK Canada: N3N4
- COSEWIC: Special Concern (2014)
- SARA: No schedule, No Status
- ESA 2007: Threatened
- SRANK: S2S3

## 1.2. Distribution in Ontario

Wolverines formerly occurred throughout Ontario north of the Carolinian Zone, but were extirpated from southern Ontario by the late 1800s. The range continued to recede to the northwest until the 1970s when the species had largely disappeared from the Hudson Bay lowlands and was mainly restricted to central and western portions of northern Ontario (Sutherland 2003, COSEWIC 2014). Aerial survey data from 2005 to 2012 indicated that Wolverines were expanding eastward to reoccupy parts of the historical range. Tracks were observed east to within <200 km of the Quebec border (Ontario Wolverine Recovery Team 2013). Trapping records suggest the same trend.

## 1.3. Distribution and status outside Ontario

Wolverine has a Holarctic distribution across Europe (Estonia, Finland, Norway, Sweden), Asia (Russia, Mongolia) and North America. The European range has receded northward south of 60° N (COSEWIC 2014). The Wolverine range formerly included most of Canada (except some of the Arctic islands, extreme southern Ontario, Nova Scotia, Prince Edward Island, and the island of Newfoundland) and the states bordering Canada, extending south in the mountains to central California and Colorado. The North American range has receded northward since the mid-1800s and Wolverine is now confined to British Columbia, NWT, Yukon, Nunavut, Alaska and the northern portions of Ontario, Manitoba, Saskatchewan and Alberta. Wolverines are apparently extirpated or very rare in Quebec and Labrador. In the US, Wolverines are currently confined to small populations in Washington, Idaho, Montana, Wyoming, with recent occurrences in California, Colorado, and Oregon (COSEWIC 2014).

## 1.4. Ontario conservation responsibility

Ontario has less than 10% of the global range.

## 1.5. Direct threats

Wolverine populations are highly vulnerable to trapping activity. They travel great distances and are easily attracted to baits, making them more susceptible to trapping

than many other furbearers (Ontario Wolverine Recovery Team 2013). Although not well documented, trappers apparently target Wolverines because of their destructiveness on trap lines (OMNR 2013). Overexploitation can lead to local extirpation with very slow replacement due to low reproductive potential. Overall, the current level of trapping mortality in Ontario is apparently not impairing Wolverine population recovery, but local extirpations occur where new roads expand into previously inaccessible areas (Ontario Wolverine Recovery Team 2013). Most trapping mortality occurs at the southern edge of Wolverine range where road access is greatest (Chenier pers. comm 2014). Roads and other linear corridors allow increased access by snowmobiles and other motorized vehicles and enable greater trapping mortality. Trapping of Wolverines by non-aboriginals in Ontario was closed in 2009, but 1 to 4 animals are killed accidentally each year and unreported kills probably also occur (COSEWIC 2014). Aboriginal peoples can trap or hunt Wolverines for their own use under treaty rights but harvest rates are often unreported (Tyhuis pers.comm 2014). Wolverine pelts cannot be sold in Ontario.

In addition to allowing greater access to hunters and trappers, roads and other linear corridors may act as barriers to movements and dispersal, and may be a source of mortality (COSEWIC 2014). Thirteen Wolverines were reported killed by vehicle (12) and train (1) collisions between 1990 and 2013 (OMNR 2013). Roads and transmission lines are proposed to extend northward through Wolverine range to access mining projects and First Nations communities (OMNR 2013).

Changes in predator and prey numbers can influence Wolverine populations, but the effects are often difficult to discern due to concurrent changes in habitat and human access. Important prey species include Woodland Caribou, Beaver, and Moose, while predators, especially Gray Wolf, provide food from scavenged kills (although wolves and bears also prey on Wolverines). The Pen Island Caribou herd has apparently shifted its range south from the Hudson Bay coast in recent years (Magoun et al. 2005), possibly altering prey availability for Wolverine (Ontario Wolverine Recovery Team 2013).

Warming climate may reduce the duration of spring snow cover and limit natal denning habitat (Ontario Wolverine Recovery Team 2013). Over the longer term, climate change could alter vegetation and prey habitat or movements.

Historically, conversion of forested land to agriculture or other uses destroyed Wolverine habitat but is unlikely to be an extensive threat in present Wolverine range in Ontario.

Human activities including recreation, tourism, and air traffic can displace Wolverines from suitable habitat (Ontario Wolverine Recovery Team 2013) although the magnitude of the threat in northern Ontario is unknown, and is likely minimal.

## 1.6. Specialized life history or habitat use characteristics

Wolverines have low reproductive potential compared to other carnivores, resulting in low resilience to increased mortality (Ontario Wolverine Recovery Team 2013). Females breed at 2-3 years of age, generally have only 2 kits per litter, usually at intervals of 2 or

more years (Ontario Wolverine Recovery Team 2013). Wolverines require large home ranges (50-400 km<sup>2</sup> for females and 230-1580 km<sup>2</sup> for males; COSEWIC 2014), and travel great distances seeking prey and carrion, placing them at greater risk for encountering traps and being hit by vehicles, compared to more sedentary species. Spring snow cover is important for natal denning to provide protection from extreme weather and predators. Persistence of snow patches > 1 m deep into late spring may be important (COSEWIC 2014).

## 2. Eligibility for Ontario status assessment

### 2.1. Eligibility conditions

#### 2.1.1. Taxonomic distinctness

Yes.

#### 2.1.2. Designatable units

Wolverine is represented by a single DU in Ontario and Canada (COSEWIC 2014).

#### 2.1.3. Native status

Yes.

#### 2.1.4. Occurrence

Records of Wolverines in Ontario date back at least to the early 1800s but the species has probably occupied the province for thousands of years. Wolverines apparently occupied one or more refugia south of the continental icesheet and recolonized Ontario about 10,000 years ago (Kyle and Strobeck 2002).

### 2.2. Eligibility results

Wolverine (*Gulo gulo*) is eligible for status assessment in Ontario.

## 3. Ontario status assessment

### 3.1. Application of endangered/threatened status in Ontario

#### 3.1.1. Criterion A – Decline in total number of mature individuals

Does not apply.

Inferred population increase based on apparent eastward range expansion in northern Ontario (COSEWIC 2014) .

#### 3.1.2. Criterion B – Small distribution range and decline or fluctuation

Does not apply.

The “core” range in Ontario in 2003 was approximately 230,000 km<sup>2</sup> with an additional approximately 90,000 km<sup>2</sup> of “peripheral” range (COSEWIC 2014). Therefore the extent of occurrence exceeds 20,000 km<sup>2</sup>. There are occurrences in > 500 2 km X 2 km squares (COSEWIC 2014), therefore the area of occupancy exceeds 2,000 km<sup>2</sup>.

### 3.1.3. Criterion C – Small and declining number of mature individuals

Does not apply.

Meets population size threshold for Endangered, but there is an inferred population increase based on apparent range expansion in northeastern Ontario (COSEWIC 2014).

### 3.1.4. Criterion D – Very small or restricted total population

D1 Threatened.

Qualifies for Threatened based on small population size (<1000 mature individuals). The Ontario population is estimated at 458 to 645 (COSEWIC 2014). The population estimate was derived using home range sizes from radio-collared Wolverines near Red Lake, ON and results of a genetic study to determine the number of individuals in the same study area. Aerial survey data was used to stratify into high and low density areas and the calculated density was extrapolated across Wolverine range (Ray pers. comm. 2014). An estimated population size of 300 animals in 2007 (Slough 2007 – cited in OMNR 2013) was based on expert opinion and probably an underestimate (Ontario Wolverine Recovery Team 2013). The proportion of “mature individuals” is unknown because age class distribution data are unavailable for Ontario Wolverines (Ray pers. comm. 2014). A sample of hunted and trapped wolverines in Nunavut were about half >2 years, but trapping may over represent dispersing subadults (Awan and Szor 2012). If there are a significant number of one- and two-year old animals in the population the number of mature individuals may be close to 250 (the threshold for Endangered).

### 3.1.5. Criterion E – Quantitative analysis

Information unavailable.

No Population Viability Analysis has been completed.

## 3.2. Application of Special Concern in Ontario

Not applicable.

## 3.3. Status category modifiers

### 3.3.1. Ontario’s conservation responsibility

The Ontario range comprises less than 10% of the global range.

### 3.3.2. Rescue effect

Rescue effect is possible. Subadults are highly mobile and known to disperse several hundred kilometres (Ontario Wolverine Recovery Team 2013). There are no significant barriers to dispersal between Manitoba (where populations are believed to be stable or increasing) to northwestern Ontario. Manitoba and Ontario Wolverines are genetically similar, suggesting that exchange has occurred historically and that Manitoba Wolverines are adapted to survive in Ontario. Wolverines are apparently absent on Akimiski Island, Nunavut and extirpated or extremely rare in Quebec (COSEWIC 2014), so southward and eastward dispersal from those jurisdictions is highly unlikely. No recovery efforts are underway in adjacent jurisdictions.

Rescue effect was not applied to bump down from THR to SC because it's unknown if "significant immigration" from Manitoba occurs (see COSEWIC table adapted from Gardenfors *et al.* 1999).

### 3.4. Other status categories

#### 3.4.1. Data deficient

Not applicable, although there are some uncertainties regarding the size of the mature breeding population and whether or not the population is actually increasing.

#### 3.4.2. Extinct or extirpated

Not applicable.

#### 3.4.3. Not at risk

Not applicable.

## 4. Summary of Ontario status

Wolverine (*Gulo gulo*) is classified as Threatened in Ontario. D1 Threatened.

## 5. Information sources

Awan, M. and G. Szor. 2012. [Wolverine \(\*Gulo gulo\*\) carcass collection and harvest monitoring in Nunavut.](#) Summary report. [web site Accessed December 16 2014].

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## 6. Appendix 1: Technical summary for Ontario

Species: Wolverine (*Gulo gulo*)

### Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	7.5 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	No; inferred population increase since the early 2000s based on range expansion into northeastern Ontario.
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown, but possibly increasing
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Unknown, but probably increasing
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Unknown
Are the causes of the decline a. clearly reversible, and b. understood, and c. Ceased? <i>Historical loss and fragmentation are irreversible.</i>	a. No b. Yes c. No
Are there extreme fluctuations in number of mature individuals?	No

### Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence. <i>Based on Figure 2 in Ontario Wolverine Recovery Team (2013)</i>	>400,000 km <sup>2</sup>
Index of area of occupancy (IAO). <i>Occurrences in &gt; 500 2 km X 2 km squares (COSEWIC 2014)</i>	>2,000 km <sup>2</sup>
Is the total population severely fragmented? (i.e. is >50% of its total area of occupancy is in habitat	a. No b. No

<b>Extent and occupancy attributes</b>	<b>Value</b>
patches that are: a. smaller than would be required to support a viable population, and b. Separated from other habitat patches by a distance larger than the species can be expected to disperse?)	
Number of locations ( <i>as defined by COSEWIC</i> ).	“many”
Number of NHIC Element Occurrences	Unknown. < 20 “general areas of occupancy” (Sutherland 2003)
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	No; inferred increase in extent of occurrence
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	No; inferred increase in area of occupancy
Is there an observed, inferred, or projected continuing decline in number of populations?	No
Is there an observed, inferred, or projected continuing decline in number of locations?	No
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes; projected decline in habitat quality with projected increased road access and resource development
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of mature individuals in each sub-population or total population (if known)

<b>Sub-population</b>	<b>N of mature individuals</b>
Total Population Estimate of total individuals , not mature individuals (mature at age 2 or 3)	458 - 645

Quantitative analysts (population viability analysis conducted)

No PVA.

## Rescue effect

<b>Rescue effect</b>	<b>Value</b>
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible from Manitoba
Would immigrants be adapted to survive in Ontario?	Probably
Is there sufficient suitable habitat for immigrants in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions? Ranked S3S4 in MB but population stable or increasing.	Yes
Is rescue from outside populations reliant upon continued intensive recovery efforts?	No

## Appendix 2: Adjoining jurisdiction status rank and decline Information regarding status rank and decline of Wolverine

Jurisdiction	Subnational rank	Sources	Population trend	Sources
Ontario	S2S3	NatureServe	Stable - Increasing	COSEWIC 2014
Manitoba	S3S4	NatureServe	Stable – Increasing (unquantified)	COSEWIC 2014
Michigan	SX	NatureServe	Extirpated	n/a
Minnesota	SX	NatureServe	Extirpated	n/a
Nunavut	SNR	NatureServe	Stable – Increasing (unquantified)	COSEWIC 2014
New York	SX	NatureServe	Extirpated	n/a
Ohio	SX	NatureServe	Extirpated	n/a
Pennsylvania	SX	NatureServe	Extirpated	n/a
Quebec	S1	NatureServe	Probably Extirpated	COSEWIC 2014
Wisconsin	SX	NatureServe	Extirpated	n/a

### Acronyms:

AOO: area of occupancy

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

COSSARO: Committee on the Status of Species at Risk in Ontario

EOO: extend of occurrence

ESA: Endangered Species Act

GRANK: global conservation status assessments

IAO: index of area of occupancy

MNRF: Ministry of Natural Resources and Forestry

NHIC: Natural Heritage Information Centre

NNR: Unranked

NRANK: National conservation status assessment

SARA: Species at Risk Act

SNR: unranked

SRANK: subnational conservation status assessment

S1: critically imperiled

S2 : imperiled

S3: Vulnerable

S4 : apparently secure

SX : Presumed extirpated