SASKATCHEWAN CONSERVATION DATA CENTRE

12/13/2011

Status Assessment

Wolverine (*Gulo gulo luscus*) in Saskatchewan

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SPECIES INFORMATION

Name and Classification

***GULO GULO LUSCUS* Linneaus, 1758**
[The Nature Serve element code AMAJF03010]

Class: Mammalia
    Subclass: Theria
Order: Carnivora
    Suborder: Caniformia (dog-like carnivores)
Family: Mustelidae
    Subfamily: Mustelinae (martens, weasels, wolverines)
Genus: Gulo
Species: *Gulo gulo*
    Subspecies: Gulo gulo luscus

The wolverine, *Gulo gulo*, was formerly known as *Gulo luscus* in North America; however, in 1959 the New World and Old World forms were found to be the same. There are four subspecies found in North America, two of which occur in Canada; *Gulo gulo luscus*, found across Canada, Alaska and the northwestern United States, and *Gulo gulo vancouverensis*, found only on Vancouver Island. The Vancouver population is recognized as a distinct subspecies as it has undergone a high degree of isolation since the Pleistocene Epoch (COSEWIC 2003).

Common Names: Wolverine
Synonymy: none
Derivation of names: The Latin "gula" and "gulosus" translate to the English words "throat" and "gluttonous", respectively (Wolverine Foundation 2011). The Latin word luscus translates to "one-eyed".

Description

The wolverine is the largest terrestrial mustelid in North America and resembles a small bear in appearance more than a weasel (*Mustela spp.)* (Figure 1). It has long, glossy coarse fur, which varies from brown to black, often with a pale forehead and yellowish or tan stripes running laterally from the shoulders, merging just above the tail. Some individuals have a white patch on the neck and chest.

Wolverines have a large head, broad forehead, short stout neck, short stocky legs, and a heavy musculature (COSEWIC 2003). Their feet are large with five toes on each foot and long semi-retractile claws (Banci 2001). They have short, rounded ears and their tail is long and bushy. Their skull structure is robust, allowing them to crush bones and frozen carcasses. Wolverines are sexually dimorphic with adult females ranging in size from 7.5 to 11 kg and males weighing 12 to 16 kg. Total length averages about 1 m, with the average tail length being 23 cm (COSEWIC 2003).

Wolverines are non-migratory and do not hibernate in the winter. They are active both day and night, and often alternate periods of activity with sleep every three to four hours. They can travel for long distances, climb trees, and swim. Their broad feet and muscular limbs allow them to chase down their prey - even on soft snow [Environment Canada (EC) 2010].

Figure 1. Wolverine.

DISTRIBUTION

The wolverine has a circumpolar distribution inhabiting the tundra, taiga, and forest zones of Eurasia and North America (Christopher and Strobeck 2002) (Figure 2). In Saskatchewan, wolverines are moderately widespread; they are most common north of Reindeer Lake, rare south to La Ronge, and occasional records from southern Saskatchewan (i.e., rogue). The Saskatchewan ecoregions that wolverines occur include the following: Selwyn Lake Upland, Tazin Lake Upland, Athabasca Plain, Churchill River, Mid-Boreal, and Boreal [Saskatchewan Conservation Data Centre (SKCDC) 2008] (Figure 3).

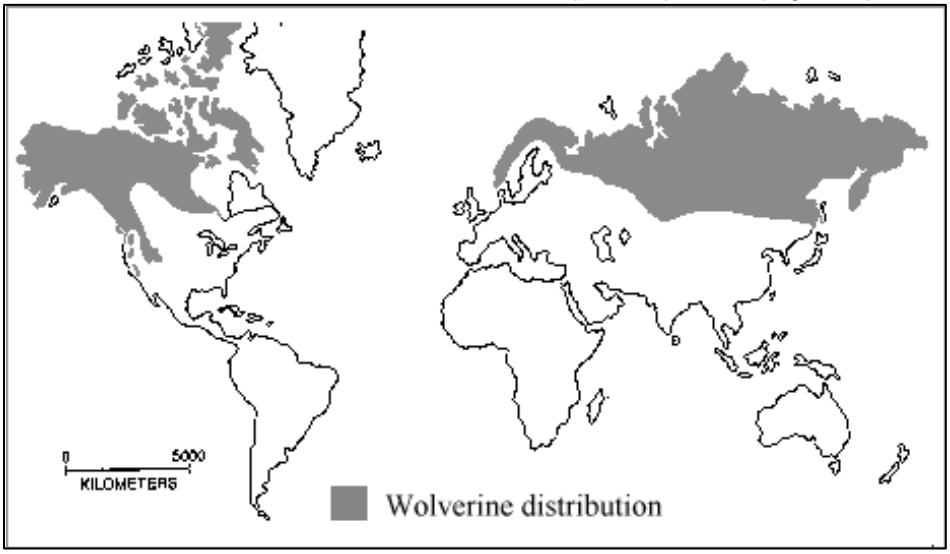

Figure 2. Wolverine global distribution (The Wolverine Foundation 2011).

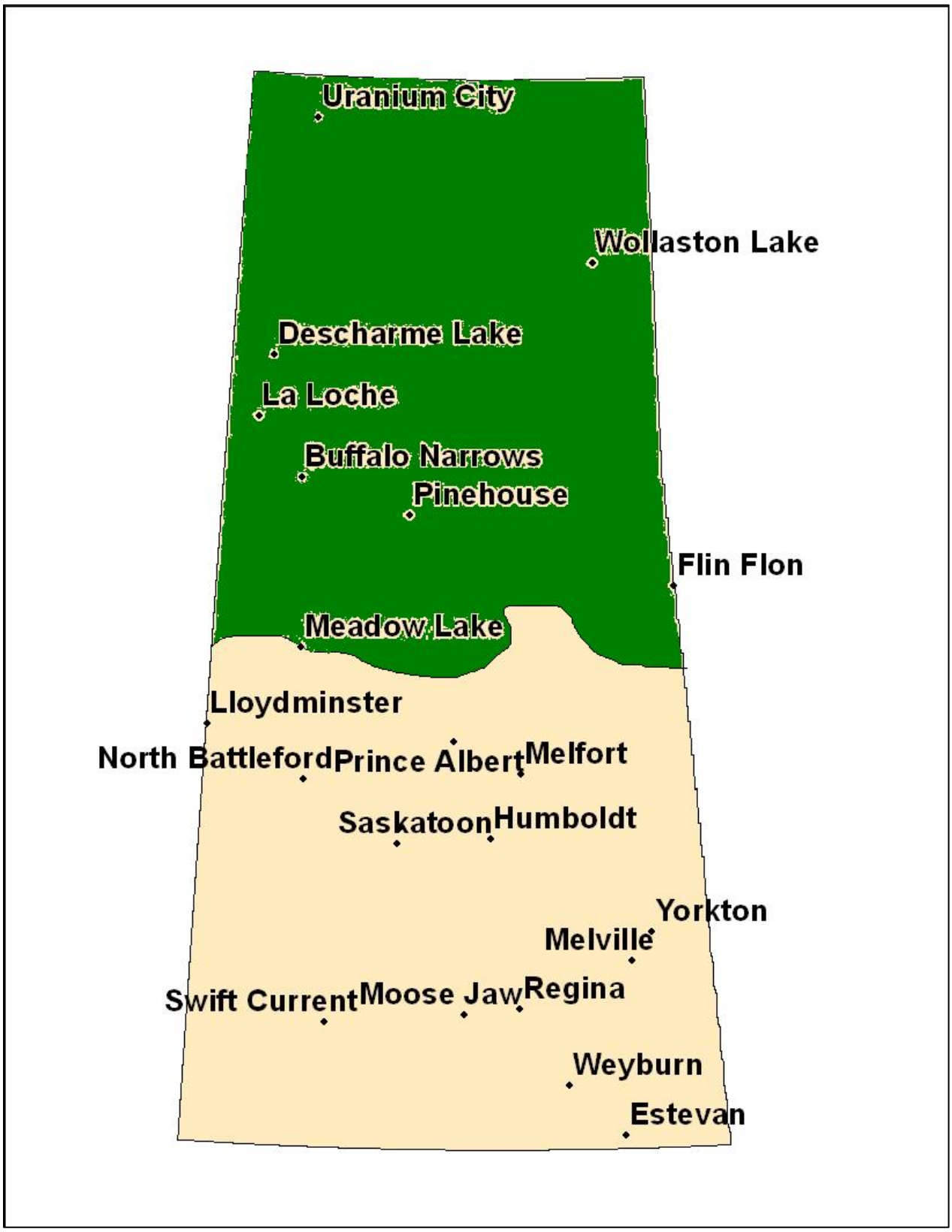

Figure 3. Wolverine distribution in Saskatchewan (SKCDC 2011).

HABITAT

Vast tracts of land are necessary for wolverines to maintain viable populations because of their large home ranges. Wolverine habitat is better defined in terms of food supply than particular types of vegetation or topography (COSEWIC 2003). Wolverines can inhabit a variety of treed and treeless areas at all elevations including the northern forested wilderness, the alpine tundra of the western mountains, and the arctic tundra. The wolverine is most likely found where large ungulates are common, and where carrion is abundant in winter from hunter kills, predation and natural mortality (COSEWIC 2003).

Wolverines have specific habitat requirements for den sites and may reoccupy sites for several consecutive years (COSEWIC 2003). Dens are constructed either in boulders, under deadfall, or in snow tunnels (i.e., at higher elevations). Specifically, dens require adequate insulating snow cover that persists throughout the denning natal period and protection from predators such as golden eagles (*Aquila chrysaetos*), bears (*Ursus spp.*) and wolves (*Canis lupis*). Multiple dens may be used for rendezvous between female and kits or as a resting site (COSEWIC 2003).

BIOLOGY/ECOLOGY

Reproduction

Wolverines have a low reproductive rate which contributes to a low population resiliency (COSEWIC 2003). Most wolverines become sexually mature at two to three years of age (Species at Risk 2010). Wolverines' exhibit delayed implantation which allows the females to breed in summer, when they are more sedentary and give birth in winter and early spring (COSEWIC 2003). Between April and September, the animals come together in pairs to breed. Pairing lasts only for a few days and both males and females may re-mate several times with other individuals.

Wolverines give birth to a litter of 2 to 5 young between March and mid-April (EC 2010). Females over the age of 6 have the largest litter sizes, but also lower pregnancy rates. Reproductive rates observed in Alaska and Idaho were 0.69 and 0.89 kits per female per year respectively, since females gave birth 2 or more years apart (COSEWIC 2003). The young are weaned at 8 to 10 weeks, and leave the den in autumn although they may remain with the mother for up to a year before dispersing (Species at Risk 2010). Wolverine kits reach adult body size by 7 months of age (Figure 4). Both mother and kits may require more carbohydrates near the time of weaning when energy requirements peak (COSEWIC 2003).

Figure 4. Wolverine kit.

Survival

Wolverines are preyed on by bears, wolves, cougars, golden eagles and other wolverines. Because wolverines are scavengers, predator encounters are likely most common at carrion (COSEWIC 2003). A summary of mortality rates from 12 studies of radio collared wolverines found that human caused mortality from trapping and road/rail kill accounts for 46% of deaths (Krebs et al. 2004). Natural sources of mortality included predation by wolves, cougars and conspecifics, and starvation. Survival was < 0.75 among all age/sex classes in trapped areas and > 0.84 in areas where trapping did not occur. Intrinsic rates of increase (λ) were estimated at 0.88 in trapped populations and 1.06 in untrapped populations. Survival was highest among adult females (i.e., 0.88 in un-trapped areas, 0.73 in trapped areas) and lowest among sub-adult males (0.45 in trapped areas). The rate of mortality among kits and the most successful age classes of females at raising kits to weaning are unknown factors. This evidence suggests that trapped populations would decline without immigration from refugia from trapping (Krebs et al. 2004).

As population surveys are not conducted on wolverines due to their solitary nature, fur harvest statistics are used as an index of population status (Figure 5) [Ministry of Environment (MoE) 2011]. There is a strong correlation between wolverines harvested and price of pelts (Figure 7). Since 1986 the number of pelts marketed has been consistently lower than the average price per pelt, whereas prior to 1986 the number of pelts marketed was consistently higher than the average price per pelt. The number of wolverine pelts marketed fluctuates across the years but has dropped from more than 30 per year in the late 1970's to under 20 per year in recent years (Figure 6). This may indicate that either harvest effort or wolverine population has declined since 1986.

Statistics of number of pelts marketed and number of trappers from 1970 to 2010 (Figure 6) indicate that number of pelts being marketed has remained consistent with the number of trappers. Both pelts marketed and numbers of trappers have severely declined since 1986. The evidence that pelts marketed has remained consistent with harvest effort and that harvest effort has dropped considerably in recent years suggests that there has been a decline in harvest effort rather than wolverine population.

Movements/Dispersal

Wolverines typically occupy home ranges that vary from about 50-400 km^2 for females and 230-1580 km^2 for males (COSEWIC 2003). Dispersing sub-adult males have an average home range size of 3500 km^2 (COSEWIC 2003). There may be home range overlap between members of the same and opposite sexes, however intersexual overlap is considered to be more common (COSEWIC 2003). A proportion of the population is transient at any given time and these transients are usually yearlings. Yearling females tend to establish home ranges nearer their natal ranges than do yearling males although both sexes are capable of long distance movements - about 100 to 330 km (COSEWIC 2003). Estimating population densities should include consideration of home range overlap and transients. Competition for resources seems to drive dispersal patterns for females, whereas competition for mates drives male dispersal (Vangen et al. 2001).

Wolverines are able to traverse rugged terrain, including tundra and glaciers that would act as barriers to many species of mammals. In Scandinavia, wolverines have successfully recolonized gaps in their distribution; this success is attributed to their dispersal characteristics (Vangen et al. 2001). However, these long distance movements can lead to increased risk of mortality due to predation, trapping, accident or starvation. The large home range size of wolverines also increases its susceptibility to trapping (COSEWIC 2003). Refugia from trapping must necessarily be large enough to protect entire ranges of wolverines. The propensity of juveniles to disperse long distances is a key factor in gene flow (COSEWIC 2003).

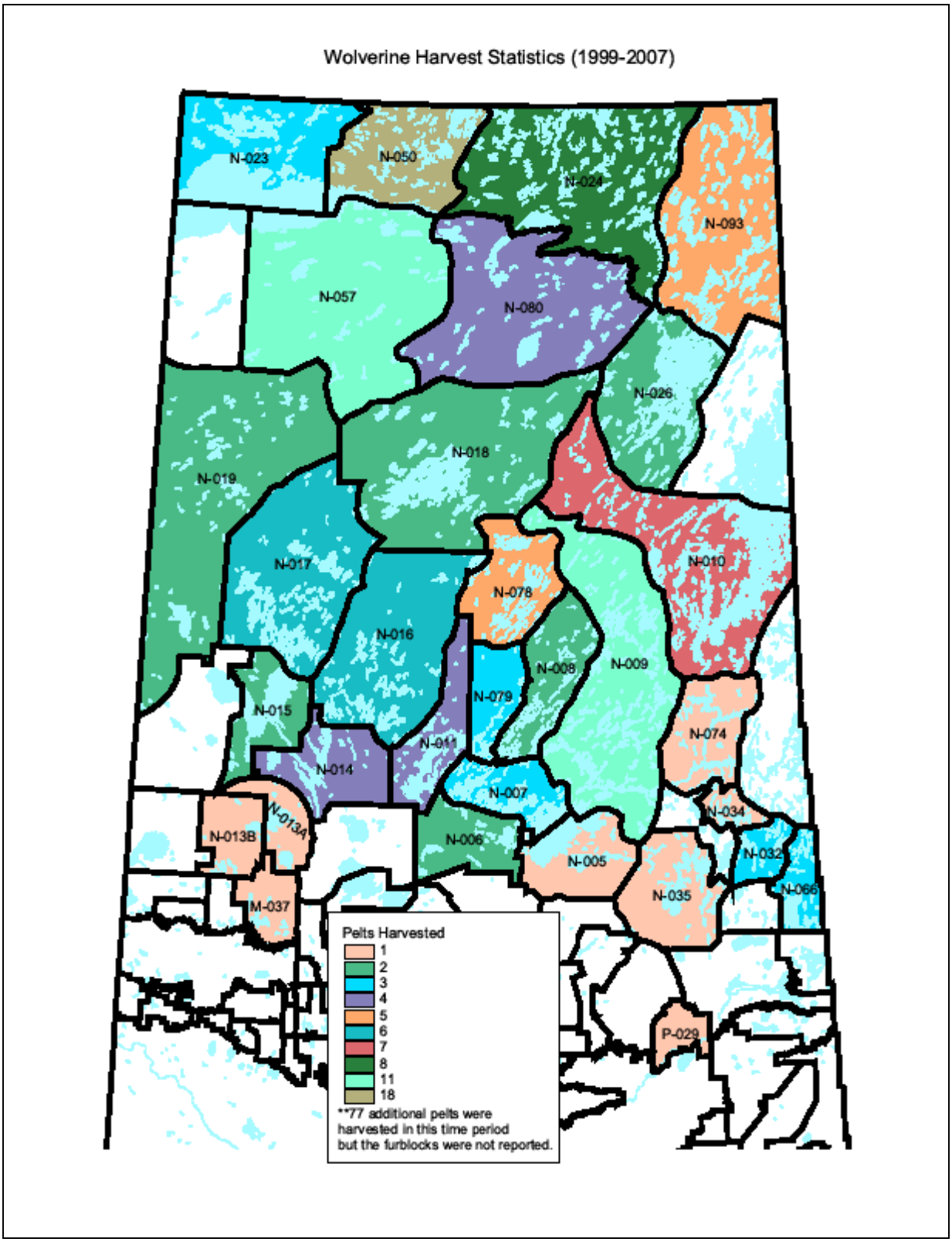

Figure 5. Wolverine harvest statistics from 1999 to 2007 (MoE 2011).

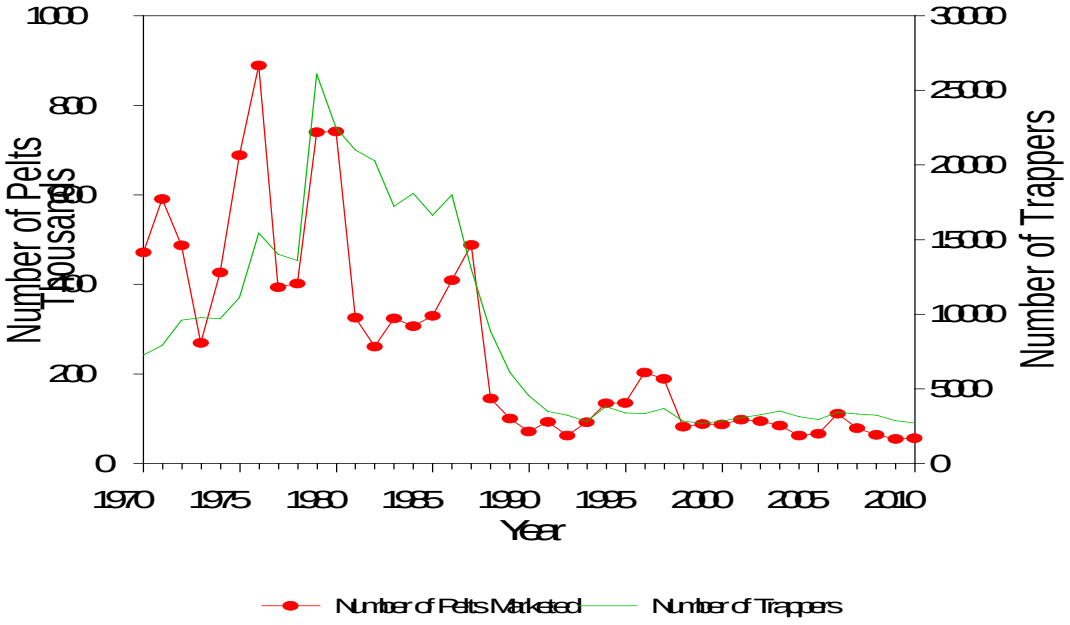

Figure 6. Annual trend in number of licensed trappers and pelts marketed from 1970 to 2010 (MoE 2011).

Nutrition and Interspecific Interactions

Wolverines are opportunistic scavengers and predators. Fresh prey is eaten more during summer and carrion - including cached items - is used more in winter (Magoun 1987). Prey species may include rodents, snowshoe hares (*Lepus americanus*), birds, fish, and young ungulates. The most common sources of carrion are caribou (*Rangifer tarandus*), moose (*Alces alces*), mountain sheep (*Ovis dalli* and *O. canadensis*), mountain goats (*Oreamnos americanus*), deer (*Odocoileus spp.*), and elk (*Cervus elaphus*). Fish and marine mammals are also scavenged. Wolverines will also eat plant material such as berries and roots. Studies in subboreal and interior wet-belt montane environments in British Columbia have shown that caribou and marmots (*Marmota spp.*) are important foods for denning females (Lofroth et al. 2007). Dependence of reproductive females on a species of current conservation concern (e.g., caribou) and one which could be affected by issues related to climate change (i.e., hoary marmot) may present conservation issues for wolverines in the future (Lofroth et al. 2007). Large carnivores such as grizzly bears, wolves and cougars generate carrion for wolverines. These carnivores compete with wolverines at kill sites and are a potential source of wolverine mortality. The highest densities of wolverines occur in the mountainous areas of the Yukon Territory, Northwest Territories, British Columbia and Alberta, where habitats, prey species and ungulates are most diverse and abundant (COSEWIC 2003).

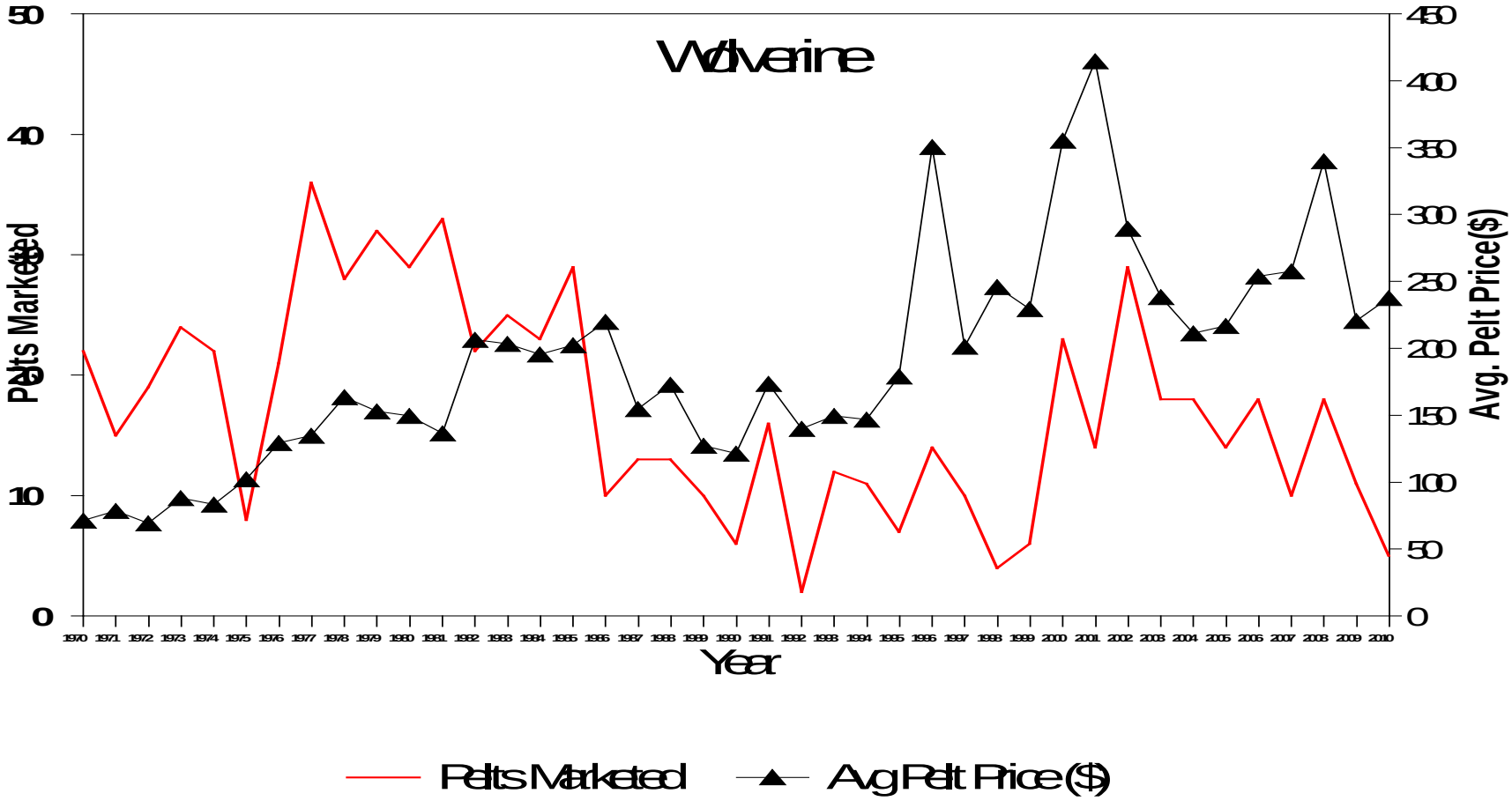

Figure 7. Pelts Marketed and Average Pelt price for Wolverines in Fur Conservation Areas from 1970 to 2010 (Ministry of Environment 2011).

Behaviour
Wolverines prefer pristine areas but much of the time their home ranges overlap with active traplines, cross-country ski trails, busy roads such as logging roads and the edges of communities (COSEWIC 2003). Large highways and other transportation corridors may act as barriers to movements and dispersal, and are significant sources of mortality. It is believed that wolverines prefer uncut forest stands within a matrix of cut and uncut stands, particularly where forest roads are active (COSEWIC 2003). If so, this preference would serve to increase trap vulnerability. Wolverines are curious, and will investigate campsites, food caches and even cabins when humans are not present. Wolverines will opportunistically use snowmobile trails for travel and scavenge trapped animals and hunter kills (COSEWIC 2003). This improved mobility and prey base may offset the negative population effects of targeted wolverine fur trapping. Wolverines are thought to be highly secretive; however, they are occasionally observed at a distance by people hiking, skiing or rafting (COSEWIC 2003).

POPULATION

There are two geographically separated populations of *G. g. luscus* in Canada: the eastern population of Quebec and Labrador, and; the western population of northwestern Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, Northwest Territories, Nunavut and Yukon Territory (SKCDC 2008).

Wolverine populations are not monitored in Saskatchewan, but it is believed that densities are lowest in the southern boreal forest and increase further north. The total population is crudely estimated at less than 1000 animals (SKCDC 2008).

THREATS AND LIMITING FACTORS

Wolverines have a naturally low intrinsic rate of increase and low population densities which limits their ability to populate and recover vacant habitats. Large home ranges and long-distance dispersal of juveniles contributes to trapping vulnerability (COSEWIC 2003). Maternal den site availability may also limit successful reproduction. An adequate ungulate prey base is also necessary for population growth. Other factors that may limit populations include harvest, and disturbance of denning areas by recreational users. Habitat loss, habitat alienation and habitat fragmentation continue to threaten wolverine populations (COSEWIC 2003).

In Saskatchewan the potential threats to wolverines include new and existing roadways, over-harvesting, and recreational activities. Roadways are considered a small threat with slight severity due to the low human habitation of northern regions of the province. Harvesting occurs throughout the wolverine's range but trapping effort is low, so the threat impact remains low. In the Arctic, wolverines are frequently hunted from snowmobiles. Denning females are sensitive to disturbance caused by researchers therefore snowmobiling and back-country skiing may similarly impact reproductive success. Disruptions to caring for young may lead to den relocation or litter abandonment. Recreation is more of a threat in the southern extent of their range and decreases farther north. The total threat impact of recreation is considered low (Saskatchewan Conservation Data Centre 2011).

SIGNIFICANCE

Wolverines are one of the most sensitive indicator species due to their dependence on large, intact and connected ecosystems (COSEWIC 2003). Wolverines, like other large carnivores, are useful for multi-species conservation planning (Carrol et al. 2001). Wolverines also have intrinsic and spiritual value for Aboriginal peoples who believe that wolverines have great powers and can be spiritual guides or ferocious enemies. Wolverines are still a very valuable furbearer for both the quality and aesthetics of their fur (COSEWIC 2003).

Wolverines are declining in much of their range; the eastern population of *Gulo gulo luscus* is considered Endangered by COSEWIC; the western population is considered of Special Concern (COSEWIC 2003). In Saskatchewan, wolverines are listed as S3S4 or vulnerable to apparently secure (SKCDC 2011). In British Columbia, the *G. g. luscus* population is considered an S3 or vulnerable. The *G. g. vancouverensis* population however, is considered possibly extirpated or critically imperilled (B.C. Conservation Data Centre 2011).

PROTECTION

Wolverines have no specific habitat designated as critical or important that is protected in Saskatchewan. Current protection comes through the large number of parks which are a refuge from most trapping/hunting and development in western Canada. Harvest is regulated with options available to set quotas or close trapping seasons entirely where there is a demonstrated conservation concern. However, human recreation such as snowmobiling and skiing may disturb wolverines, particularly during the denning season in February-March. These activities are generally permitted and occur with great frequency both within and outside of protected areas. As well, transportation corridors bisect and penetrate parks (e.g., Trans-Canada Highway) (COSEWIC 2003).

STATUS

Global rank: G4
Canada National rank: N3N4
Saskatchewan Provincial Rank: S3S4

The original COSEWIC status designation for wolverine was Rare (i.e., equivalent to Special Concern prior to 1990). In 1989, two geographically separated populations were delineated: the eastern population and the western population. The eastern population was assigned the status of Endangered and the western population was Vulnerable (i.e., equivalent to Special Concern from 1990 to 1999). In 2003 COSEWIC listed *Gulo gulo luscus* as special concern in Canada (COSEWIC 2003).

The provincial status of Gulo gulo was updated in 2008 as S3S4. This rank was confirmed in 2011 using Nature Serve's Element Rank Estimator v2.Or2. This status was determined from a number of factors including range extent, number of occurrences, population size, short-term trends and threats (SKCDC 2011).

Wolverines' range extent in Saskatchewan consists of the northern two thirds of the province or roughly 433,333 km^2. Number of occurrences is more difficult to estimate as wolverines are not currently tracked by the Saskatchewan Conservation Data Centre, however, population size is estimated at 1 – 1,000 individuals. There is currently no conclusive data on the trend of wolverines in the province. There have been no surveys or research projects devoted to wolverines in Saskatchewan so accurate population information is lacking (Saskatchewan Conservation Data Centre 2011). The overall threat impact of roadways, harvesting, and recreational activities is estimated to be low.

ACKNOWLEDGEMENTS

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