Shadows of Gold. Artwork submitted, Verna Hutlet, 2005

The Cougar in Manitoba

By

Joanne Hutlet

A Thesis
Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements
For the Degree of

Master of Natural Resources Management

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THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES
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Abstract

Due to the number of reported cougar sightings in Manitoba over many years, this study was undertaken to determine if experts believe that Manitoba can support a resident cougar population, and what laws and regulations can assist in protecting the cougar to ensure a stable population in the province. There have been many cougar sightings over the years, with one shot in 1973 and two killed in 2004, which confirms their existence in Manitoba.

The cougar is a protected species under The Wildlife Act in Manitoba, but is not listed under The Endangered Species Act at this time. Although the Manitoba Endangered Species Advisory Committee recommended a status for the cougar as Vulnerable on 28 September 1992, this designation was not acted upon. The Wildlife Act protects the cougar against hunting, trapping, taking, killing, or capturing except as permitted by the Act or the regulations. The Manitoba Conservation Data Centre (CDC) lists the cougar as S2S3—halfway between S2 (rare throughout its range in Manitoba and may be subject to extirpation) and S3 (uncommon in the province).

This study determined some of the factors that could better protect the cougar in Manitoba by analyzing expert opinions dealing with quality cougar habitat, and by suggesting management ideas for the safety and well-being of both the cougar and human population.

Opinions on these matters were gathered from both Canadian and United States cougar experts and Manitoba habitat specialists using the Delphi method. This is a survey technique in which specific questions are posed to experts in the field to determine their opinions. Experts do not have contact with each other. The results are assessed and further questions on the matters are re-mailed to them for further discussion with hopes that a consensus can be reached.

The Delphi method was successful in developing and identifying many issues, such as determining criteria for resident versus migrating cougars, corridor importance, habitat availability, and the importance of protective laws. The Delphi method proved most beneficial in areas where each panel had expertise and where the panel member was asked to answer specific, single-dimensional questions.

After combining their testimonies, it was determined that Manitoba has sufficient habitat, corridors and prey to support a resident cougar population. However, monitoring and protection in these areas will be needed to ensure a future cougar population. It was also determined that although present laws protect the cougar in Manitoba to some degree, improved legal proposals, provincial initiatives, cooperation by landowners, citizen awareness, and ongoing research are all important factors for ensuring future cougar survival in Manitoba.

Acknowledgements

I would like to separately thank Dr. Bob Wrigley and Dr. Bob Nero for their information and research regarding cougars in Manitoba. Their book, MANITOBA'S BIG CAT sparked my interest in cougars in Manitoba many years ago, and eventually led me to pursue a master's degree researching the Manitoba cougar as my thesis. Thanks also to Bob Nero for taking the extra time to keep me up to date on cougar happenings with phone calls and sending newspaper clippings, and to Bob Wrigley for helping me with any cougar information I needed and showing me around the zoo.

I have gained valuable knowledge from the experts' opinions I received while using the Delphi Survey Method. I thank the interested individuals who took the time out to complete my survey rounds and for sharing their knowledge with me.

I would like to acknowledge my Faculty Advisor, Merlin Shoesmith and committee members, Rick Baydack, Bob Wrigley and Mike Campbell. Their helpful ideas and direction has helped greatly with my thesis. Each member offered unique ideas that I took into consideration and were a great asset in completing my thesis. Thanks for your endless support and patience.

Information from Manitoba Wildlife Federation, Manitoba Conservation, and other government agencies regarding cougar reports and data information was greatly appreciated.

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Finally I dedicate this work to my family, parents, Verna and Robert Hutlet, who believed in this project from day one, and to all my sisters and brothers whose endless hours of emotional support was most valuable to me. Thanks to Lauri for her editing ideas, Mark for fixing computer problems, Jacalyn for always listening over coffee, Tammy for offering her Jacuzzi, and Jay for making me laugh with answering machine messages. Thanks to my Dad who has worked for Natural Resources-Parks for over 20 years, for taking me on trips in the forest to hunt for cougar tracks, and to my Mom for her literature help, artwork (inside cover) and many words of encouragement. Without all your help, this thesis wouldn't be possible. Thanks so much.

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The Cougar in Manitoba

By: Joanne Hutlet

Chapter I: Introduction

1.0 Background – A large number of cougar sightings have been reported in Manitoba since 1879 and these prompted further study of this species in Manitoba. There are records of 281 acceptable sightings of cougars in Manitoba from 1879 to 1975 with 15 kills (Wrigley and Nero 1986). Between 1990 and 1991, there were 61 reported sightings (Johnson 1991). In 1973 a cougar was killed and in 2004, two kills confirmed the presence of cougars in Manitoba. This study will examine whether Manitoba can support a resident cougar population, as well as suggest ways to manage the cougar for the well-being and safety of both cougar and human populations.

1.1 Problem statement – There is very little recent research available on cougars in Manitoba. Sightings alone are not considered scientific fact, since many sightings maybe false or cannot be proven. Until 2004, only a specimen retrieved in 1973 was considered as physical evidence that cougars may exist in the province.

Accurate estimates of the distribution and population of the cougar in Manitoba were not available because research on this species is not a high priority and experts must rely on sightings and other signs such as tracks, scratchings and prey kills. Many false sightings may be due to lack of knowledge about cougars, especially in areas where the cougar is apparently not plentiful, such as in Manitoba.

1.2 Goals -

a) To determine experts' opinions on whether Manitoba can support a resident cougar population.

b) To determine experts' opinions on what measures are suitable to provide adequate protection for the cougar in Manitoba

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1.3 Objectives -

a) -Determine if experts believe that there is an adequate prey supply in Manitoba.

-Examine expert opinions on climate conditions and other limiting factors of cougar survival in Manitoba.

-Examine expert opinions on the possible signs of resident versus transient cougars.

b) -Identify problem areas such as human intervention in corridors and other quality cougar habitat, and look at expert's solutions to improve these situations.

-Discuss expert opinions on the causes of false sightings and examine ways to improve such.

1.4 Summary of Methods– The objectives in the previous section will be met by:

A) Delphi Method using Cougar Experts - The Delphi Method includes the use of a survey technique. The ***snowball technique*** will initially be used to pick experts who best qualify to answer the surveys. "In snowball sampling, the researcher collects data on the few members of the target population, then asks those individuals to provide the information needed to locate other members of that population whom

they happen to know" (Babbie 2001). Questionnaires were given to 9 experts from the United States, and 11 from Canada, 5 of which are Manitoba habitat experts. The results were assessed and then further questions were re-mailed out for further information.

B) Delphi Method using Manitoba Habitat Experts – Surveys with specific questions regarding "Manitoba habitat" were distributed to a set of Manitoba habitat experts.

***C) Prairie Habitat Questions*-** A serious of 8 questions were given to experts who live in the Prairie grassland states and provinces surrounding Manitoba and Southern United States. The purpose of this separate study was to assess opinions on whether cougars are increasingly moving into Prairie habitat.

1.5 Summary of Limitations – There are limitations to studying the cougar. "The elusive nature of the cougar makes it a difficult animal to census" (Busch 1996). Some reported sightings appear valid, while others are likely in error. Cougar experts from other areas in Canada and the United States will also be consulted during the Delphi Method, and their information will be used to help assess Manitoba's suitability for a resident cougar population. To help acquire information on cougars in prairie habitats, a series of questions was also asked to help gain feedback on what experts know about cougars living in the prairies.

Chapter II: Literature Review

2.1 History -

2.1.1- Pleistocene Era – Ice Age Cats

A variety of large cats roamed North America during the Pleistocene, which included events from 1.8 million to about 10,000 years ago. Extensive migration took place during that time. Some of the species that inhabited parts of North America during the end of the Pleistocene era were saber-toothed cats, the American lion (*Panthera leo atrox),* jaguars (*Felis conea),* and American cheetah. We know of their existence through the discoveries of fossils (Livingston 1970).

"*Smilodon*, one of the saber-toothed cats, did not need to be huge in stature to be colossally efficient...The big cat, which in general appearance may have looked more like a bobcat than a tiger, persisted in North America until well into the ice ages" (Livingston 1970). The saber-toothed cats are known, through fossil records, to have evolved about ten genera (Busch 1996).

"Bodies of the saber-toothed tiger, the dire wolf and many other animals have been recovered from the amazing tar pit of Ranchero La Brea in California" (The Grolier Society of Canada 1956). "At about the end of the ice ages, North America lost about 70% of its large mammals. Not only did the horses and camels, mammoths and mastodons disappear, but also the large ground sloths, a southern musk ox, two kinds of swine and saber-toothed cats, the dire wolf, the giant beaver-over one hundred in all....In fact, the invasion of the continent by man coincides almost perfectly with the disappearance not only of the largest herbivorous mammals, but also with the

disappearance of their predators...Along the Old Crow River in the Yukon, C.R. Harington of the National Museum and P. Lord came upon some telling evidence in 1966...Also in the same area, associated with human artifacts, were the remains of the extinct giant beaver, one of the extinct lion-like cats, mastodon, extinct horse, camel, and long-horned bison"(Livingston 1970).

Despite it being referred to as a mountain lion, the cougar is related to the cheetah species, not the lion species. The fossil of an American cheetah was discovered near Winnemucca Lake, Nevada. "The saber-toothed cats and the giant jaguar are gone, but we still have the cougar" (Livingston 1970).

2.1.2 – Distribution

Cougar, puma, panther, mountain lion- many names refer to this powerful carnivore, known by scientists as *Felis concolor,* cat of one color. This mammal is widely distributed from Argentina and Chile to northern British Columbia and New Brunswick. It has adapted to deserts, brush land, tropical rain forests, and deciduous and coniferous forests. It is one of the world's most adaptable mammals. (Wrigley 1986). (Figure 1)

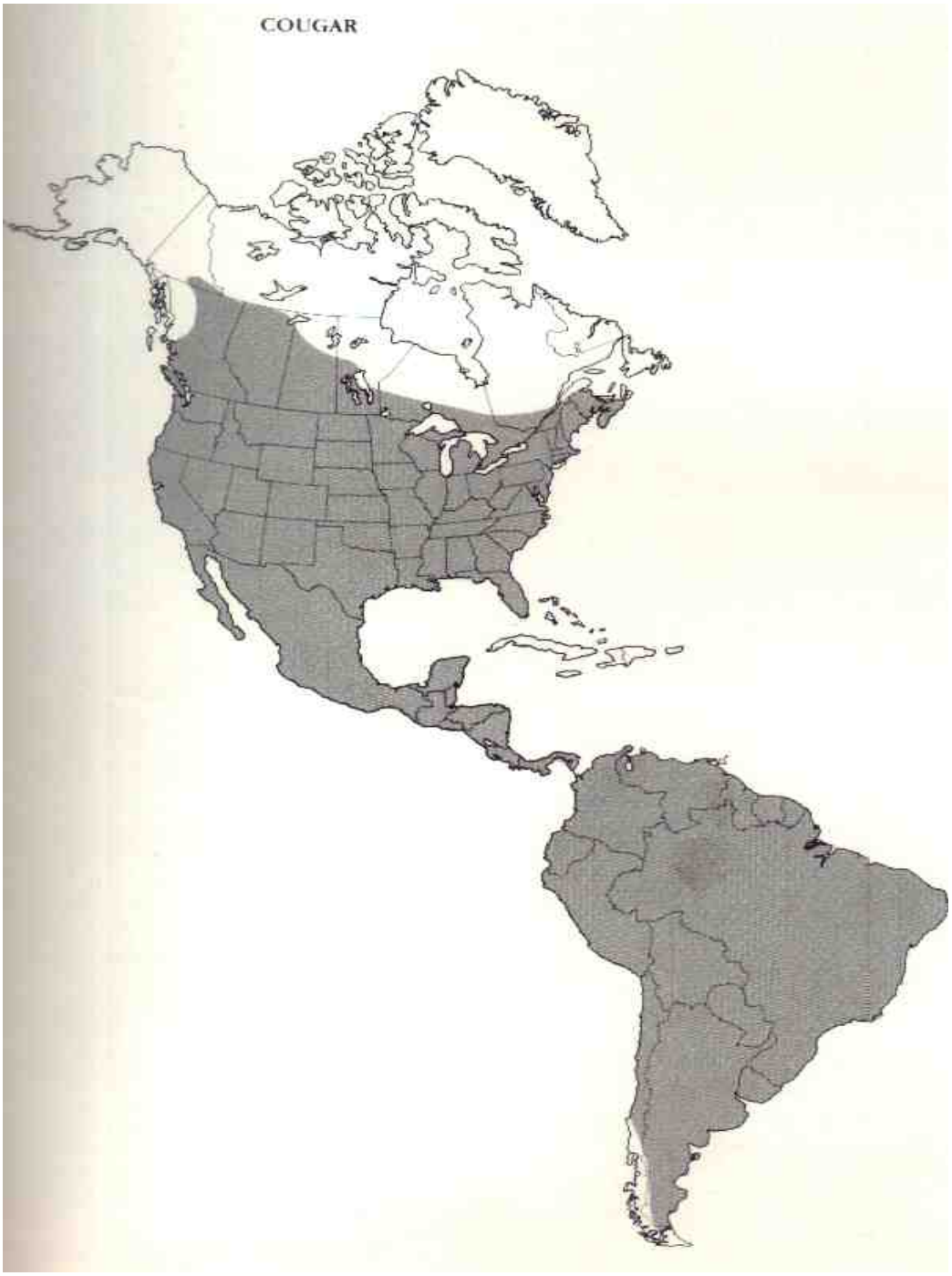
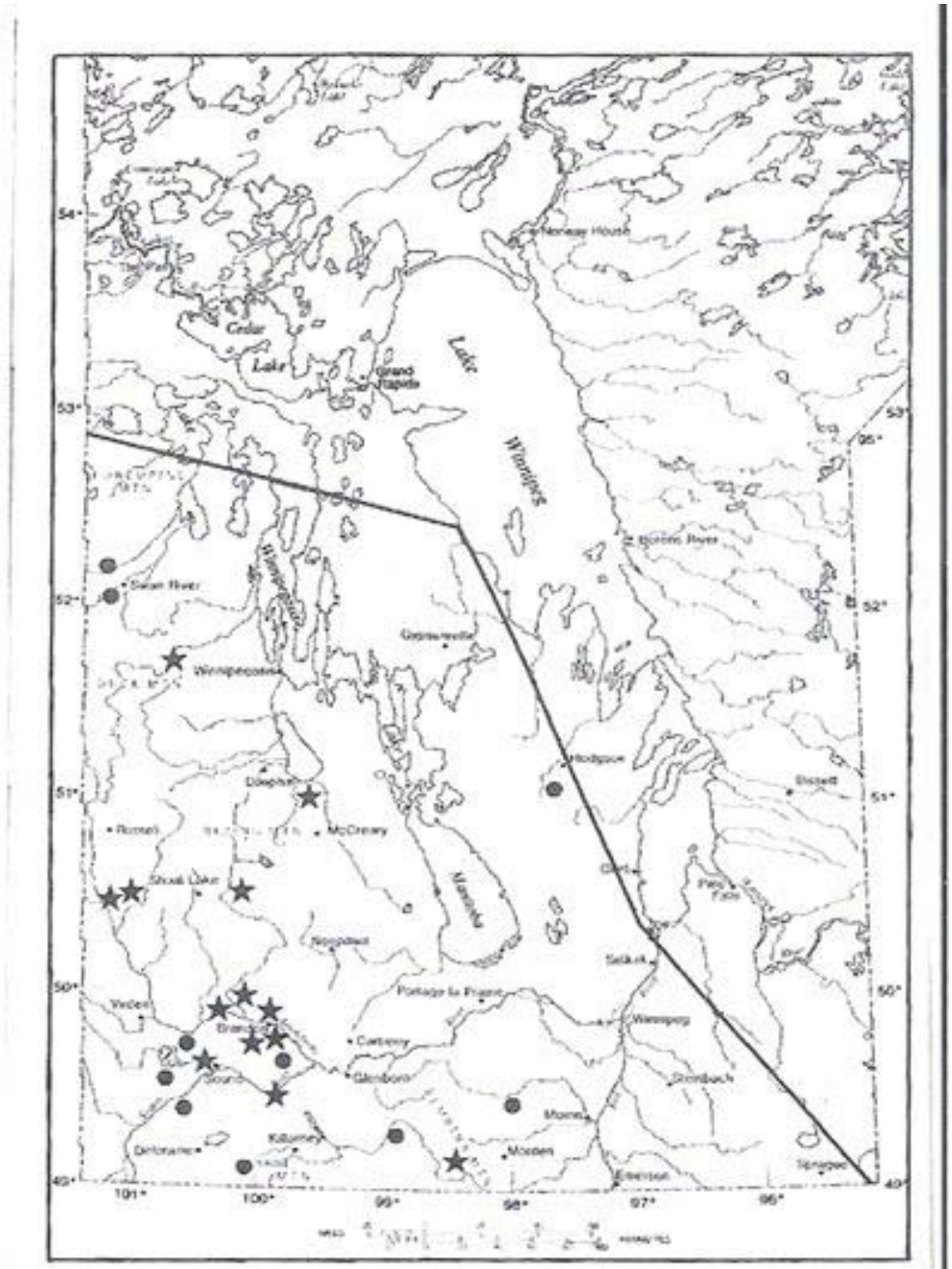
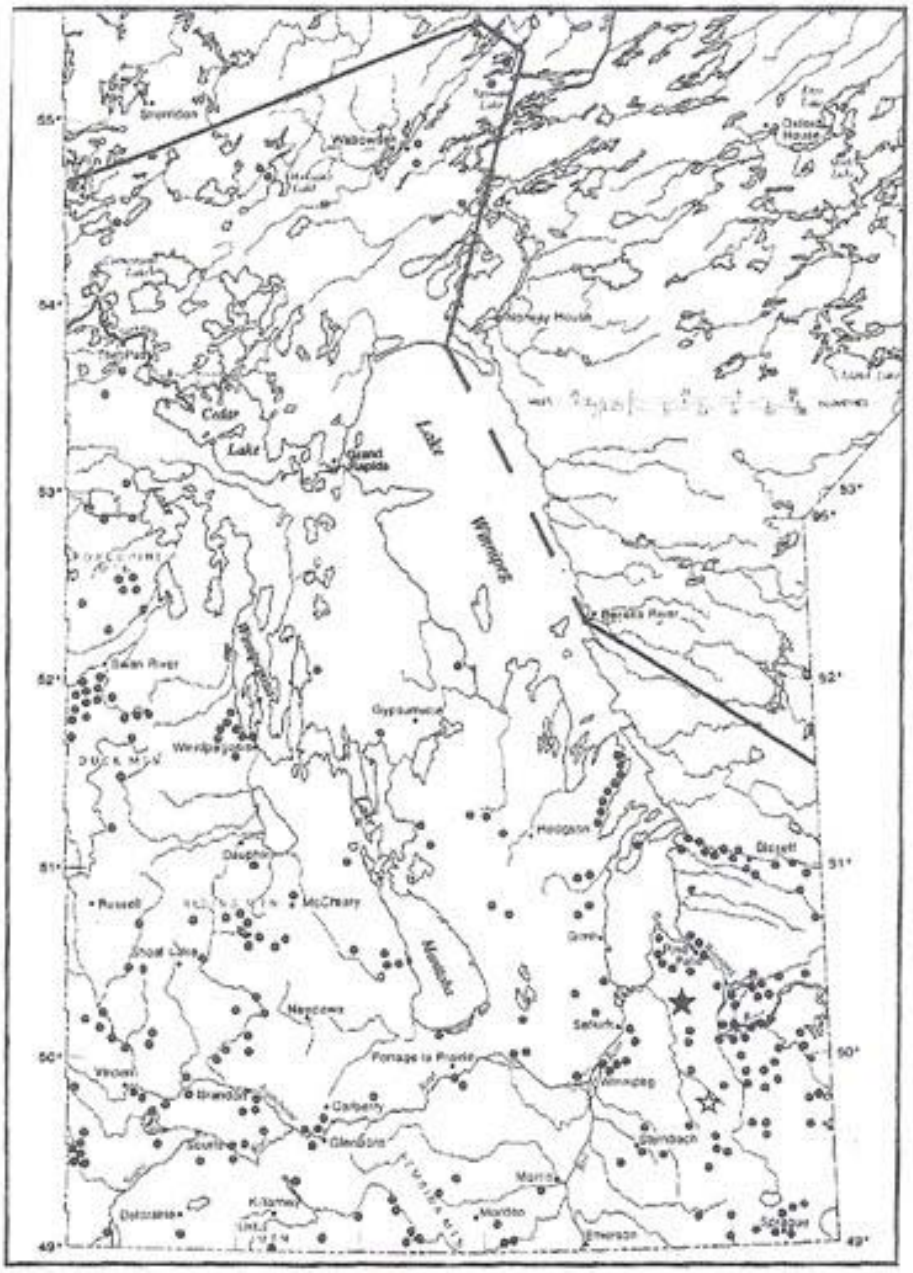


Figure 1. Historical range of the cougar (Wrigley 1986)



Map of southern Manitoba showing the maximum distribution of mule deer and American elk (solid line) (after Seton[17]), and cougar sightings (dots) and reported kills (stars) prior to 1940.

Figure 2. Southern Manitoba, showing distribution of mule deer and American elk and cougar sightings, with reported kills prior to 1940 (Wrigley and Nero 1982).



Map of southern Manitoba showing the maximum distribution of white-tailed deer (line) and cougar sightings (dots) from 1941 to 1975. The hollow star indicates the location of the 1969 cougar kill, and the solid star, the Stead specimen killed in 1973.

Figure 3. Manitoba, showing maximum distribution of white-tailed deer and cougar sightings from 1941 to 1975 (Wrigley and Nero 1982).

The earliest recorded mention of a cougar on the plains of North America is by Alexander Henry (the senior) in 1776, "…but, I saw also the skins of foxes, bears, and a small number of panthers, sometimes called tigers, and most properly, cougars" (Wrigley and Nero 1982). Another possible early reference to cougars in Manitoba was the naming of the Tiger Hills, a rolling range of land south of the Assiniboine River between Wawanesa, Cypress River, and Ninette, and of the Tiger's Head in northwestern Manitoba. Seton (1925-1928) published early Manitoba records of cougars being seen or shot in southwestern Manitoba, but because a Manitoba specimen was not saved, proof could not be determined. Following Seton's reports, sightings were investigated and reported by former directors of the Manitoba Museum, L.T.S. Norris-Elye (1951) and Richard W. Sutton (1960). In 1968, an assistant curator at the Manitoba Museum of Man and Nature, W. Harvey Beck, started a card file on cougar reports. Charles H. Buckner of the Federal Forest Biology Laboratory in Winnipeg continued gathering records, and in 1972, Robert Nero at the Wildlife Branch initiated a program to document the status of the cougar in Manitoba (Wrigley and Nero 1982).

Cougar data were also compared with sightings reported to wildlife agencies, universities and museums in Ontario, Saskatchewan, North Dakota and Minnesota. Sightings lacking sufficient evidence were rejected. Tracks, cougar calls, and partly eaten prey provided support, but were not used as sightings. A cougar was shot at Stead, Manitoba, 56km northeast of Winnipeg (Wrigley and Nero 1982). Believing the animal to be a wolf bothering their cattle, farmers shot a two year-old male cougar. The specimen was obtained by the Manitoba Museum of Man and Nature. The Stead

specimen was compared with specimens of Felis *concolor missoulensis* (the western race), *F.c.couguar* (the eastern race), and *F.c.hippolestes* (race from mid-western United States). Wildlife Biologist, A.L.Gardner first compared the specimen to the western race, reporting that the characteristics and color pattern of the skin were characters found in *F.c.missoulensis*. "More recently, J.D. Lazell examined the Manitoba specimen, along with several hundred others from North America, and felt that although it was intermediate in characters between the eastern and western races, on balance he placed it with *F.c.couguar*- the endangered eastern race" (Wrigley and Nero 1982).

"The elusive nature of the cougar makes it a difficult animal to census" (Busch 1996). A rough estimate of 1970s cougar population in Manitoba was 50 (Nero and Wrigley 1977), with some individuals shared with adjacent provinces and states. From 1900 to 1950, ten cougars were supposedly killed, but the specimens were not saved, other than several exhibited for a time in local store windows (Wrigley and Nero 1982).

In Manitoba, sightings of two or more animals at the same time have been reported over 14 times, some with kittens at foot. (Wrigley and Nero 1982) "The presence of females with young confirms the existence of a resident population, since only after establishment of a home range does the cougar end its transient phase and enter the reproductive phase of its life" (Seidensticker et al. 1973).

2.1.3 – Hunting and Bounties

Public opinion about this big predator and cougar hunting has changed considerably over the years. Bounties and unregulated hunting before 1960 completely eliminated the cougar in many states of America. In the 1960s and 1970s, the game

departments began to regulate cougar hunting in the United States. Immediately after lifting the bounty in California, the cougar was listed as a game animal and permits were issued to hunt them. "In 1972, as younger wildlife managers brought to their work an appreciation for the role of predators in healthy ecosystems and concern grew for the shrinking populations of cougars, they were protected entirely from hunting, except as necessary to protect lives and property" (Ewing and Grossman 1999). The change from a bountied predator to game, rare or endangered status in all the western states, except Texas, has helped the species to survive.

Trophy hunting of the cougar does exist today, as suggested to hunters in the magazine, *Alberta Outdoors 2002*. "Growing up to 10 feet long and weighing in at close to 200 pounds gives the hunter an opportunity to harvest a real trophy" (Alberta Outdoors 2002, http://www.abhunting.com/). The problem with trophy hunting is that the majority of trophy hunters prefer to shoot large adult cougars in their prime for better display. "Adult cougars keep their home ranges in check, which means the older lions that are more established and more experienced drive off younger cats looking to move into their territory" (Blessley 1999).

Trophy hunting is not permitted in states such as California, where it is illegal to take, injure, possess, transport, import or sell any lion or any part or product of a lion. (Mountain Lion Foundation. Found June 2004 in http://www.mountainlion.org/prop117guide.asp). Cougars cannot be possessed by game breeders without a special permit. According to the Mountain Lion Foundation's Anti-Poaching Campaign, commercial poaching is the second greatest threat to California

wildlife after habitat loss. Although the cougar is a specially protected mammal in California, it is still being illegally killed for the black market, with a cougar pelt bringing $1000 to $1500.

In 1973, a cougar was shot and killed at Stead, Manitoba, 35 miles northeast of Winnipeg. This established physical evidence of the cougar's existence in Manitoba and led to the Wildlife Act protecting the animal. A regulation to the Wildlife Act in 1974, states: "Except under authority of a permit issued by the Minister, no person shall hunt, kill, take or capture a cougar." Cougars are protected in Manitoba, but may be killed in defense of personal safety and property. If a person accidentally traps or shoots a cougar, they must surrender the animal and report it to provincial wildlife authorities. If a permit is given for the destroying of a cougar, limitations apply.

"Once a species has been declared by regulation as being threatened, endangered or extirpated, it is unlawful to kill, injure, possess, disturb or interfere with the species; destroy, disturb or interfere with the habitat of the species; or damage, destroy, obstruct or remove a natural resource on which the species depends for its life and propagation" (Legislation & Permits, Manitoba Conservation Wildlife and Ecosystem Protection Branch, Province of Manitoba, Found 2005 in: http://www.gov.mb.ca/conservation/wildlife/legislation/endangered act.html).

2.1.4 **–** The Cougar in Manitoba **- COUGAR (*Felis concolor)***

MANITOBA STATUS –"Cougars are not listed as endangered in Manitoba simply because there is not enough evidence to determine their status, but they are protected"

(Fowler 2005). In Manitoba, the cougar is currently a Protected Species under the Wildlife Act. "Certain species, such as cougar, are 'protected' under the Manitoba Wildlife Act. That is, hunting and killing the species is illegal. The Wildlife Act does not include any habitat protection" (Biodiversity and Species 2005, found in: http://www.manitobawildlands.org/bio_species.htm). The status of the cougar in Manitoba is that of a Species of Special Concern under the Wildlife Act. (R. Wrigley, Assiniboine Park Zoo, Winnipeg, Manitoba, May 2005, personal communication). "In Manitoba the Conservation Data Centre (CDC) lists the cougar as S2S3 halfway between S2, which means it is rare throughout its range in Manitoba and may be subject to extirpation (i.e., lost to the province), and S3, which means it is uncommon in the province. However, not all laws protect the cougar in all circumstances. For example, the Canada Endangered Species Protection Act (CESPA), Bill C-65 was introduced to the House of Commons on October 31, 1996 in response to the need for a federal endangered species act. At the present time, Canada has no comprehensive law to protect endangered species in Canada" (R. Wrigley, Assiniboine Park Zoo, Winnipeg, Manitoba, May 2005, personal communication).

The Species at Risk Act (SARA) only has jurisdiction for endangered species if they are on federally owned lands or in special circumstances where provinces are not doing an adequate job of habitat protection. Provinces have jurisdiction over provincial crown lands and private property on which publicly owned resources such as wildlife occur. Since the cougar has a limited range on federal lands, the animal is mainly the responsibility of the province (Species at Risk Act, 2005, Found in: http://www.speciesatrisk.gc.ca/).

Views differ on whether Manitoba has a resident cougar population, but according to Bob Wrigley (co-author of Manitoba's Big Cat), "with effort (as Bob Nero made years ago), one could gather 50-100 sight records annually, a high percentage with details on the animals that would be hard to disqualify. As a biologist with 35 years of experience in Manitoba, there is no doubt in my mind that with all the evidence accumulated over 100 years, there has always been a resident population of cougars in the province. My strongly held opinion, as a member of the Manitoba Endangered Species Advisory Committee, is that any case in which a population of plant or animal falls below 2,000 individuals, it should be automatically classified as Endangered, and the cougar would definitely fall within this category" (personal communication, Wrigley 2005).

With differing views on whether the cougar in Manitoba should be considered an Endangered Species or not, one can also look at the Precautionary Principle (Cooney 2004), now being promoted by the International Union for the Conservation of Nature (IUCN) and many natural-resource management agencies.

"The precautionary principle has emerged over recent decades as a widely and increasingly accepted general principle of environmental policy, law, and management. It is an approach to uncertainty, and provides for action to avoid serious or irreversible environmental harm in advance of scientific certainty of such harm" (Cooney 2004). According to Bob Wrigley, "this view is rational, while the argument that there are insufficient data available to act or to classify a species in trouble, is not. Almost by definition, a species at risk will have little information available, so doing nothing is unacceptable" (personal communication, Wrigley 2005).

Controversy regarding whether the cougar in Manitoba should be considered an Endangered Species, is still ongoing today.

2.2 Ecology of the Cougar

2.2.1 – Introduction – The cougar is a long, sleek, muscular animal. "It appears thin and flat-sided, and its chest is narrow. It may stand two feet (0.61 meters) or more at the shoulder and an inch or two taller than that in the rear because of its powerful hindquarters. Its elegant tail, which makes up about a third of the mountain lion's total length, is cylindrical and about the thickness of a child's arm. From the tip of its tail to the end of its nose, a male mountain lion may measure six to eight feet (1.83 to 2.44 meters). Females are smaller, averaging five to seven feet (1.52 to 2.13 meters)" (Grambo, 1999). "…in the wild very few cougars reach the age of twelve. In one study of thirteen cougars in the Diablo Range of California, the average age of death for males was six years; for females, five years" (Busch 1996).

PHYSICAL CHARACTERISTICS OF THE COUGAR

Figure 4. Facial photo of the cougar. Submitted, Joanne Hutlet, 2005

Scientific name – Felis concolor

Family – Cats (Felidae)

Order – Carnivores (Carnivora)

Average total length - males 240cm (94.5 in); females 205cm (80.7in)

Average tail length – males 88cm (34.7 in); females 78cm (30.7 in) *(see photo below)*

Figure 5. Rear view of the cougar and tail. Submitted, Joanne Hutlet, 2005

Weight – males 80kg, maximum 136kg (176.4 Ib); females 50kg (110.2 Ib)
The smallest cougars live in the tropics.

Color – Adult cougars are brown (darker along the back) and white or pale brown on the underside. (Figure 2) The muzzle, tip of the tail, and behind the ears are black. *(see Appendix 4).* The young have a spotted coat that is replaced at 6 months of age (Wrigley 1986).

Figure 6. Adult cougars are darker along the back and white or pale brown on the underside. Submitted, Verna Hutlet, 2005

Tracks -

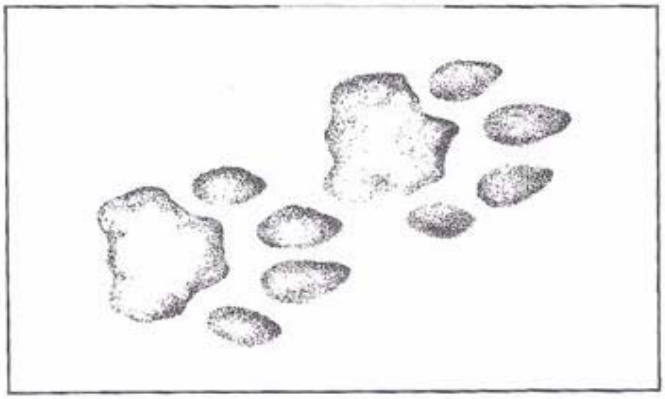


Figure 7. Cougar Tracks (Wrigley and Nero 1982).

2.2.2 – Reproductive Biology

Cougars are solitary animals that seek their own kind only in mating season.

During her active breeding period, the female emits an extremely loud, bloodcurdling

scream to attract a mate; a piercing sound that can be heard for great distances. (Seton 1925; Wright 1959).

"Female cougars become sexually mature at about two to two and half years and males by about two and half to three years" (Busch 1996). "The gestation period for cougars lasts for ninety to ninety-six days. Two or three kittens comprise the average litter, although there is a record of six in a litter from Utah" (Busch 1996).

COUGAR KITTENS – With their spotted coat, kittens bear little resemblance to their parents. (Figure 3) When kittens approach six months they are already beginning to lose their baby spots. They will eventually become an adult cougar with a coat of one color.

Figure 8. Young cougar. Submitted, Verna Hutlet, 2005.

2.2.3 – <u>Habitat Requirements</u>

"The lofty mountains of Peru are probably the last places most people would expect to see cougars, but many varied habitats, including deserts, forests, mountains, and lowlands, were all home to the early cats…generally, the cougar prefers habitat that

provides good forage for its prey and enough cover for it to efficiently stalk that prey" (Busch 1996). In Manitoba, the cougar can be found from the boreal forest to the grasslands, concentrating in areas where prey is abundant (Wrigley and Nero 1982). So it is not surprising to see the cougar appear in areas where it has not been for some time, if attracted by prey or forced out of its usual habitat by human development. "When the Europeans arrived in the New World, they brought with them the attitudes of a people used to exterminating animals as potential competitors for land and game…….the first bounty on cougars was established in 1680, and was quickly followed by many others" (Busch 1996). Bounties have no limit upon the take, whereas regulated hunting allows for a population of a species to reproduce and stabilize.

2.2.4 – Food Habits

The cougar is a solitary, mostly nocturnal hunter. Its sense of smell and hearing are good, but its eyesight is its main tool for locating prey. The cougar's relatively small lungs do not give it great endurance as a running hunter, therefore it relies on stalking and ambush, with explosive and rapid attacks. If the prey is small, like a snowshoe hare, a rapid charge and paw swipe is all that is needed to capture its prey. "If the animal is larger, the cougar usually attacks from the side, reaches out with both forepaws, claws extended, and gets a solid grip of the animals neck and shoulders" (Grambo 1999). After leaping upon its' prey, "it is followed by either twisting their head to the side to snap the neck or biting through the back of the neck. Death is often due to one of the cougar's large canine teeth forcing vertebrae apart and severing the prey's spinal cord" (Busch 1996).

Deer, moose, elk, beaver, raccoon, rabbit, porcupine, and various small rodents, are the cougars' main diet. The majority of cougars eat very few domestic animals, as long as their wildlife food supply is sufficient. After a kill, the cougar drags its eaten prey into cover and then covers it with sticks, leaves, and earth. "When satiated, it covers the carcass with leaves or snow, which protects it from the hot sun and, to some extent, some scavengers" (Wrigley and Nero 1982).

2.2.5 – Cougar Range and Territory

The cougar is a territorial creature and its home range size varies depending on the habitat type and quality. An animal will have to search further afield if prey is scarce. Commencing in 1973, the California Department of Fish and Game conducted field studies on cougar behavior for 20 years. (Found 2004 in: http://www.dfg.ca.gov/). Along with other agencies and universities, the Department captured and marked adult cougars with radio telemetry collars and juveniles with ear tags. The technique involves receiving a radio signal from a radio transmitter attached to a cat's neck. Following the signal enables one to locate the cougar, determine where and when cougars interact for breeding, determine travel patterns, locate den sites, and learn when a cougar dies. These studies examined more than 250 cougars in 10 long-term studies from Sierra County in the north to San Diego County in the south. The studies documented the extent of home ranges, size of litters, food habits, and survival in each specific area.

Cougars are solitary animals that seek fellow cougars only during the mating season. Field workers learned that home ranges tended to overlap, especially those of

females. Male territories tend not to overlap, with reasoning being that males are inherently more aggressive due to testosterone levels. Each male marks its territory by scent, scratch marks, and piles of debris, and avoids sharing boundaries with other males, which lessens the chance of territorial fights. Female cougar territories tend to overlap, as they are more tolerant of other males and females for breeding purposes and to avoid fights. When accompanied with young kittens, female cougars do become more aggressive towards other male and female cougars (R. Wrigley, Assiniboine Park Zoo, Winnipeg, Manitoba, April 2005, personal communication).

The cougar's range can fluctuate from summer to winter, with cougars moving to lower, warmer elevations during the winter months. Transient, non-resident males (usually around 2 years of age) may pass through resident male territory, but rarely attempt to stay unless powerful enough to challenge the resident male for territory.

A method of collecting data is with DNA testers. In December, 2002, cougar tracks and tree-trunk scratches (a cougar trait) were sighted and photographed in Quebec**.** A DNA cougar-tester was installed on a tree close to the sighted tracks. The tester was implanted with an inviting scent, which encourages the cougar to rub up against the tester, thus leaving hair for DNA testing. The hair collected in Quebec proved a cougar had come to that location. (The Cougar Network, Found February 2005 in: http://www.easterncougarnet.org/index.html).

"Because mountain lions are territorial, their population increase means younger cougars are pushed out into less desirable territories, such as those harboring human beings" (Grice 2001). This creates a potentially dangerous situation for cougars and the

humans who confront them. Young cougars are the most dangerous to humans, since they are usually hungry, unskilled hunters, and chased out of their territory by older males.

A cougar's natural life span is about 6 - 12 years in the wild (Busch 1996) and up to 25 years in captivity, taking into account that cougars fall victim to bears, other cougars, starvation, disease, accidents, collision with motor vehicles, trapping and shooting. Senior cougars, losing their agility to hunt, may seek out easy prey such as livestock or a human. When the habitat is near carrying capacity for the cougar population, there is a high level of competition among individuals, with the stronger adult males usually winning the battle. Weaker individuals are forced to move away, usually ending up in less favorable habitat, such as human-populated areas where they are more likely to cause trouble by attacking livestock, pets and humans. Wildlife corridors can help in these situations because they encourage the passage of animals from one good habitat to another with little immigration into the less-favorable, human-populated areas. "Cougar are not real fussy about type of habitat but they need lots of it, and well connected" (Beier 1994).

2.2.6 – Wildlife Corridors

Wildlife corridors are most often wooded areas that act like a bridge through human-occupied territory. Ideal corridors are natural, forested river valleys that pass through agricultural land, and form a thoroughfare from one wildlife habitat to another. A good corridor encourages animal use by offering cover at trees, shrubs, and complex topography. It lessens the chance of animals crossing where

they are exposed and liable to cause damage or danger to humans and their property. Smaller corridors might simply be bushes allowed to stand through a farmer's property or an overpass or underpass structure made to allow animals to cross roads unharmed. Wildlife corridors meet with different human acceptance because it is impossible to expect all wild animals will keep to the corridor. In the case of cougars, it can possibly mean encountering a dangerous animal passing through one's pasture or yard, therefore it is beneficial to have lots of habitat for cougars that is well connected (Beier 1994).

"Without dispersal corridors and the influx of transient cats, the survival of most small cougar populations are doubtful....Biologist Dr. Paul Beier once calculated minimum habitat requirements for cougars based on his work in California. He found that without immigration, for a viable breeding population to survive for 100 years, but not in the long term, a minimum block of 1,606 square kilometers is required" (Busch 1996). Because such large blocks of suitable habitat are not possible in many areas, wildlife corridors are needed to allow animal passage between smaller territories (Busch 1996).

In areas such as Florida where there has been a drastic decline in cougar numbers and therefore bloodlines, populations declined due to disease, heart defects, reproductive problems, etc. caused from inbreeding among the Florida cougars (Busch 1996). Recovery of the population is linked to continued healthy reproduction and immigration. "Isolated populations of animals can suffer from two genetic problems: inbreeding and loss of genetic variability" (Busch 1996). Historically, animals could move to locations where new gene pools were established. The change in land use over time has created an

island effect in many areas like Florida, which allows for little immigration and emigration of individual cougars. “The first warnings about the Florida cougar’s very survival came a few years later in 1958, the animal became protected by state law, and in 1967, the Florida Cougar was added to the first endangered species list in the United States” (Busch 1996).

2.3 – Cougar Management –

2.3.1 Human and Cougar Encounters

In some cases, the increase in cougar attacks on humans may be the result of the expanding human population into cougar territory (Busch 1996). “Some people believe these cougars are being forced out of their former home ranges into the city by humans. That may be a factor in some cases. Since they compete for food and space, some cougars are forced to move, ending up in marginal areas where they are more likely to cause trouble. The fact that damage to livestock is increasing in rural counties like Inyo, Lassen, Modoc and Mono, where human populations have not greatly increased, suggests cougars are expanding their range” (Mansfield 2005, found in: http://www.dfg.ca.gov/lion/outdoor.lion.html).

In 1986, the Hornocker Wildlife Institute surveyed cougars in Montana, and completed another seven-year research project in 1996. (Hornocker Wildlife Institute, Found December 2004 in: http://www.hwi.org/). They documented the fact that cougars were back in Yellowstone Park after an absence of decades. In 1996, a five-year research project in Banff National Park addressed the major impacts of roads on wildlife,

particularly the Trans Canada Highway. One portion of their study monitored underpasses and overpasses (wildlife-crossing structures), and discovered cougar use increased dramatically over the last two years, from 150 cougar passes to over 500 in 1998.

In 2001, there were several cougar attacks within the town of Banff. "Cougar attacks are exceedingly unusual, and these represent the first attacks recorded in Banff National Park. On this day there were three separate incidents involving at least two separate cougars" (MountainNature, Found April 2005 in: www.mountainnature.com). There have been a number of changes to Banff's landscape, which could be the cause of increased attacks and sightings. The large wolf pack has grown from 6 to 11 wolves, and has begun following the local elk population. To avoid this pack, the elk have moved into Banff town-site. The cougar's then follow the elk into the town-site, as speculated (MountainNature, Found April 2005 in: www.mountainnature.com).

With this information, cougar and human encounters are bound to happen on occasion. Cougar management will definitely play an important role in the protection of this species, as well as humankind.

2.3.2 Conservation Efforts

"Perhaps because the cougar is rarely seen by humans, and has none of the lengthy mythology of such animals as the wolf, few voices have been raised for its conservation – until recently" (Busch 1996). In California, it is no longer legal to possess a cougar unless its possession is approved (such as shelters) and kept under a special

permit issued by the Department of Fish and Game. A person having a cougar (or any big cat) as a pet usually winds up in trying to find a shelter for the cat, according to personal experience visiting three wild cat refuges (Florida, Texas and Calgary), where the owners stated that many of their big cats were former pets. Although many disagree with keeping cougars in zoos and shelters, most animals have been previously injured or adapted to captivity since birth, and would not survive in the wild, according to many wildlife shelter owners.

Large wildlife refuges provide suitable habitat for animals, and can be essential in saving an endangered species. "The cougar is also receiving extraordinary public support in Florida, where a subspecies, the Florida panther, has barely hung on in the pine forests and oak hammocks in and around the Big Cypress Swamp" (Hornocker 1992). In the United States, the National Wildlife Refuge System Act of 1996 includes methods to preserve ecosystems for endangered species such as the Florida panther. (*Puma concolor coryi*), is one of more than 20 subspecies of the cougar. The Florida Panther National Wildlife Refuge has placed 24,000 acres of habitat under protection. Agricultural lands have been returned to a natural state and many roads were rerouted to reduce the number of Florida cougars killed on the roads. The Florida Game and Fresh Water Fish Commission limited the use of hunting dogs and vehicles in panther habitat. Even attempts to bring in cougars from Texas, have many people hopeful. In Florida, radio collaring was helpful in capturing the cougars to give them vitamins, vaccines, and de-wormers (Busch 1996).

Once a cougar has killed a pet or livestock, or has attacked a human, conservation officers are usually called into action. Catching the cougar and putting it in a refuge is difficult because many refuges are filled to capacity and older animals do not adapt to captivity as easily as young ones. Returning the cougar to the wild in another area rarely solves the problem because, "there are almost always other lions where there is prey. The relocated cat may be killed by a resident male. Or starve if there is, after all, too little food. Some relocated cougars, unfamiliar with the new area, wander onto highways and are killed by cars. Many simply head back where they came from, so relocation is rarely done. We're usually just relocating the problem. Most of the cougars that are removed, if healthy and adaptable to confinement, will be placed in a zoo or other facility, but some will be destroyed" (Mountain Lions in California, 2005, Found in: http://www.dfg.ca.gov/lion/outdoor.lion.html). The Department of Fish and Game (DFG) has a large list of educational and private licensed facilities, but not all are suitable to hold large cats.

In Banff, where there is increasing attacks due to the cougar's following the elk into the area, park managers are undertaking a number of initiatives to try and deal with the recent changes. There is a study where park wardens are attempting to radio collar all cougars around the area for study, and also the continuation of elk relocation. "By continuing to move elk out of the town-site, warden's hope that the elk will become available to predators like wolves and cougars without being attracted into the town-site. Wardens will also be working to educate residents in ways to reduce elk attractants such as wildflower gardens" (MountainNature, Found April 2005 in: www.mountainnature.com).

In this province, Manitoba Conservation protects wildlife resources, species and ecosystems. The Wildlife Act, The Endangered Species Act, and the Conservation Agreements Act of Manitoba share this responsibility. The Department develops programs, policies, and legislation for hunting and trapping, biodiversity conservation, and habitat and land management on Crown and private land. Several land-stewardship acquisition programs and conservation agreements are delivered by the private Manitoba Habitat Heritage Corporation and the Nature Conservancy of Canada.

"Currently, there is one Order-in-Council (O/C) regulation under this Act (Endangered Species Act) administered by Wildlife and Ecosystem Protection Branch within the Province of Manitoba. This regulation declares species as threatened, endangered or extirpated. O/C regulations govern other matters such as preservations and survival of habitat and entry into a designated area that is occupied by a declared species" (Manitoba Conservation Wildlife and Ecosystem Protection Branch, Province of Manitoba 2005, found in: http://www.gov.mb.ca/conservation/wildlife/legislation/endangered act.html).

The Manitoba Critical Wildlife Habitat Program (CWHP) is a cost-shared program involving Manitoba Natural Resources (DNR), Nature Conservancy of Canada, the Manitoba Habitat Heritage Corporation (MHHC) and a variety of other agencies including Wildlife Habitat Canada, Manitoba Naturalists Society, World Wildlife Fund Canada, Environment Canada, City of Winnipeg, Ducks Unlimited Canada, and Manitoba's Conservation Districts. "The goal of the CWHP is to identify, preserve and manage the remaining critical wildlife habitats in Manitoba. The conservation of native

grasslands, the habitats of unique, rare and endangered species, the forested landscape and urban habitats are program priority areas" (Manitoba Critical Wildlife Habitat Program, 1999, found in: http://www.gatewest.net/~cwhp/intropara.html). Such programs are essential in protecting the cougar in Manitoba.

2.3.3 Cougar Attacks

"Of those attacks verified by biologists, many are made either by old, starving animals or by young cougars still learning to hunt. In one British Columbia study, most attacks were by juvenile cougars independent of their mothers but not yet proficient at catching prey" (Busch 1996). Public education should address the possibility and defense against cougar attacks in areas where a number of cougars have been sighted or suspected of inhabiting. A major step in cougar conservation is presenting the information gained by research on the animal to the public (Busch 1996). By knowing what provokes attacks, one has a better understanding of how to avoid them. Although cougar attacks on humans are rare, they do happen. According to the Mountain Lion Foundation, 13 people have been killed in cougar attacks in North America in the past 100 years (up to Year 1990). The "Latest U.S. and Canada Attack Numbers from E. Lee Fitzhugh, show 38 attacks with 7 fatal from 1991 to 2000" (Beier 1991). In Manitoba, V.W. Jackson, a zoologist at the University of Manitoba, wrote in the Winnipeg Tribune, February 14, 1942: "Twenty years ago (1922) a mountain lion attacked a boy and a girl at Birtle, Manitoba and killed one of the children. When shot it was found to be blind and half starved." A search for confirming information from long-time Birtle residents, however, revealed no knowledge of this incident" (Wrigley and Nero 1982).

The cougar feeds on smaller prey in between larger deer kills, but if prey is scarce, it may turn to easier catches such as livestock, pets, or humans. Conserving and managing habitat that will supply a satisfactory food supply for the cougar may help to discourage unwanted attacks (Busch 1996). Beier did a study on increased cougar attacks on Vancouver Island and discovered the absence of several prey species-opossum, rabbits, coyote, bobcat, badger, and skunks. "A lack of small prey may be especially critical for a yearling animal less proficient at taking deer, and may contribute to the increased attacks on humans on Vancouver Island" (Beier 1991).

"Cougar predation on humans is rare, and is contrary to the cat's nature…but there have been exceptions, and reports of cougar attacks on humans, in areas with large populations of both humans and cougars, have increased" (Busch 1996). Humans can help avoid a cougar attack, since cougars do not naturally attack humans, it is usually caused by a human coming too close to a cougar kill (deer or other such prey that it has no intention of sharing), protective female concerned over a human getting too close to her kittens (Busch 1996), a sick or old animal not able to catch its normal prey, female with lots of kittens to feed, or most likely by hungry, young cougars 12-23 months old which have been forced out of their home range by territorial cougar competition and shortage of habitat. "The low body mass of most yearling attackers suggests that this may be an important factor. The data suggest that yearling and underweight cougars were most likely to attack humans" (Beier 1991).

2.3.4 Management concerns

Cougar management involves:

- protecting cougar habitat
- ensuring genetic diversity by providing wildlife corridors to allow undisturbed movement of cougars from one habitat area to another
- monitoring cougar populations and their prey abundance to maintain healthy populations of both
- minimizing threats to people, property and other wildlife by removing troublesome cougars and enforcing hunting laws
- improving public awareness
- and conducting research

Selective hunting to remove troublesome cougars is a last-resort technique of managing cougars, otherwise hunting may upset the ecology of the species and its ecosystem, and can result even more attacks on humans and livestock. "The most effective means of controlling depredation are those aimed at eliminating individual depredating cougars" (Montana Department of Fish, Wildlife, and Parks 1995).

Human and livestock attacks are the direct result of human invasion into cougar habitat, either from taking up residence in their habitat, or driving them from it into less desirable locations. Land-use zoning and public education on safety precautions may help avoid attacks for those living in or visiting cougar occupied territory. Managers need to help protect undisturbed areas of suitable habitat where the cougar will be encouraged to stay in its own territory.

One method to ensure healthy genetic populations and the survival of the species is the preservation of wildlife corridors, which are essential in allowing the movement of cougars from one protected area to another. The public and conservation agencies also play an important role in leaving wooded areas to serve as corridors through their properties (Busch 1996).

Wildlife agencies are responsible for managing and protecting all fish and wildlife, including their habitat, however, protecting the public and preventing damage to private property are equally important priorities. A balanced approach must be taken to ensure good management for all concerned.

Chapter III: Methods

The chosen method for meeting the objectives in this thesis, is the Delphi Method. At the time of researching into the best possible methods of researching cougars in Manitoba, there was no physical evidence of a cougar kill since 1973. Due the cougar being a challenging animal to study, (Busch 1996), the Delphi Method was chosen as a way to generate information from experts from various regions of Canada and the United States. Other methods that were considered, such as field research, seemed to not work well with the type of cougar information in Manitoba that was available at that time. Many sightings could not be pin pointed on a map, therefore it was difficult to try to attempt a study involving mapping sightings using a special computer program for future analysis of the surrounding habitat. "In the original Delphi process, the key elements were (1) structuring of information flow, (2) feedback to the participants, and (3) anonymity for the participants. Clearly, these characteristics may offer distinct advantages over the conventional face-to-face conference as a communication tool" (RAND, Found March 2005 in http://www.rand.org/pardee/pubs/methodologies.html).

Snowball sampling was chosen as a method to find experts as participants. "This procedure is appropriate when the members of a special population are difficult to locate" (Babbie 2001). Since the experts chosen were from all over Canada and the United States, snowball sampling seemed appropriate. "In snowball sampling, the researcher collects data on the few members of the target population, then asks those individuals to provide the information needed to locate other members of that population whom they happen to know" (Babbie 2001). Well known agencies such as Fish and Wildlife

departments and cougar foundations were asked for recommended names for participants in the type of research that was being done.

3.0 Delphi Method – "The Delphi Method is based on a structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback" (Adler and Ziglio 1996). Experts who have knowledge in this particular area are asked to participate in this study. In the case of this research, *snowball sampling* was used to choose the experts for participation. "A non-probability sampling method often employed in field research whereby each person interviewed may be asked to suggest additional people for interviewing" (Babbie 2001).

The Delphi Method calls on the insights and experiences of a group of individuals to make decisions regarding the question asked. A series of questionnaires are designed and then sent to a group of experts. The method is very successful for a topic with strong differencing of opinions or a great level of uncertainty. Questionnaires were given to 9 experts from the United States and 11 from Canada, 5 of whom are Manitoba habitat experts. The results were assessed and then further questions were re-mailed out for further information.

Fowles describes the following ten steps for the Delphi method (Fowles 1978):

1. Formation of a team to undertake and monitor a Delphi on a given subject.
2. Selection of one or more panels to participate in the exercise. Customarily, the panelists are experts in the area to be investigated.
3. Development of the first round Delphi questionnaire
4. Testing the questionnaire for proper wording (e.g., ambiguities, vagueness)
5. Transmission of the first questionnaires to the panelists
6. Analysis of the first round responses
7. Preparation of the second round questionnaires (and possible testing)

8. Transmission of the second round questionnaires to the panelists
9. Analysis of the second round responses (Steps 7 to 9 are reiterated as long as desired or necessary to achieve stability in the results.)
10. Preparation of a report by the analysis team to present the conclusions of the exercise

Due to the fact that some experts will be more knowledgeable on cougars and others more knowledgeable on Manitoba habitat, the Delphi questionnaires were divided into two parts:

PART I: **Delphi Method using cougar experts** – Questions were given to cougar experts with 9 from the USA, and 6 from the rest of Canada, other than Manitoba. The results were assessed and further questions were re-mailed for further comment.

PART II: **Delphi Method using Manitoba Habitat Experts** – The same method was applied as described earlier, but some questions were more related to Manitoba habitat requirements for the cougar, as Manitoba experts were more knowledgeable on specific habitat requirements for cougars in this province. Five Manitoba experts received the surveys.

PART III: **Prairie Habitat Questionnaire** – A series of questions regarding cougar sightings in the prairies will be asked to experts from Prairie areas.

3.1- Background – "The Delphi method has been widely used to generate forecasts in technology, education, and other fields" (Cornish 1977). The main point of the Delphi method is to overcome the disadvantages of conventional committee actions where single experts sometimes influence other opinions and will follow the leader, or be reluctant to take back a previously stated opinion.

HISTORY: "The technology forecasting studies which eventually led to the development of the Delphi method started in 1944. At that time General Arnold asked Theodor von Karman to prepare a forecast of future technological capabilities that might

be of interest to the military" (Cornish, 1977). "Arnold got the Douglas Aircraft company to establish in 1946 a Project RAND (an acronym for Research and Development) to study the "broad subject of inter-continental warfare other then surface." In 1959 Helmer and fellow RAND researcher Rescher published a paper on "The Epistemology of the Inexact Sciences," which provide a philosophical base for forecasting" (Fowles 1978). "The paper argued that in fields that have not yet developed to the point of having scientific laws, the testimony of experts is permissible" (RAND, Found March 2005 in http://www.rand.org/pardee/pubs/methodologies.html). One of the very first applications of the Delphi method carried out at the RAND Corporation. "Its aim was to assess the direction of long-range trends, with special emphasis on science and technology, and their probable effects on society" (RAND, Found March 2005 in http://www.rand.org/pardee/pubs/methodologies.html).

3.2. The Delphi method Process- "The Delphi method is an exercise in group communication among a panel of geographically dispersed experts" (Adler and Ziglio, 1996). "It comprises a series of questionnaires sent either by mail or via computerized systems, to a pre-selected group of experts. These questionnaires are designed to elicit and develop individual responses to the problems posed and to enable the experts to refine their views as the group's work progresses in accordance with the assigned task. The main point behind the Delphi method is to overcome the disadvantages of conventional committee action" (RAND, Found March 2005 in http://www.rand.org/pardee/pubs/methodologies.html).

The process in this research involves a number of rounds:

Round number 1: -Preparation of the initial questionnaire and using the snowball technique to gather experts for participation in this study.

-Ten to 16 questions were be made with opportunities for respondents to add additional comments if they choose. The participants were asked to give a score on each statement in the questionnaire.

Round number 2: -The results given from round one were analyzed and the scores were summarized and included in the new questionnaire for the second round.

-A final review of the responses were prepared based on the response from round one.

-The participants were asked to restate their agreement with each statement, with the opportunity to change their score with the new information now provided.

-The new results were summarized and a degree of consensus will be looked for. A general consensus is the desired outcome.

-If no consensus is revealed, another round is completed to try to achieve a degree of consensus.

Summary: -The answers in all rounds were analyzed and summarized in a final report to be given to the participants after the thesis is complete.

-This took place in the form of a summarized document, which was also used in the summary of this research.

FLOWCHART FOR THE DELPHI METHOD

1. START

2. PROBLEM DEFINITION

3. SELECT PANEL MEMBERS BASED ON THE EXPERIENCE REQUIRED

4. PREPARE AND DISTRIBUTE QUESTIONNAIRES

5. ANALYZE QUESTIONNAIRE RESPONSES (back to #4 if required)

6. SEND REPORT TO PANEL A SECOND TIME – analyze second questionnaire

7. HAS A CONSENSUS BEEN REACHED??? Yes or No

3.2.1 Analyses and Assessment – "The outcome of a Delphi sequence is nothing but opinion. The results of the sequence are only as valid as the opinions of the experts who made up the panel. The panel viewpoint is summarized statistically rather than in terms of a majority vote" (RAND, Found March 2005 in http://www.rand.org/pardee/pubs/methodologies.html). The results will be put into graphs, to show the responses in graph format. This will be compared to the explanations that the participants gave, and summarized for a final assessment of the overall answer. The goal is to try to find a consensus with the second round surveys, from questions taken from the first round by looking at the graphs that the answers provided.

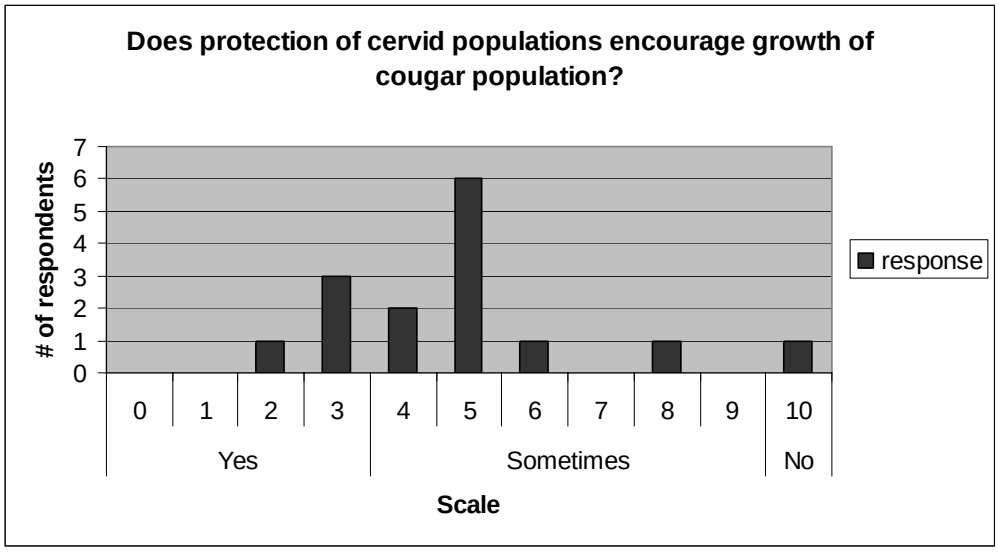


Figure 9a. Round one question: Will the protection of cervid populations encourage the growth of a cougar population?

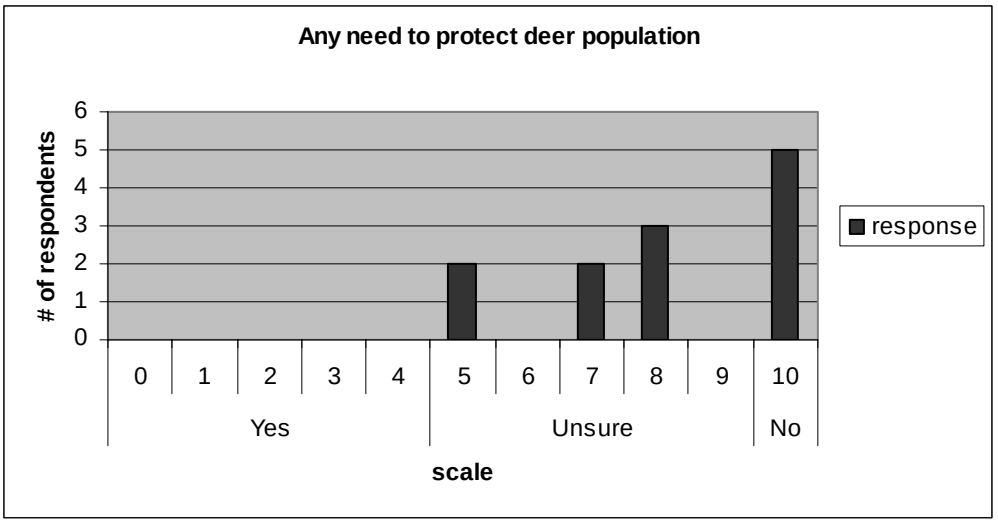


Figure 9b. Round two question: Do you think there is any need to further protect or increase the present deer population of 150,000 to encourage a higher cougar population?

Analysis of the second round involved looking for a consensus to agree with the idea of the Delphi Process.

3.3 Limitations – There are limitations in using the Delphi Method technique. No discussion takes place to help in achieving an agreement. There could be lack of consensus between the experts due to different professional histories and interpersonal differences. All experts should desirably have an equal amount of knowledge on the subject matter, but this may not be the case. In some circumstances, there is just not enough information to reach any kind of consensus.

The RAND Corporation lists major concerns about the Delphi method:

- Discounting the future: Future (and past) happenings are not as important as the current ones, therefore one may have a tendency to discount the future events.

- The simplification urge: Experts tend to judge the future of events in isolation from other developments. A holistic view of future events where change has had a pervasive influence cannot be visualized easily. At this point cross-impact analysis is of some help.
- Illusory expertise: some of the experts may be poor forecasters. The expert tends to be a specialist and thus views the forecast in a setting which is not the most appropriate one.
- Sloppy execution: there are many ways to do a poor job. Execution of the Delphi process may loose the required attention easily.
- Format bias: it should be recognized that the format of the questionnaire may be unsuitable to some potential societal participants.
- Manipulation of Delphi: The responses can be altered by the monitors in the hope of moving the next round responses in a desired direction." (RAND, Found March 2005 in http://www.rand.org/pardee/pubs/methodologies.html).

"In general, the Delphi method is useful in answering one, specific, single-dimension question. There is less support for its use to determine complex forecasts concerning multiple factors" (RAND, Found March 2005 in http://www.rand.org/pardee/pubs/methodologies.html).

3.4 - Prairie Habitat Survey Process- With the use of the *snowball technique* (as used in the Delphi Method), individuals were selected to answer 8 questions in regards to cougars in the prairie regions. The "Cougar Network" was contacted for individuals who would be best suited to answer cougar questions in the prairie areas. Since Manitoba has

a large prairie area, expert opinions on cougar existence in other prairie areas were considered. Individuals from the following states and province were contacted and asked to participate in this survey: Iowa, Illinois, Nebraska, Minnesota, Saskatchewan, North Dakota and South Dakota.

Chapter IV: Results

The results were put into graphs to show the responses in visual format. After analyzing the graphs, they were compared to the explanations that the participants gave, and finally summarized for a final assessment of the overall answer.

4.0 Non-Manitoba Cougar Expert Survey Summary (for graphs, see Appendix 3)

Why are there not more cougar sightings in Manitoba?

Manitoba has an approximate deer population of 150,000 which is believed by most experts to be a sufficient supply of prey to sustain a cougar population. However, diet is not the only issue that affects cougar existence in any area. Stalking cover, disease, high mortality and genetic factors all affect the cougar population. Most cougar experts believe that the main reason for few sightings is due to the elusive and secretive nature of the animal. Banff, Alberta has both a healthy deer and cougar population, but cougar sightings are rarely reported. Many people are not aware of cougar signs, such as tree scratchings and buried prey under leaves, etc., or of what cougars actually look like. Where the species is known to be present, cougars can be more readily studied with appropriate trained individuals, funding, equipment, etc., but in low-density areas such as Manitoba, the study of cougars is very challenging.

Any need to further protect the deer population in Manitoba

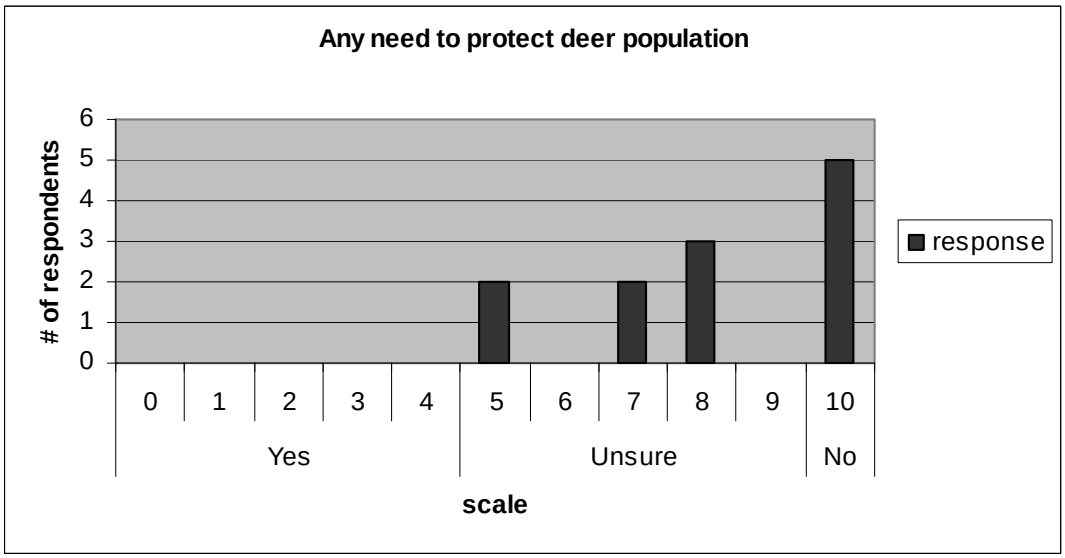


Figure 10. Do you think there is any need to further protect or increase the present deer population to encourage a higher cougar population?

Most experts agree that the deer population in Manitoba has little need of protection other than the current management now in existence *(Figure 10).* Humans are the main predator of deer in the majority of the province, with the exception of wolves in the remote central and eastern areas. Deer can be a nuisance without active management, so increasing their population could create problems and would not necessarily encourage a larger cougar population. Prey may not be the limiting factor. Experts believe a regular influx of breeding-age cougars from populations in adjacent jurisdictions may be missing in order to have a larger population here.

Aid in the growth of a cougar population

The majority of experts believe that the establishment and protection of corridors for movement of breeding individuals, and the creation of large wildlife sanctuaries are most critical for the survival of a cougar population in Manitoba.

Home ranges of cougars

Most experts believe that deer, not human existence is the most determining factor to a cougar in developing its home range. Although cougars choose to avoid humans in most cases, they seem able to exist in close proximity to high densities of people so long as they have sufficient prey. Cougars commonly share habitat with humans in California, Colorado, Alberta (Banff), British Columbia, Montana and other locations in North America.

Main factors in limiting cougar populations

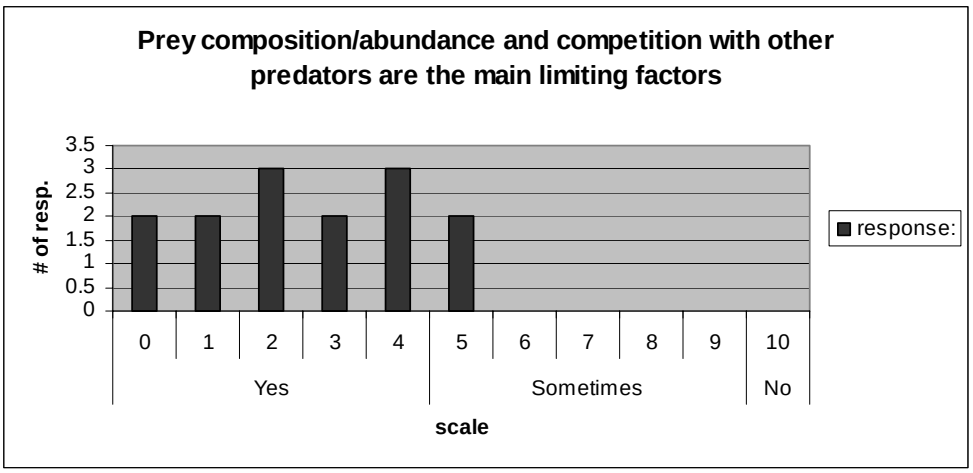


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Figure 11. Do you agree with the majority of respondents that prey composition, along with abundance and competition with other predators, are the main factors in limiting cougar populations in North America?

Although prey composition and abundance, and competition with other predators may be limiting factors, most experts believe competition to be the major factor, due to the fact that the cougar is such an adaptable carnivore. Cougars can adapt to various types or prey, terrain and climate. Competition with wolves may be a limiting factor in some areas, as they compete for the same prey, but humans are probably a more disruptive factor to the cougar than wildlife. General habitat quality such as available area, topography, denning and stalking cover, and nearby populations for breeding stock are thought to be more limiting factors than prey abundance and competition *(Figure 11).*

Most common habitat for cougars

Round 1	**Manitoba Experts**	**Non-Manitoba Experts**
	1. Deciduous-Coniferous Forest	1. Deciduous-Coniferous Forest
	2. Coniferous-forested areas	2. Coniferous-forested areas
	3. Any area	3. Aspen/semi-open aspen

Table 1. Comparison of experts on the top three chosen as preferred cougar habitat in Manitoba:

Deciduous-coniferous forest, coniferous forest, and aspen/semi-open aspen areas are probably the most desired habitats for cougars in Manitoba because coniferous trees provide better ambush opportunities over trees that lose their leaves in winter. Aspen parkland would provide good cover in summer months. Many experts feel that the cougar can adapt to living almost anywhere there is prey.

Determining factor if a resident cougar

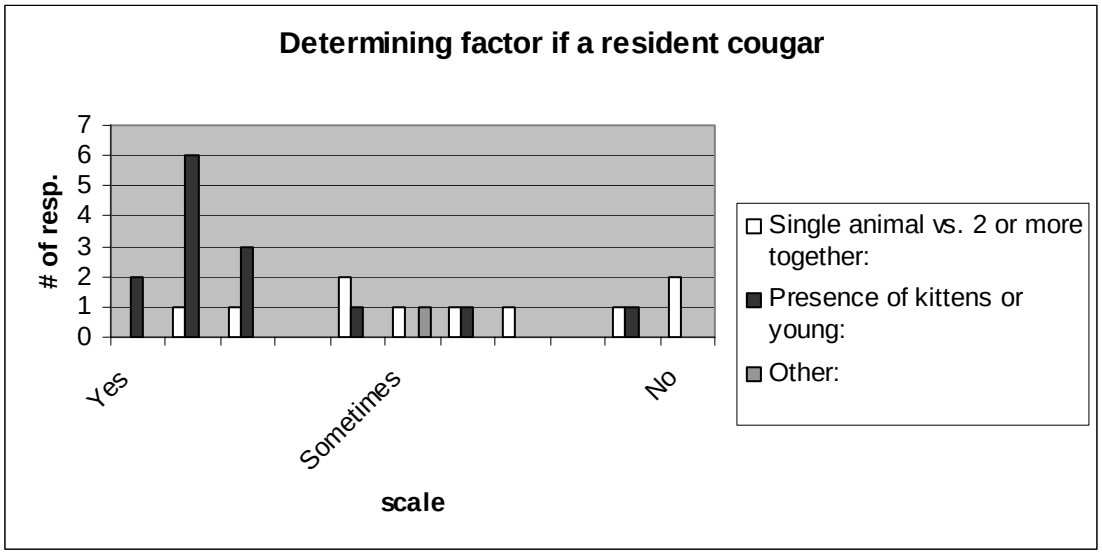


Figure 12. What factors do you believe would help determine if a cougar sighting was of a resident or a transient individual from another area?

A cougar sighting may represent a resident or a transient cougar. Most experts believe the presence of kittens is the most significant factor in demonstrating residency. Sighting two animals together may be a sign of a mating trait, whereby a female has likely become resident, but not all sightings of two animals together depict a pair. Some experts feel that if two animals are seen together, with persistent sightings in an area, this may be good evidence of a resident cougar. One accurate way of monitoring cougars would be the use of radio-collars or using DNA testing. "While local lore indicated cougars have been sighted in various Manitoba locations in recent years, few people report sightings, and physical evidence has been non-existent. So when two cougars were killed in Manitoba in 2004, Manitoba Conservation was able to gather real evidence about cougars in this province for the first time in 30 to 35 years" (Fowler 2005).

Are cougar sightings taken seriously?

Most experts are divided in opinion on whether the majority of cougar sightings is accurate. Experts feel most sightings are incorrect, sighting yellow labs and retrievers as cougars, etc. and so the authorities seldom take them seriously. Members of the public often do not report potential cougar sightings for fear of being criticized.

Public knowledge of cougar characteristics

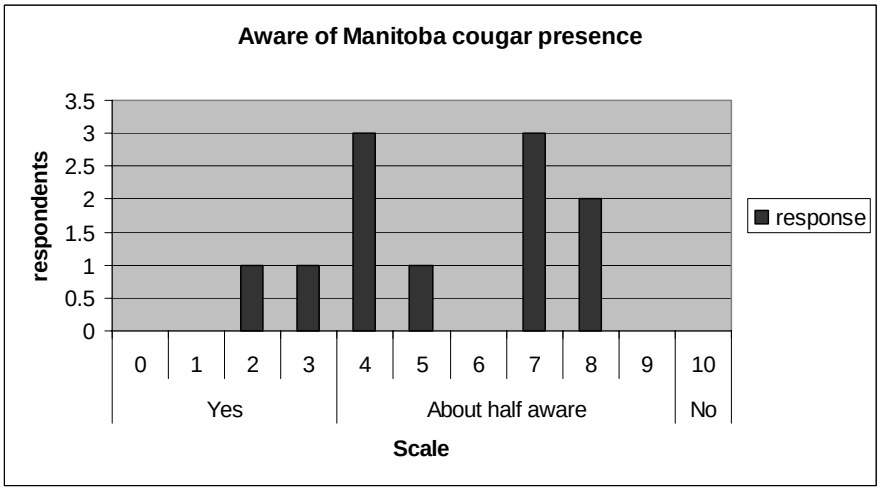
Most experts feel that even where cougars are abundant and there is an awareness of their presence, people are still misinformed or disinterested. Typically, areas that experience cougars promote safety and educate the public more than less densely cougar-populated areas.

Why some sightings are unreported?

Most experts believe that 50% of cougar sightings go unreported due of lack of knowing who to contact. Other close factors are taking the matter into their own hands (killing cougar without reporting, because they know it is illegal in Manitoba unless they are in danger, or unless they have permission by authorities for a kill). Others may feel the cougar is simply part of the ecosystem and ignore the sighting as natural. A few may have no interest so long as the sighting doesn't constitute a complaint.

Is the general public aware of the cougar's presence in Manitoba?

a) NON-MANITOBA (round one)



b) MANITOBA (round one)

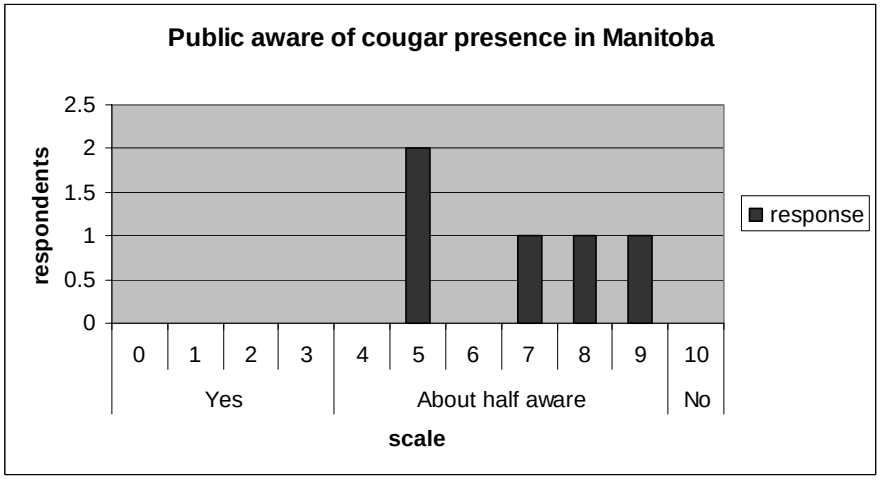


Figure 13. Comparison of Non-Manitoba and Manitoba experts on the whether the general public is aware of cougars in Manitoba

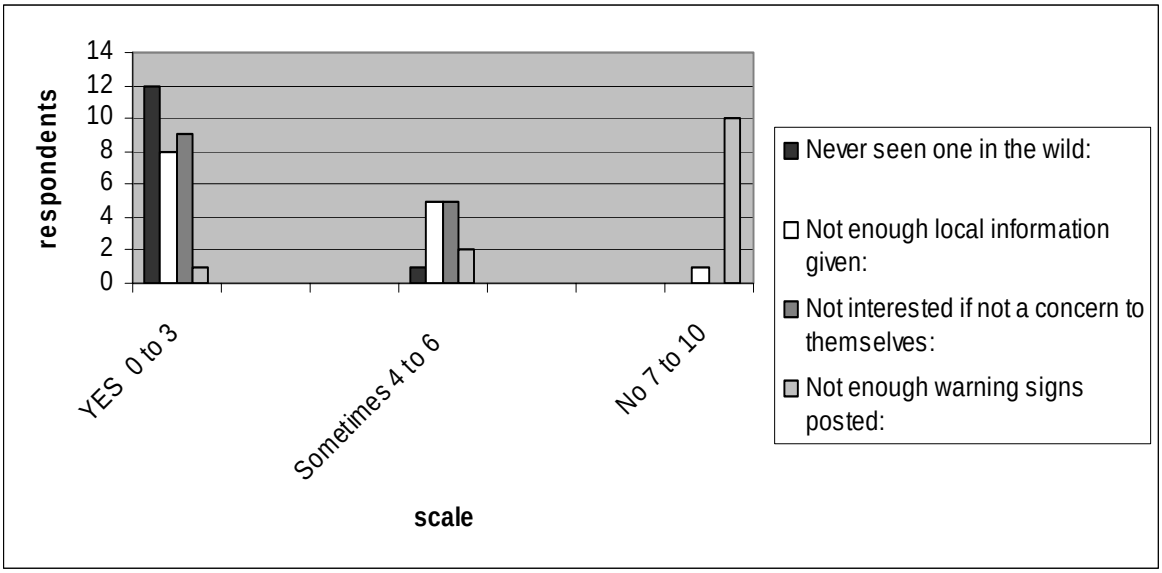


Figure 14. Why do you think that so many are not aware of the presence of cougars in our province?

Experts agree that many are not aware of the presence of cougars in Manitoba because insufficient local information is given. If a person has never seen a cougar in the wild, they don't believe the animals exist here *(Figure 14).* If the cougar does not bother them, people often have little concern or interest. Warning signs cause unnecessary alarm, so in order to have more people aware of cougar existence, developing interest is the key, not creating fear.

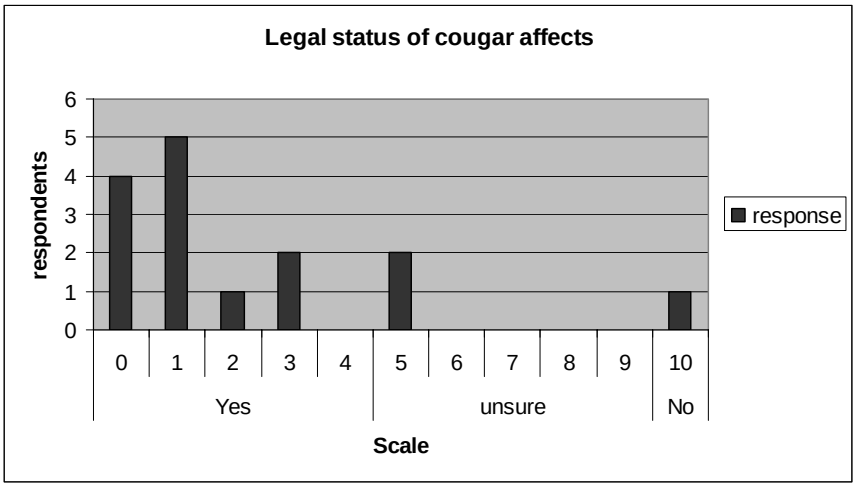
Protection of cougars in Manitoba (non-Manitoba expert opinions)

The majority of experts believed that the legal status of a cougar affects its protection measures. Although not all non-Manitoba experts were familiar with regulations that are available in Canada and in Manitoba, most thought the Federal SARA and National Recovery Plan would greatly protect a rare species under national law.

However, they felt a provincially managed plan was more necessary due to the great variation in regional cougar populations, the difference in hunting seasons between provinces, and the difference in status from province to province (cougars are a Protected Species in Manitoba). Cougar population estimates determine the management and protection plan needed.

-Comparison of Manitoba and Non-Manitoba Experts

a) NON-MANITOBA (round one)



b) MANITOBA (round one)

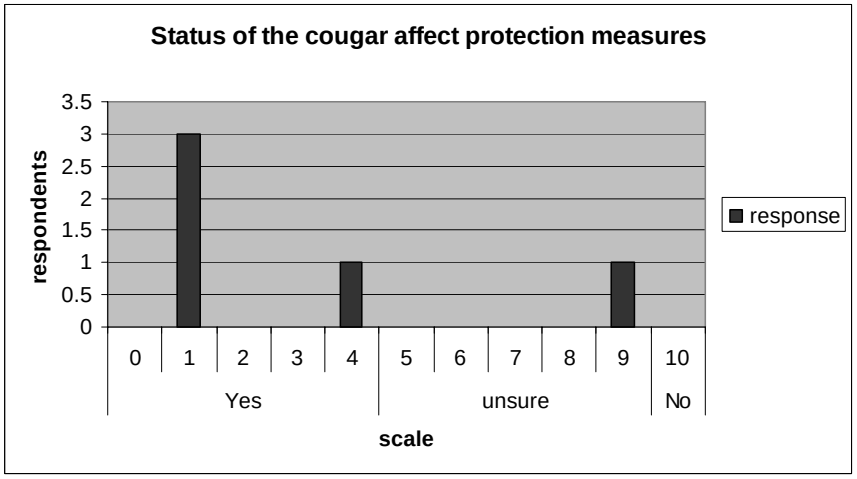


Figure 15. Does the legal status of cougar affect its protection measures:

4.1 Manitoba Habitat Expert Survey Summary

Factors affecting cougar populations in Manitoba

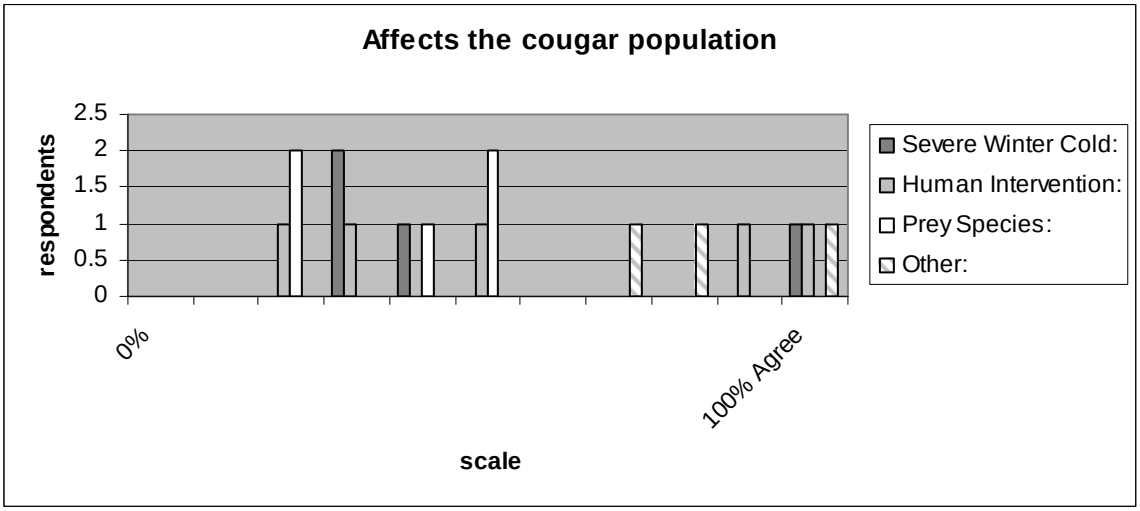


Figure 16. Do you agree that the following may affect a cougar population?
A. Severe winter cold
B. Human Intervention
C. Other Prey Species Abundant
D. Other

-55-

Severe winter cold, human intervention and prey species all significantly affect the cougar. *(Figure 16)* Experts feel that the presence of humans with sound, smell, disturbance, etc. seems to stress some cougars more than others. Most Manitoba experts think human intervention plays the largest part in limiting population, but others feel some cougars are known to adapt and live in close proximity to people, so human intervention is not the major cause of the low cougar population in Manitoba.

Some Manitoba experts feel other factors, such as food supply, play a large role in limiting the population. Other experts believe the length of Manitoba's winter (with

sometimes up to six months of snow cover), as well as the cold, wind, snow depth and crusting puts more stress on Manitoba cougars than those living in warmer climates or in the mountains where they can move up and down elevations to suitable conditions. Experts feel that animals cold and stressed at the northern limit of the range are also more likely to have a weaker immunity to disease and parasitism. Overall, experts agreed that the deep snow conditions and extreme cold dictate survival.

Other prey species killing cougar kittens was not thought to be a highly significant factor in limiting cougar population growth, since few animals would approach a protective mother cougar. However, some mentioned that wolves may be a danger to cougar kittens.

Corridors that cougars would use most often

Experts believe cougars would have sufficient undisturbed corridors in Manitoba to travel safely from one area to another. They feel the corridors most often used by the cougars would be ditches and smaller wooded areas between areas of forest lands such as parks, and sometimes wooded and hilly lands following river chains. Another possibility is shrubby fence rows or any other cover that gives the animal a sense of security.

Threats to suitable corridors

Threats to suitable corridors, such as the building of cottages along river and lake chains, the noise of snowmobiles, dirt bikes, the breaking up of fence lines and smaller woods, and the construction of roads across corridors are all considered by the experts to have a negative effect on cougar travel. They believe the greatest threat to corridors is the

breaking up of fence lines and smaller woods to create large fields for bigger machinery and irrigation.

Cougar diet in Manitoba

The majority felt there is an adequate food supply to sustain a cougar population across the southern third of Manitoba. The majority of responses suggested that deer are the main prey species of cougars in Manitoba.

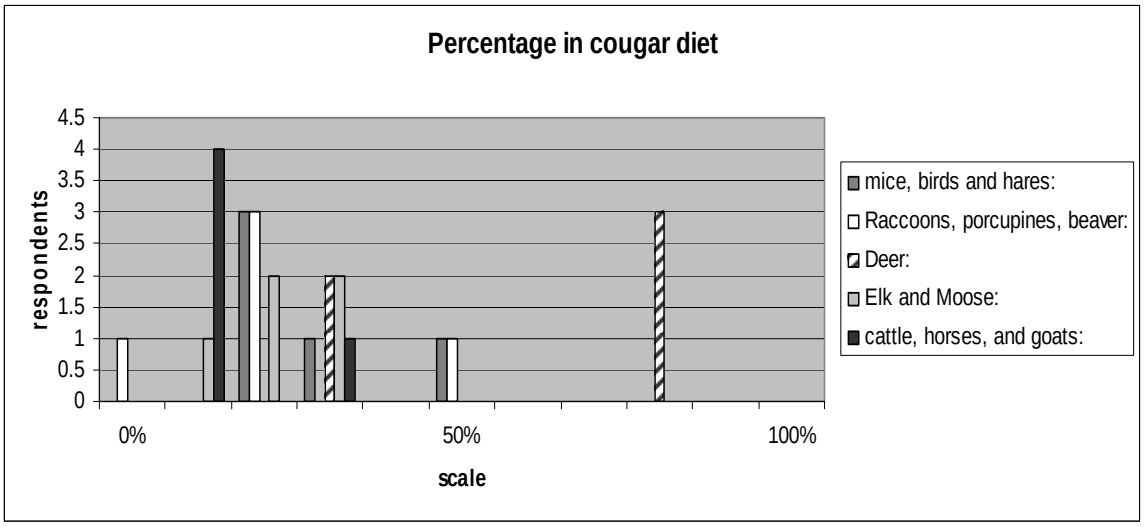


Figure 17. What percentage do you feel the following would make up in their usual diet?

The southern third of Manitoba appears to have a sufficient food supply for cougars. Most experts believe the greatest percentage of their diet would be made up of deer, followed by abundant prey items such as mice, birds and hare, and to a lesser degree, raccoons, porcupine, beaver, elk and moose. Livestock such as cattle, horses and goats are rarely included in their diet *(Figure 17).*

Reasons for habitat selection

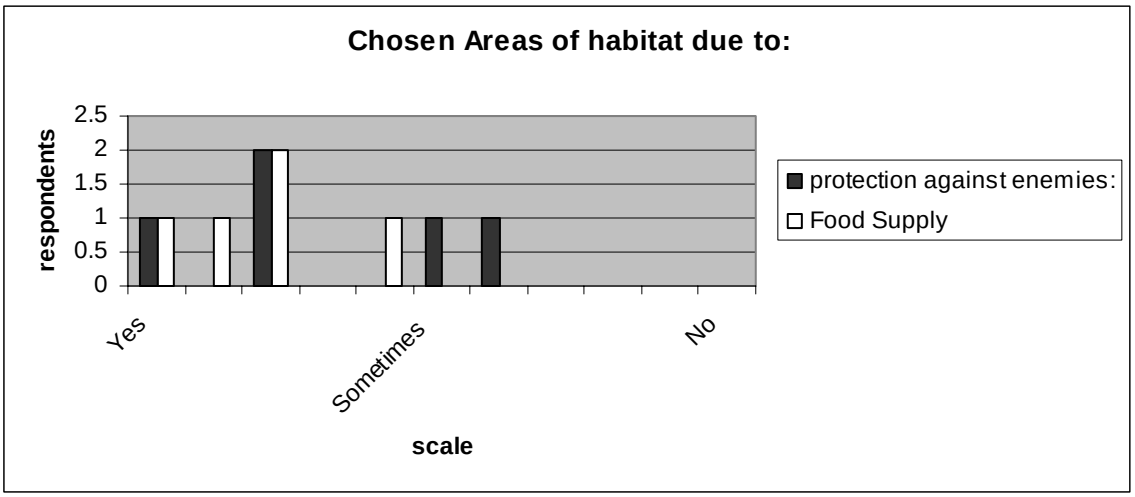


Figure 18. Experts believed the most preferred habitats in Manitoba for cougars were coniferous forest, deciduous-coniferous forest, and mountainous (hilly) areas.

a) Do you feel cougars chose these areas in Manitoba because of?

A: BLACK: their secluded coverage for protection against enemies
B: WHITE: food supply (which also uses forested areas as coverage).

The most preferred habitats in Manitoba for cougar are coniferous forest, deciduous-coniferous forest and hilly areas. Experts were divided between whether the cougars chose these areas for protection against enemies or for food supply, as both are equally critical for cougar survival *(Figure 18).*

Adaptability of the cougar

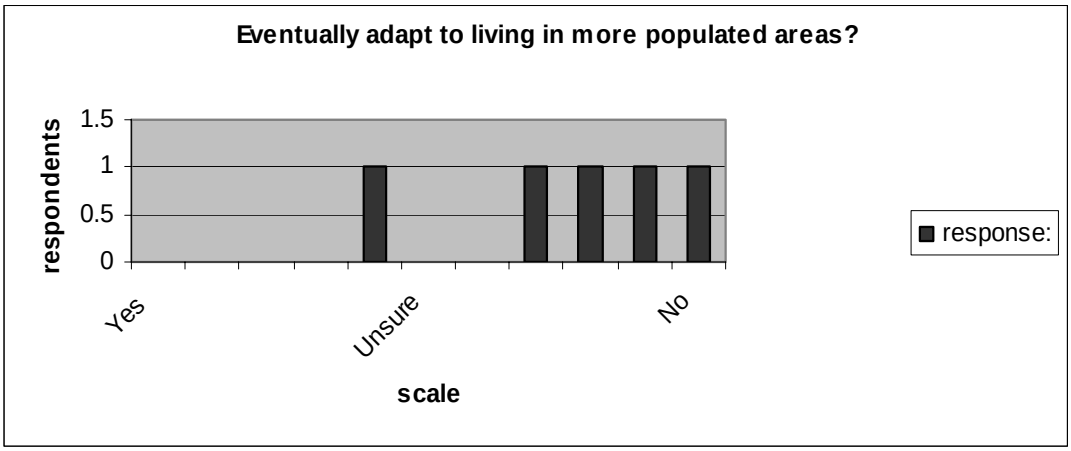


Figure 19. Cougars are known to have lived in many different habitats across North America from deserts and swamps to mountains and prairies. Since the cougar is highly adaptable, do you feel they will eventually adapt to living in more populated areas if secluded areas and food supply are limited?

Although the cougar is highly adaptable to different habitats from deserts and swamps to mountains and prairies, most experts agree that the cougar will not completely adapt to living in populated areas if secluded areas and food supply diminish. Cougars are dominant but nervous predators that rely on selected habitats for their solitary lifestyle. They are not sociable even with their own kind except for mating season. Some may adapt to living near populated areas, but their natural instinct is to seek solitude as much as possible *(Figure 19).*

Factors determining if a resident cougar population

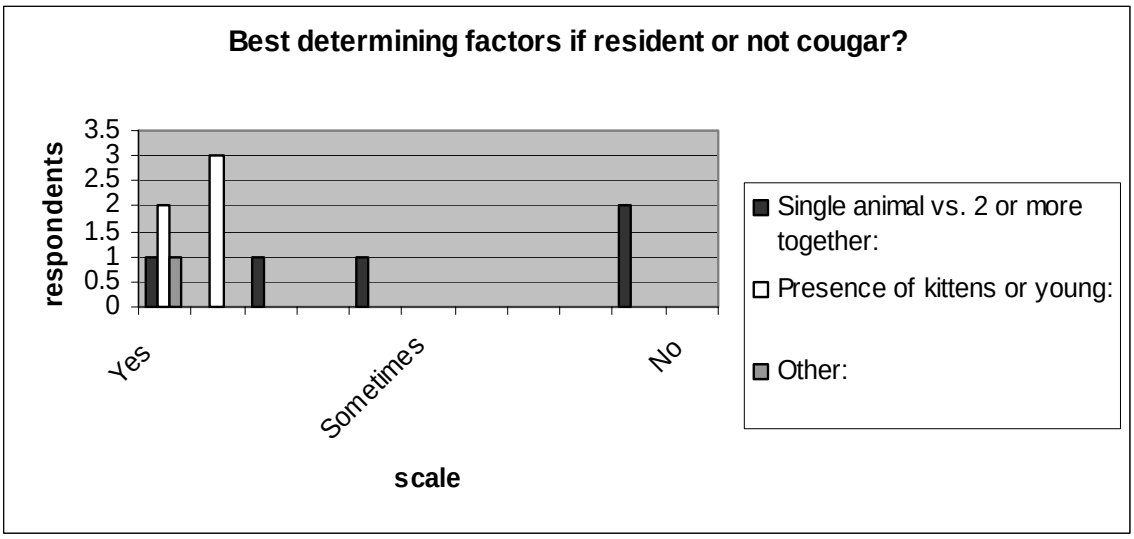


Figure 20. What factors do you believe best determine whether cougar sightings in Manitoba represent resident animals or transient cougars from other regions?

Manitoba experts believe the presence of kittens or young best determine that cougar sightings in Manitoba represent resident animals. Two or more animals sighted together and frequent sightings in an area over many years also suggests that cougars are resident, not just passing through the province, according to experts *(Figure 20).*

Round 2	**Manitoba Experts**	**Non-Manitoba Experts**
First choice:	1. Presence of kittens or young	1. Presence of kittens or young
	2. Single animal vs. 2 or more together	2. Single animal vs. 2 or more together
	3. Other	3. Other

Table 2: Comparison of Manitoba and Non-Manitoba Experts: Best determining factors if a resident cougar or not:

Are kittens an indicator of a resident population

Many cougar sightings are considered false and half the expert responses believed kitten sightings were in error, while the other experts believed kitten sightings to be very

accurate, because cougar kittens are so distinctive compared to other cats. Kittens are also most likely to be accompanied by their mother, so the sighting of both adult cougar and kitten makes for a reliable judgment.

Other methods of determining if a cougar population is present

The majority of Manitoba experts believe that 70% of cougar sightings are accurate. As sightings alone can not be determined as scientific fact that cougars exist, a DNA sample kit (objects attached to trees with inviting scent which attracts cougar to rub and leave hair) is one method of retrieving such fact. Manitoba experts rated the use of a DNA kit to be excellent if DNA is found because they are a very accurate and foolproof method. However, in Manitoba where cougars are few, DNA would be difficult to obtain.

Collecting DNA samples for determining cougar presence

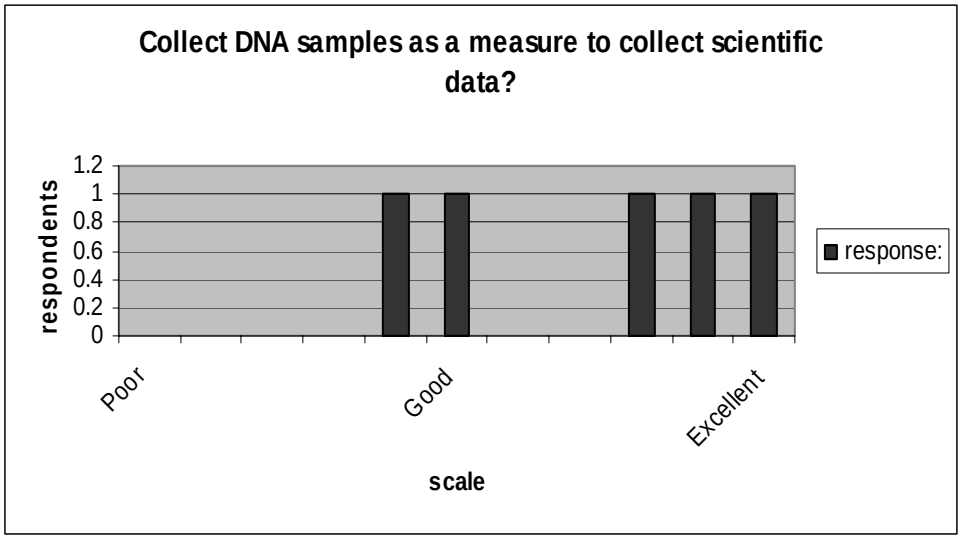


Figure 21. As sightings alone can not be determined as scientific fact that cougars are present, how do you rate the following method of collecting DNA samples from the vicinity of a suspected cougar livestock kill?

Experts believe collecting DNA hair samples from the vicinity where a suspected cougar kill has taken place would be an excellent method of confirmation, as cougar hair or other evidence would be more readily available at a kill site *(Figure 21).*

Important factors in limiting cougar populations in Manitoba

Most experts agree that snow depth and type in conjunction with long winter months have significant effects on cougar survival. In some areas of its northern range, snow depth and type would not be a problem, (i.e., in the mountains, cougars can descend to lower, snow-free areas) but even average snow depth and type can create hardship if extended up to six months, as in Manitoba. Cougars are known to avoid deep snow, and having to walk/jump/hunt through deep snow for many months in Manitoba's long and severe winters create extreme hardship.

Protection most effective (according to Manitoba habitat experts)

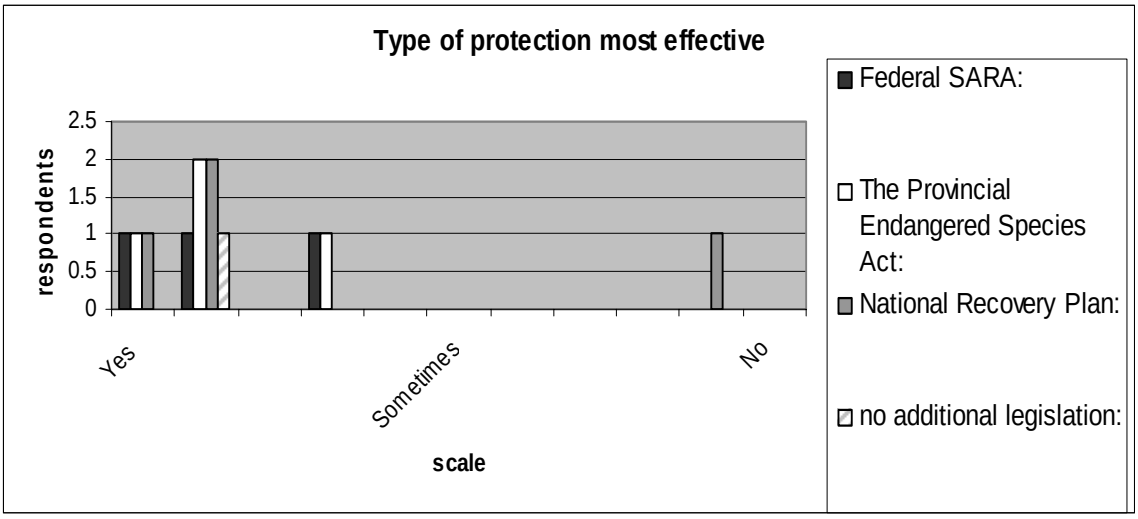


Figure 22. The majority of respondents thought that yes, the legal status of a cougar affects its protection measures. What type of protection would be most effective?

The legal status of a cougar affects its protection measures, and Manitoba experts believe the Federal SARA, Provincial Endangered Species Act, and National Recovery Plan are all highly effective and sufficient enough for offering legal protection. They feel that no additional legislation is needed, as it will take mainly interest, voluntary support by landowners wherever cougars are sighted or found, and other current programs, such as the Ecological Reserves which set aside large parcels of land and offer undisturbed, quality habitat in order to greater protect the cougar in Manitoba *(Figure 22).*

*The most common response among the **Manitoba** experts were, "Yes", the most effective protection measure would be: The provincial Endangered Species Act and National Recovery Plan*

*The most common responses among the **Non-Manitoba** experts were that "sometimes", the most effective protection choice would be the: Federal SARA and National Recovery Plan*

Figure 23. Comparison of Manitoba and Non-Manitoba Experts opinions.

4.2 Prairie Habitat Questionnaire responses –

Since Manitoba has a large prairie area, and this research was looking into whether Manitoba could support a resident cougar population, expert opinions on cougar existence in other prairie areas were considered.

The Department of Natural Resources in the State of Iowa made note that their state was not a good State to do research on cougars as they are not native to their area and the population is extremely low. When contacting Manitoba Conservation, one member felt that they simply did not have enough information on cougars in Manitoba to even attempt to answer the questions asked. Surveys received were from Nebraska, Saskatchewan, Minnesota, Oklahoma, Illinois, North Dakota and finally, South Dakota.

The results of the answers from the following states and province:

Cougar habitat in your area:

Nebraska	**Saskatchewan**	**Minnesota**
-most habitats -commonly near pine or riparian forests.	-anywhere there are deer -from downtown To boreal forests	-we have not verified breeders in the wild in any habitat

South Dakota	**North Dakota**	**Illinois**
-nothing is known of cougar habitat in the prairies of SD -likely move through the regions along rivers and streams.	-no official studies done -assumption of a small population in the western badlands of North Dakota.	-some habitat in the southern states where protected by the Shawnee National Forest.

Oklahoma

-Cougars are primarily found in the western half of Oklahoma where the habitat consists of mixed and short-grass plains interspersed with shrub/timber along drainages.

Table 3. Cougar habitat in your jurisdiction, particularly in prairie/agricultural areas.

Cougars found in your state/province:

Nebraska	**Saskatchewan**	**Minnesota**
-almost all confirmations have occurred near forests or rivers.	-the majority of observations are found in the prairie eco-region.	-occurrences suggest that prairie and grassland matrixes with wooded Lowland or floodplain inclusions are good habitat.
South Dakota	**North Dakota**	**Illinois**
-so far, only sub-adult cougars have been found in prairies or grasslands in South Dakota.	-few sighting every year -verified sightings rare -7 confirmed sightings in 2004.	-1 documented/1 possible -neither were in prairies
Oklahoma -both		

Table 4. Are cougars found in prairie or grasslands areas in your state/province?

Prey species in your area:

Nebraska	**Saskatchewan**	**Minnesota**
-white-tailed deer, mule deer, jack and cottontail rabbits, porcupine, and raccoon.	-most common deer	-white-tailed deer most common with rabbits and hares and wild turkeys frequent prey as well.
South Dakota	**North Dakota**	**Illinois**
-we did necropsy one cougar that was killed within city limits of Yankton, SD. That Individual had consumed mustelids.	-deer, porcupines, porcupine, rabbits, small mammals, potentially livestock and pets.	-white-tailed deer
Oklahoma -White-tailed deer		

Table 5. The types of prey species are common and likely taken by cougars in your area:

Domestic livestock as prey?

Nebraska	Saskatchewan	Minnesota
- non confirmed	-no not common	-not a problem
South Dakota	**North Dakota**	**Illinois**
-there have been, but none confirmed	-very rarely confirmed	-no
Oklahoma		
-None recorded		

Table 6. Is domestic livestock commonly taken as prey by cougars?

Types of habitat cougars occupy in your area:

Nebraska	Saskatchewan	Minnesota
-no answer	-river valleys and coulees. Have been seen in farm fields and forests across Saskatchewan, one record of one denning under the corner of a barn. -only limited by deer distributions.	-anywhere, but near deer and deer may require some forested areas.
South Dakota	**North Dakota**	**Illinois**
-nothing extra to add	-rough topography, canyons, draws and ridges.	-n/a
Oklahoma		
-Oklahoma has so few confirmed sightings that it would be hard to characterize the type of habitats they occupy. The majority of the sightings are road-killed animals which have been in the panhandle counties, which consists of short-grass prairie.		

Table 7. The specific type of prairie or grassland habitats that cougar occupy:

Factors controlling cougar populations:

Nebraska	Saskatchewan	Minnesota
-only one confirmed female and she was killed by a hunter, so	-deer populations and human presence.	-not applicable

the animals in Nebraska do not seem to be a balanced ratio of male and females.		
South Dakota	**North Dakota**	**Illinois**
-we do not have resident cougars in grasslands or prairie habitats to our knowledge.	-public sentiment, legislation, and and research findings.	-no large parcels of prairie or grassland habitat remain in state, therefore vehicles
Oklahoma		
-unknown		

Table 8. The factors that are most important in controlling cougar populations in prairie or grasslands:

Wolves and cougar populations:

Nebraska	**Saskatchewan**	**Minnesota**
-No wolves here.	-no wolves do not affect cougar populations in prairie habitat. Coyotes may be a factor, but again, no evidence.	-wolves here restricted to forested areas in the north, so little interaction in the prairies. May be, but no evidence.
South Dakota	**North Dakota**	**Illinois**
-little is known on this subject.	-no, wolves are very rare	-n/a
Oklahoma		
-no wolves here		

Table 9. Do wolves affect cougar populations, and how so, in prairie or grassland areas?

If wolves are present, the significance on cougars:

Nebraska	**Saskatchewan**	**Minnesota**
-no answer	-perhaps in the forest portion of the cougar range. Wolves have largely been excluded from prairie habitat.	-some evidence that wolves can kill cougars, but cougars can climb trees, wolves can't. -no data to predict, enough prey for both.
South Dakota	**North Dakota**	**Illinois**
-little known	-no, wolves very rare	-n/a

Oklahoma
-n/a

Table 10. If wolves are present, do they have a significant effect on cougars, such as predation and competition for prey?

Reasons for cougar population change, if any:

Nebraska	**Saskatchewan**	**Minnesota**
-may have increased, but not confirmed a breeding population in the state.	-we don't know. -suspect slowly on the rise. -no evidence yet.	-if increasing, likely because of dispersal from established western populations. High deer populations in the east may also be keeping some of those dispersers here.
South Dakota	**North Dakota**	**Illinois**
-some sub-adult cougars moving through this region likely from the Back Hills, but this has not been verified yet.	-believed to be increasing -dispersal of lions of other states	-increasing. -young males dispersing.

Oklahoma
-increasing. Emigration from border states to the west.

Table 11. Are cougars increasing or decreasing in your area, and what do you think are the reasons for the change?

Natural corridors:

Nebraska	**Saskatchewan**	**Minnesota**
- The Niobrara and Platte rivers are excellent wooded corridors across the state, they provided cover and high deer densities. Much of the surrounding land is open grass or farmland.	-unknown	-cougar's can probably disperse across quite open landscapes, it is likely that river valleys are important dispersal corridors through intensively farmed areas, but little data.
South Dakota	**North Dakota**	**Illinois**
-not sure	-the badlands offer corridors	-along major rivers

-riparian corridors

Oklahoma

-natural corridors such as river systems play an important role in the expansion of the cougar range.

Table 12. The importance of natural corridors in your state in allowing cougars to move to new locations across large expanses of open farmland or prairie areas:

4.3 Results chart - According to expert opinions, Manitoba has what is required to support a resident cougar population, although many felt that more information needs to be found before confirming such a claim. Opinions from Non-Manitoba, Manitoba, and Prairie Experts were summarized as below:

Prey Supply in Manitoba

- Experts agree that with approximately 150,000 deer in Manitoba, the province has sufficient prey to support a cougar population. Deer, the main diet choice of cougar, are plentiful in many areas of Manitoba, as well as an ample supply of secondary diet choices, which consist of mice, birds, hare, and other smaller animals such as raccoons, porcupine and beaver. To a lesser degree, there is also elk and moose available in some areas.
- Both expert groups agree that available prey is not the reason for low cougar population in the province, so no change in prey policies was recommended. Hunting regulations for animals such as the deer keep the animal in check, and still provide enough prey for the cougar's needs in most areas in the province.

Corridors in Manitoba

- Corridors are most important for the safe passing of cougars from one area to another in order to bring in new genes for breeding. It is recommended that large parcels of undisturbed land be set aside for the use of wildlife such as the cougar, and that maintaining corridors be encouraged with land owners.

- Both Prairie and Non-prairie experts felt that corridors for cougars would be important in Manitoba.

Limiting Factors in Manitoba

- Experts felt that our harsh Manitoba winters, which can sometimes last up to six months with deep snow coverage and extreme cold temperatures, could greatly limit cougar survival. Cougars are stressed for a longer period of time in Manitoba than cougars living in warmer climates or where they can move up and down elevations to find suitable living conditions. Cougars avoid deep snow, and having to walk/jump/hunt in deep snow for many months can greatly affect their survival, especially for the very young and the very old animals. As one cannot change the climate, providing suitable habitat is the best recommendation for helping the cougar to survive Manitoba winters.

Presence of kittens (sightings)

- Experts believe that the presence of kittens is the most determining factor in determining resident versus migrating cougars. Repeated sightings in an area may signify a cougar taking up resident, and two cougars together may mean possible mating, as cougars are solitary creatures other than at mating time. However, young siblings often travel together.

Suitable Habitat in Manitoba

- Experts feel that only areas in Manitoba that are capable of providing breeding habitat and habitat suitable for raising young should be considered probable, year-round cougar habitat. Less favorable habitats, such as prairie grasslands, would probably be used more for travel. Greater protection of suitable breeding habitat in Manitoba is recommended with the setting aside of large parcels of protected land.
- Prairie experts feel that the cougar could live almost anywhere, as long as there was sufficient prey supply present, including prairie grasslands.
- Experts agree that suitable land for cougars in Manitoba would be coniferous and mixed forest with a good topography with cliffs, ravines, etc. to allow for their hunting skills. Suitable habitat is necessary, not only for hunting, but for protection from the environment and enemies, and for the successful raising of kittens.
- With adequate coniferous and mixed forest and a variety of terrain, the cougar has been able to take up residence in Manitoba. The two specimens killed in 2004 were from relatively the same range near the Riding Mountain National Park. Their good condition showed that they had ample prey supply. Sightings in other areas of the province suggest a wide population distribution, as well.

Sightings *(along with the many credible sightings in Manitoba and 3 confirmed kills)*
■ Many cougar sightings are reported each year with a large number being false sightings. While the majority of experts feel sightings are taken seriously by authorities, some feel reports are not taken seriously enough due to so many false sightings. With more cougar sightings taken seriously in Manitoba and looked at in depth, many feel that we have what it takes to support the cougar. ■ The majority of experts feel 50% of cougar sightings in Manitoba go unreported. Cougar experts also feel most people can not accurately describe a cougar, and have a general lack of knowledge with regards to other wildlife as well, so many false sightings occur. Experts recommend that the public be made more aware of cougar existence in Manitoba by arousing their interest in the cougar, not by creating fear. Public information using educational tools and campaigning for cooperation in protecting corridors and other habitat is recommended.
Status
▪ The cougar in Manitoba is classified as a Species of Special Concern, and is protected under the 1974 Manitoba Wildlife Act, but it does not have status under the Endangered Species Act. The Wildlife Act protects the cougar in Manitoba against hunting, trapping, taking, killing or capturing except permitted by this Act or the regulations. A recommended proposal by the Manitoba Endangered Species Advisory Committee in 1992 was made to change the cougar in Manitoba to Vulnerable, which could be considered endangered or threatened if factors affecting it do not improve. This designation was not acted upon and it is recommended that more attention be brought to this matter, as the status of a species affects its priority for protection.

Table 13. Expert opinions on whether Manitoba can support a resident cougar population.

Main Points in Summary:

1. Experts agree that there is a cougar population in Manitoba, (i.e., nothing to prevent immigration and emigration from other areas);

2. Major blocks of wild landscape exist, often with reasonable corridors for cougar movement; and

3. Experts feel that Manitoba has an abundance of prey species available throughout most of the year, with the exception of deep winter when all large animal species are stressed metabolically. Cold stress may be the ultimate limiting factor controlling Manitoba's cougar population, as the energy budget is critical in long winter periods.

Chapter V: Discussion and Conclusion

5.0 Discussion and Conclusions-

Discussion:

There are contrasting views on whether Manitoba has a resident or a migrating cougar population. Many experts believe Manitoba has sufficient prey and suitable habitat to support a resident cougar population. Many reported cougar sightings have been documented over the years, with clustered sightings in an area over a period of time and the sighting of females with kittens, usually meaning a probable sign of cougars taking up residency. One scientist, Bob Wrigley, who has been studying ecology in Manitoba for over 35 years, feels that "there is no doubt in my mind that with all the evidence accumulated over 100 years, there has always been a resident population of cougars in the province" (R. Wrigley, Assiniboine Park Zoo, Winnipeg, April 2005, personal communication).

Other experts feel that cougars in Manitoba may be migrating animals from south of the border. Some experts feel it may be these animals that are migrating north, including parts of Manitoba in their range or territory.

According to Cougar Network Co-Founder Mark Dowling, “The Network has been conducting comprehensive research on cougar distribution in North America for three years. During this time, it has documented dozens of cases of confirmed cougar presence far to the east of the species' recognized range” (The Cougar Network 2005, found in: http://www.cougarnet.org).

One purpose of this research was to determine whether Manitoba could support a cougar population, and if so, then why is there not a larger amount of reported sightings?

Experts determined that Manitoba can indeed support a population, so the reasons for the lack of a large population need further discussing. Climate, human intervention, protection laws and many other factors affect the survival of the cougar.

Determining the cougar population size in Manitoba and their specific ranges is important for both human and cougar safety and management. Discussion on how to encourage the reporting of all sightings is needed. Experts think many people feel their reports are not taken seriously. Many people report sightings with little or no feedback, so are left wondering if their sighting was taken seriously or not. Many wonder what procedures are taken by authorities after a sighting is reported. Is there a better way to encourage the reporting of sightings, and encourage more public interest and awareness of a possible cougar in their area?

Conclusions:

There have been hundreds of reported cougar sightings in Manitoba over the years. With the kill in 1973 and two others in 2004, plus hundreds of sightings all over the southern half of the province, it is evident that cougars have been resident here for a long time. Because law prohibits cougar hunting, and therefore no harvested pelts are available for count or examination, and because the cougar is such an elusive species, collecting scientific data is difficult. The Delphi method was used to determine if Manitoba can support a resident cougar population and what measures can be taken to protect the cougar population regarding laws.

Experts from Manitoba and experts from USA, Alberta and British Columbia, both agree that prey supply is crucial to cougar survival. They also agree that with

approximately 150,000 deer in Manitoba, the province has more than adequate prey to support a cougar population. Hunting regulations and weather conditions keep deer numbers in check, and still provide enough prey for the cougar's needs in most areas in the province. Deer, the main diet choice of cougar, are plentiful in many areas of Manitoba, as well as an ample supply of secondary diet choices, which consist of mice, birds, hare, and other smaller animals such as raccoons, skunks, porcupine and beaver. To a lesser degree, there are also elk and moose available in some areas. Both expert groups agree that available prey is not the reason for a low cougar population in the province.

Experts feel that most cougars will never adapt to living in heavily human populated areas due to their preference for a life of solitude. Human intervention in areas such as destroying and disturbing corridors greatly affect the cougar from taking up residence or using the corridors. Corridors are most important for the safe passing of cougars from one area to another in order to bring in new genes by breeding. They also give better protection to the public by encouraging the cougar to use such corridors, away from human habitation. Because such large blocks of suitable habitat are not possible in many areas, wildlife corridors are needed to allow animal passage between smaller territories (Busch 1996). It is also recommended by some experts that large parcels of undisturbed land be set aside for the use of wildlife such as the cougar, although many find that this is not a realistic option. The Natural Parks Protected Areas help, but additional protection is needed, especially since many cougar sightings are not found in these areas. It may be of benefit to promote more protected areas for all ecosystems and species, not just the cougar. “Cougar are not real fussy about type of habitat but they need lots of it, and well connected” (Beier 1994).

Experts felt that Manitoba's harsh winters, which usually last up to six months with deep snow and extremely cold temperatures, could greatly limit cougar survival. Cougars are stressed for a longer period of time in Manitoba than cougars living in warmer climates or where they can move up and down elevations to find suitable living conditions. Cougars must use considerable energy resources to travel in deep or crusted snow, and having to continue this high metabolic level for many months can greatly affect their survival, especially for young and old animals. Providing suitable habitat is the best recommendation for helping the cougar to survive Manitoba winters. The cougar has adapted to deserts, brush land, tropical rain forests, and deciduous and coniferous forests, as it is one of the world's most adaptable mammals (Wrigley 1986).

Experts believe that the presence of kittens is the most reliable factor in determining resident versus transient cougars. Repeated sightings in an area may signify a cougar taking up resident, and two cougars together may mean possible mating, as cougars are solitary creatures other than at mating time or a mother with young. Also young siblings often travel together. Experts believe that only areas in Manitoba that are capable of providing habitat for breeding and raising young should be considered probable year-round cougar habitat. Greater protection of suitable breeding habitat in Manitoba is recommended by experts.

Many cougar sightings are reported each year, with some no doubt being unreliable. While the majority of experts feel sightings are taken seriously by authorities, a few feel reports are not taken seriously enough due to so many false sightings. Humans who live in densely populated cougar territory are more aware of cougar presence, therefore report less false sightings. The majority of experts feel 50% of cougar sightings

in Manitoba go unreported. Cougar experts also feel most people can not accurately describe a cougar, and have a general lack of knowledge with regards to other wildlife as well, so many false sightings occur. Experts recommend that the public be made more aware of cougar existence in Manitoba by arousing their interest in the species, not by creating fear. Public information using educational tools and campaigning for cooperation in protecting corridors and other habitat is recommended. More information on websites and public education pamphlets are a few ways that more cougar knowledge can be made to the public. Public education should address the possibility and defense against cougar attacks in areas where a number of cougars have been sighted or suspected of inhabiting. A major step in cougar conservation is presenting the information gained by research on the animal to the public (Busch 1996). By knowing what provokes attacks, one has a better understanding of how to avoid them.

Although many non-Manitoba experts are not familiar with what regulations are in place in Manitoba, much of the panel thinks the cougar would be protected legally in Manitoba under the different categories, such as the Federal SARA, National Recovery Plan and Provincial Endangered Species Act. Habitat and prey availability, hunting laws, etc. vary from province to province, so provincially managed plans and support by land owners play important roles in protecting the cougar.

The cougar in Manitoba is classified as a Species of Special Concern, and is protected under the 1974 Manitoba Wildlife Act, but it does not have status under the Endangered Species Act. The Wildlife Act protects the cougar in Manitoba against hunting, trapping, taking, killing or capturing except permitted by this Act or the regulations. In 1992 the Manitoba Endangered Species Advisory Committee

recommended a status of Vulnerable, which could be considered endangered or threatened if factors affecting it do not improve. This designation was not acted upon and it is recommended that more attention be brought to this matter, as the status of a species affects its priority for protection.

According to one expert from Manitoba Conservation, "according to COSEWIC, the qualitative criteria used for determining if a species is threatened or endangered is used. In the absence of range and population data, it is impossible to determine the status of a species. COSEWIC has a category, Data Deficient, which indicates if a lack of information is preventing them from assessing the status of a species or population. ESAC, the Endangered Species Advisory Committee in Manitoba uses the same criteria"(Personal communication, Manitoba Conservation Expert Opinion 2005). Although both sides offer valid opinions, some feel that the cougar should not be listed an endangered species, since we have no biological information and no definitive proof that we have a resident population. Although the cougar is listed as a protected species under the Wildlife Act in recognition of its rarity in Manitoba, this simply is not enough according to some experts. There can be no doubt that this rare animal requires better protection. Two scientists, Bob Wrigley and Robert Nero, have been studying the cougar in Manitoba. With effort, as Bob Nero had done, one could gather 50-100 sight records a year, a high percentage with details on the animals that would be hard to disqualify. Bob Wrigley believes there is no doubt in his mind that with all the evidence accumulated over 100 years, there has always been a resident cougar population of cougars in the province, he feels. So it seems that more research needs to be done to

prove to the committee members the importance of having the cougar listed as an endangered species, taking the Precautionary Principle into consideration as well.

The Eastern Cougar was listed in 1978 as Endangered by COSEWIC, but was reviewed in 1998 and downgraded to Data Deficient. Cougar are therefore not listed under the new Federal Species at Risk Act, even though the population is obviously critically endangered. Recent genetic work has determined that there may not be a valid eastern cougar sub-species, so COSEWIC has chosen to categorize eastern populations of cougar as data deficient until more information becomes available.

Experts agree that suitable land for cougars in Manitoba is coniferous and coniferous-deciduous mixed forest with a rugged topography of hills, cliffs, ravines, etc. to give greater success to the animal's hunting skills. In Manitoba, the cougar can be found from the boreal forest to the grasslands, concentrating in areas where prey is abundant (Wrigley and Nero 1982). "The lofty mountains of Peru are probably the last places most people would expect to see cougars, but many varied habitats, including deserts, forests, mountains, and lowlands, were all home to the early cats…….generally, the cougar prefers habitat that provides good forage for its prey and enough cover for it to efficiently stalk that prey" (Busch 1996). Appropriate habitat is necessary, not only for hunting, but for protection from the environmental stresses and enemies, and for the successful raising of kittens. "Coniferous forest covers nearly one-third (164,000 sq. km.) of Manitoba" ("Boreal Forest Gallery", 2002-2004, The Manitoba Museum, found in: http://www.manitobamuseum.ca/mu_boreal.html). With adequate coniferous and mixed forest and a variety of terrain, the cougar has been able to take up residence in Manitoba. The two specimens killed in 2004 were from the same area near the Riding Mountain

National Park. Their good body condition showed that they had ample prey supply. Sightings in other areas of the province suggest a wide population distribution, as well. With every year more wildlife habitat is be lost through human intervention such as land clearing, destroying and disturbance in corridors, and pollution.

Throughout the process of this research, several differing opinions on how the cougar should be protected in Manitoba were noticed. It was overall determined that there does need to be more information on cougars in Manitoba, but whether we sit back and wait for this information before seriously managing for the cougar in Manitoba, remains a concern. Many experts recommended setting aside large parcels of land for cougars, yet it may be more realistic to have more protected areas for differing ecosystems in general. Riding Mountain National Park is one example of a large area of protected land, and having more areas like this in places that valid cougar sightings are discovered, would help the species and others as well. Reality makes it hard to try to get more areas set aside directly for cougars in Manitoba, but trying to promote more protected areas in Manitoba where there is proven high reports of cougar sightings, maybe also help other species as well, not just specifically the cougar.

On many instances, people have reported cougars to authorities, but no information has been found when looking deeper into the issue. One wonders whether all sightings are accurately documented, is there a standard format, if so, than why are there so many people who have claimed to report a cougar to authorities, yet no record is found. Many cases were reported to me of it being very difficult to get immediate information and response in regards to their cougar sighting. Many people tend to just give up on reporting their sighting, as they feel that they are not believed or taken

seriously. To ensure successful managing for cougars, we must first create accurate sighting information. There should be no reason why certain wildlife officers in Manitoba have documented cougar sightings, yet Manitoba Conservation has no record of it. There needs to be a stronger connection of communication, and although it is claimed that people are working on this issue, valuable cougar reports from the past have not been all accurately documented. It is also a concern that before the two cougar kills in Manitoba in 2004, issues like this were not taken seriously. There seems to have been proof and reliable sighting in the past, many choose to still think that we have no evidence of cougars here. We cannot wait until a species is gone from our province before action is taken or wait until a human and cougar encounter takes place, before people in Manitoba are even aware of the presence of cougars here. Public education needs to be enhanced, as many in Manitoba find it hard to tell the difference between a bobcat, lynx, or cougar. Improved education will generate more accurate reports and fewer false reports. Manitoba Conservation states that it may put more information on cougars on their website, which would be a great step. It is found that many valuable sightings have not been reported to authorities, as many find it a hassle to report when it takes weeks for a response in some cases.

The goals of this thesis were to determine if Manitoba could support a cougar population and to determine what protection measures are present and could be improved upon. With evidence of cougars in the province by the 1973 and 2004 cougar specimens, and with opinions by experts in the field on suitable habitat, prey and other essentials, the experts determine that concerns are still ongoing for the protection of the species. It is

hoped the recommendations and information by experts in this thesis will bring a larger attention to the issues.

Recommendations Summary:

It is recommended by some experts that authorities should not concentrate on one particular species, such as the cougar, but instead capture large blocks of little-disturbed habitat, preferable with interconnected corridors, to conserve the whole ecosystem.

Public information using educational tools and campaigning for cooperation in protecting corridors and other habitat is recommended.

More research is needed to estimate the cougar population in Manitoba, and to determine their resident locations, so that protective measures for the human population and cougar can take place. Recommendations include creating additional tools for collecting data, such as surveys and a web-site for reporting sightings online.

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APPENDIX 1

Questions for panel of Cougar and Wildlife Experts-ROUND 1

Q1: What prey species do you think would be important in the diet of cougars in Manitoba?

Deer:

Important somewhat Not Important

0------1-------2------3------4------5------6------7-----8------9-----10

Snowshoe Hare:

Important somewhat Not Important

0------1-------2------3------4------5------6------7-----8------9-----10

Rodents:

Important somewhat Not Important

0------1-------2------3------4------5------6------7-----8------9-----10

Other:

Important somewhat Not Important

0------1-------2------3------4------5------6------7-----8------9-----10

Q2: Will the protection of cervid populations encourage the growth of a cougar population?

(Yes) 0-----1-----2-----3-----4-----5 (sometimes) ------6-----7------8------9------10 (No)

Q3: What habitats do you think cougars would prefer in Manitoba?

(Yes) 0----1----2----3----4----5 (sometimes) ----6----7----8----9----10 (No)

Coniferous Forest areas:

Deciduous-Coniferous:

Mixed Forest:

Mountains:

Ranchland:

Aspen parkland:

Semi-open aspen:

Oak-grassland:

Any area:

Other: _____:

Explain:_____

Q4: Do you think that cougar sightings in Manitoba represent resident animals or migrating cougars from other regions?

Manitoba Both Other Regions

(-5)---(-4)---(-3)---(-2)---(-1)---(0)---(+1)---(+2)---(+3)---(+4)---(+5)

Explain:_____

Q5: Are the majority of cougar sightings in any region taken seriously and accurately documented/ reported to the proper authorities?

Yes Sometimes No

0------1------2------3------4------5------6------7-----8-----9-----10

Explain:_____

Q6. What are the main factors limiting cougar populations in North America?

Prey composition and abundance:

Important somewhat Least Important

0----1----2----3----4----5----6----7----8----9----10

Severe cold: 0----1----2----3----4----5----6----7----8----9----10

Lack of cover: 0----1----2----3----4----5----6----7----8----9----10

Snow depth and type: 0----1----2----3----4----5----6----7----8----9----10

Competition with other predators: 0----1----2----3----4----5----6----7----8----9----10

Disturbance by People: 0----1----2----3----4----5----6----7----8----9----10

All of above: 0----1----2----3----4----5----6----7----8----9----10

Explain:_____

Q7: What percentage of cougar sightings from the public do you believe are actually a cougar?

0%------20------30------40------50------60------70-----80-----90-----100%

Q8: Does the presence of kittens with the sighting of a cougar make for a reliable judgment of a resident cougar population?

(Yes) 0-----1------2------3------4------5------6------7-----8-----9-----10 (No)

Explain: _____

Q9: The majority of cougar sightings describe a cat with a long tail. What other animals could be mistaken for a cougar?

Coyote: (Yes) 0--1---2---3---4---5 (Some cases)---6---7----8----9----10 (No)

House Cat: (Yes) 0--1---2---3---4---5 (Some cases)---6---7----8----9----10 (No)

Dog: (Yes) 0--1---2---3---4---5 (Some cases)---6---7----8----9----10 (No)

Deer: (Yes) 0--1---2---3---4---5 (Some cases)---6---7----8----9----10 (No)

Lynx: (Yes) 0--1---2---3---4---5 (Some cases)---6---7----8----9----10 (No)

Bobcat: (Yes) 0--1---2---3---4---5 (Some cases)---6---7----8----9----10 (No)

Other: (Yes) 0--1---2---3---4---5 (Some cases)---6---7----8----9----10 (No)

Explain: _____

_____

Q10: What percentage of cougar sightings do you think go unreported to the authorities due to fear of not being believed, or not knowing who to contact?

0%--------20--------30--------40--------50--------60--------70-------80-------90-------100%

Q11: Do you think that the general public is aware of the presence of cougars in Manitoba?

Yes About half aware No

0-----1-------2-------3-------4-------5-------6-------7-------8--------9--------10

Explain: _____

Q12: Does the legal status of the cougar in a state or province significantly affect protective measures and conservation efforts?

(Yes) 0-------1------2------3------4------5 (unsure) ------6------7------8------9------10 (No)

Explain: _____

Q13: Do you think that the home range selected by a cougar is affected by human residence?

(Yes) 0------1------2------3------4------5 (unsure) -------6------7------8------9-----10 (No)

Explain:_____

Q14: Cougars observed in Manitoba often appear unconcerned for a period by the presence of an observer on foot or in a vehicle. Do you agree that cougars farther west, where they may be hunted, have learned to be more secretive?

(Yes) 0------1------2------3------4------5 **(unsure)** -------6------7------8------9-----10 **(No)**

Name (PRINT):_____Affiliation:_____

Date: _____ Signature:_____

Questions for panel of Cougar and Wildlife Experts- ROUND 2.

1. There are APPROXIMATELY 150,000 deer in Manitoba. If deer are the main prey species of cougars, why are there not more cougars or cougar sightings in Manitoba?

Cougars are hard to study: (Yes) 0---1---2---3---4---5(sometimes) ---6---7---8---9---10 (No)

Many don't report sightings:(Yes) 0---1---2---3--4---5(sometimes)---6---7---8---9---10 (No)

There are, we just don't know it:

(Yes)0---1---2----3---4---5(sometimes)---6---7---8---9---10(No)

Other_____: (Yes) 0---1---2---3---4---5(sometimes)---6---7---8---9---10(No)

Explain:_____

2. a) Do you think there is any need to further protect or increase the present deer population of 150,000 to encourage a higher cougar population?

(Yes)0-----1------2------3------4-----5(unsure) ----6------7-----8-------9------10 (No)

Explain: _____

b) What OTHER type of protection do you feel MIGHT AID in the growth of cougar population?

Habitat (Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Available corridors to increase mating

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Wildlife sanctuary areas with low human population

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Other (Specify)_____

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

3. The majority thought that the home range of a cougar was most likely affected by human residence. Do you think that cougars attempt to avoid humans at all cost when developing their home range, or are they ADAPTING to sharing home ranges with humans?

Avoid humans at all costs Share home range with humans

(Yes) 0-----1-----2-----3-----4-----5 (unsure) ------6-----7----8------9------10 (No)

Explain:_____

4. The majority of respondents thought that prey composition along with abundance and competition with other predators would be the main factors in limiting cougar populations in North America. Do you agree with this statement? Yes or No. If NO, why not.

Yes Sometimes No

0-------1-------2-------3-------4-------5-------6-------7------8-------9-------10

Explain:

5. The most consistent response was that deciduous-coniferous forest and aspen parkland ARE PROBABLY the most common habitat for cougars in Manitoba. Coniferous-forested areas, oak grassland or other areas that provided safe coverage were also reported as being important habitat for cougars in Manitoba. Do you agree with this statement, or DO YOU feel that since the cougar is highly adaptable, that they could almost live anywhere?

(Agree) 0-----1-------2-------3-------4------5(unsure) ----6-------7------8-------9-------10 (No)

Give Reasons_____

_____

6. A cougar sighting in Manitoba may or may not be a resident animal, depending on the situation. What factors do you believe would help determine if a cougar sighting was a resident cougar or a migrating cougar from another area?

Single animal vs. two or more together:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Presence of kittens or young:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Other:_____ (Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Explain: _____

_____

7. The majority of respondents felt that of cougar sightings in any region were taken seriously and accurately documented/ reported to the proper authorities in most cases. Do you think that the general public would agree?

Yes Sometimes No

0--------1--------2--------3--------4--------5--------6--------7-------8-------9-------10

Explain:_____

_____

8. a) Do you feel that the general Manitoba population is not as familiar with or educated as much about cougar characteristics as the population in more densely cougar populated areas?

(Yes) 0-------1--------2--------3--------4--------5--------6--------7-------8-------9-------10 (No)

Explain: _____

_____

_____

b) Do you feel lack of cougar knowledge plays a major role in false cougar sightings?

(Yes) 0-------1--------2--------3--------4--------5--------6--------7-------8-------9-------10 (No)

Explain: _____

_____

_____

9. The majority thought that 50% of cougar sightings go unreported. Do you think the reason could be:

Lack of knowing who to contact:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Fear of being laughed at:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Take matter into their own hands (destroy cougar):

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Not interested in reporting:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Other _____:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Explain: _____

_____

_____

10. The experts were divided evenly on whether they thought the general public were aware of a cougar presence in Manitoba. Why do you think that so many are not aware of a possible presence of cougars in our province?

Never seen one in the wild:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Not enough local information given:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Not interested if not a concern to themselves:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Not enough warning signs posted in possible cougar territory:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Explain: _____

_____

11. The majority of respondents thought that yes, the legal status of a cougar affects it protection measures. What type of protection would be most effective?

Federal SARA:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

The provincial Endangered Species Act:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

National Recovery Plan:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

no additional legislation:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

other:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

Explain: _____

_____

Name (PRINT):_____Affiliation:_____

Date: _____ Signature:_____

Questions for panel of Manitoba Wildlife Experts-ROUND 1

Q1: Do you think there is sufficient habitat to sustain indefinitely a cougar population in Manitoba?

(Yes) 0------1-------2-------3-------4-------5 (some) ----6-------7------8------9------10 (No)

Explain: _____

_____

Q2: Animal populations need an influx of unrelated individuals to maintain genetic variation. Do you think Manitoba has enough cougars to permit a healthy gene pool?

(Yes) 0-----1------2------3------4-----5 (unsure) ----6------7-----8-----9-----10 (No)

Explain: _____

_____

Q3: Are there relatively undisturbed wildlife corridors available to allow for cougars passing from one area to another?

(Yes) 0-----1------2------3------4-----5 (unsure) --6------7-----8-----9-----10 (No)

Give Reasons_____

Q4: The majority of cougar sightings describe a cat with a long tail. What other animals could be mistaken for a cougar?

Coyote: (Yes) 0----1----2----3----4----5 (Some cases)-----6----7----8----9---10 (No)

House Cat: (Yes) 0----1----2----3----4----5 (Some cases)-----6----7----8----9---10 (No)

Dog: (Yes) 0----1----2----3----4----5 (Some cases)-----6----7----8----9---10 (No)

Deer: (Yes) 0----1----2----3----4----5 (Some cases)-----6----7----8----9---10 (No)

Lynx: (Yes) 0----1----2----3----4----5 (Some cases)-----6----7----8----9---10 (No)

Bobcat: (Yes) 0----1----2----3----4----5 (Some cases)-----6----7----8----9---10 (No)

Other: (Yes) 0----1----2----3----4----5 (Some cases)-----6----7----8----9---10 (No)

Explain: _____

_____

Q5: Considering deer, hare, and small animal prey, is there an adequate food supply to sustain a cougar population across the southern third of Manitoba?

(Yes) 0----1----2----3----4----5 (possible)-----6----7----8----9---10 (No)

Explain:_____

_____

Q6: What prey species do you think would be important in the diet of cougars in Manitoba?

Deer:

Important somewhat Not Important

0-------1-------2-------3-------4-------5-------6-------7------8------9------10

Snowshoe Hare:

Important somewhat Not Important

0-------1-------2-------3-------4-------5-------6-------7------8------9------10

Rodents:

Important somewhat Not Important

0-------1-------2-------3-------4-------5-------6-------7------8------9------10

Other:

Important somewhat Not Important

0-------1-------2-------3-------4-------5-------6-------7------8------9------10

Q7: Considering available habitat in Manitoba, what size of cougar population could Manitoba sustain? Please mark "X" on the scale.

Over 500----------100----------0

Q8: Do you think that cougar sightings in Manitoba represent resident animals or migrating cougars from other regions?

Manitoba Both Other Regions

(-5)----(-4)----(-3)----(-2)----(-1)----(0)----(+1)----(+2)----(+3)----(+4)----(+5)

Explain:_____

_____

Q9: Are the majority of cougar sightings in any region taken seriously and accurately documented/ reported to the proper authorities?

Yes Sometimes No

0--------1--------2--------3--------4--------5--------6--------7-------8-------9-------10

Explain:_____

_____

Q10: What habitats do you think cougars would prefer in Manitoba?

Coniferous Forest areas: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Deciduous-Coniferous: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Mixed Forest: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Mountains: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Ranchland: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Aspen parkland: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Semi-open aspen: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Oak-grassland: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Any area: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Other: ____ ___: (Yes) 0--1--2--3--4--5 (sometimes)--6--7--8--9--10 (No)

Explain: _____

Q11: In Manitoba, what percentage of cougar sightings from the public do you believe are actually a cougar?

0%-------20-------30-------40-------50-------60-------70------80------90------100%

Q12: Does the presence of kittens with the sighting of a cougar make for a reliable judgment of a resident cougar population?

(Yes) 0----1-----2-----3-----4-----5 (unsure) -----6-----7-----8-----9-----10 (No)

Explain: _____

_____

Q13. What are the main factors limiting cougar populations in Manitoba?

Important somewhat Least Important

0-------1-------2-------3-------4-------5-------6-------7-------8-------9-------10

Prey composition and abundance:

Severe cold

Lack of cover:

Snow depth and type:

Competition with other predators:

Disturbance by People:

All of above:

Explain: _____

_____

4: Do you think that the general public is aware of the presence of cougars in Manitoba?

Yes About half aware No

0-----1-------2-------3-------4-------5-------6-------7------8------9------10

Explain:_____

5: In 1973, a cougar was shot and killed at Stead, Manitoba. Do you believe this was a resident cougar in Manitoba?

(Yes) 0------1------2------3------4------5 (unsure) -------6------7-----8------9-----10 (No)

Explain: _____

Q16: Does the legal status of the cougar in a state or province significantly affect protective measures and conservation efforts?

(Yes) 0------1------2------3------4------5 (unsure) -------6------7------8------9-----10 (No)

Explain: _____

_____

Name (PRINT):_____Affiliation:_____

Date: _____ Signature:_____

Questions for panel of Manitoba Wildlife Experts – ROUND 2

Q1. Most experts agreed that Manitoba has enough habitat to support a cougar population.
If so, why is Manitoba's population not larger than believed to be?

To what degree do you feel each of the above may affect the population?

A. SEVERE WINTER COLD: Winter cold may affect the survival of younger cougars. The majority of respondents thought severe cold was moderately important, but snow depth and type was not considered overly relevant.

A: (0%) 0----1----2----3----4----5----6----7----8----9----10 (100% Agree)

B. HUMAN INTERVENTION: cities, farm buildings, roads, railroads, etc. The majority of respondents thought that human disturbance was a large factor in limiting cougar population.

B: (0%) 0----1----2----3----4----5----6----7----8----9----10 (100% Agree)

C. OTHER PREY SPECIES ABUNDANT: Coyotes, wolves, fox, owls, etc. may kill off young cougar cubs.

C: (0%) 0----1----2----3----4----5----6----7----8----9----10 (100% Agree)

D. OTHER. Specify.....

D: (0%) 0----1----2----3----4----5----6----7----8----9----10 (100% Agree)

Explain:_____

_____

Q2. The majority of experts feel Manitoba has enough undisturbed corridors available to maintain genetic variation for a healthy cougar population.

a) Which of these corridors do you feel cougars would use often?

A1: Wooded and hilly lands following river chains
A: (Greatly) 0----1----2----3-----4 ----5(sometimes)----6-----7-----8-----9-----10 (Rarely)

B2. Ditches and smaller wooded areas between areas of forest lands such as parks.
B: (Greatly) 0----1----2----3-----4 ----5(sometimes)----6-----7-----8-----9-----10 (Rarely)

C3: Other. Specify.....
C: (Greatly) 0----1----2----3-----4 ----5(sometimes)----6-----7-----8-----9-----10 (Rarely)

Explain:_____

_____

b) Do you feel that the following are a threat to suitable corridors?

A: The building of cottages along river and lake chains
(Greatly) 0----1----2----3-----4 ----5(sometimes)----6-----7-----8-----9-----10 (Rarely)

B. The noise and use of snowmobiles, dirt bikes, etc. in corridors
(Greatly) 0----1----2----3-----4 ----5(sometimes)----6-----7-----8-----9-----10 (Rarely)

C. The breaking up of fence lines, smaller woods, etc. to create larger fields suitable for large farm equipment, including irrigation systems.
(Greatly) 0----1----2----3-----4 ----5(sometimes)----6-----7-----8-----9-----10 (Rarely)

D. The construction of roads across corridors.
(Greatly) 0----1----2----3-----4 ----5(sometimes)----6-----7-----8-----9-----10 (Rarely)

Explain:_____

_____

Q3: The majority felt there is an adequate food supply to sustain a cougar population across the southern third of Manitoba. The majority of responses suggested that deer would be the main prey species of cougars in Manitoba.

What percentage do you feel the following would make up in their usual diet?

A: Small animal prey such as mice, birds and hares.
0%----------25----------50----------75----------100%
B: Medium prey such as raccoons, porcupines, beaver.
0%----------25----------50----------75----------100%
C: Deer.
0%----------25----------50----------75----------100%
D: Elk and Moose
0%----------25----------50----------75----------100%
E: Livestock such as cattle, horses, goats
0%----------25----------50----------75----------100%

Explain:_____

_____

Q4: Experts believed the most preferred habitat in Manitoba for cougars were coniferous forest areas, deciduous-coniferous areas, mixed forest, and mountainous (hilly) areas.

a) Do you feel cougars chose these areas in Manitoba because of?
A: their secluded coverage for protection against enemies
(Yes).0----1-----2-------3-------4------5(sometimes) ------6------7------8-----9---10(No)

B: food supply (which also uses forested areas as coverage).
(Yes) 0----1-----2------3------4-------5(sometimes) ---6-----7------8------9----10(No)

Explain: _____

b) Cougars are known to have lived in many different habitats across North America from deserts and swamps to mountains and prairies.
Since the cougar is highly adaptable, do you feel they will eventually adapt to living in more populated areas if secluded areas and food supply are not abundant?

(Yes) 0---1--2---3- -4---5(unsure)--6-----7----8----9--10(No)

Explain:_____

_____

Q5. What factors do you believe best determine whether cougar sightings in Manitoba represent resident animals or migrating cougars from other regions?
A: Single animal vs. two or more together
(Yes) 0---1---2---3---4---5(sometimes) ---6---7----8----9---10(No)

B: Presence of kittens or young
(Yes) 0--1----2----3---4--5(sometimes)--6---7-----8----9-10(No)

C: Other: Specify.....
(Yes) 0--1---2---3--4----5(sometimes)----6-----7-----8---9--10(No)

Explain:_____

_____

Q6. The majority of responses believed the presence of kittens indicate a resident cougar population. However, taking into consideration that many sightings are false, and kittens well hidden by their parents, what percentage of cougar kitten sightings, do you believe are actually accurate?

0%------10----20----30-------40----50-----60----70----80----90----100% Accurate

Explain:_____

_____

Q7. The majority of Manitoba experts believed 70% of cougar sightings from the public were actually a cougar. Therefore, 30% of sightings mistakenly identify other animals such a deer, bobcat, lynx, fox, house cat from a distance, etc. for a cougar. The majority of cougar sightings describe a cat with a long tail. Other factors such as coat color and cat species also play a part in sightings.

As sightings alone can not be determined as scientific fact that cougars exist, what other measures can be taken to collect scientific data? How do you rate the following methods?

A: Cougar DNA kits attached to trees in areas of cougar sightings, in hopes of obtaining DNA from a cougar who may scratch against the scented kit.

(Poor) 0--1---2---3--4----5(good)----6-----7-----8---9--10(Excellent)

Why? _____

B: Collecting DNA samples from the vicinity of a suspected cougar livestock kill.
(Poor) 0--1---2---3--4----5(good)----6-----7-----8---9--10(Excellent)

Why? _____

Q8. The majority of respondents thought that disturbance by people were an important factor in limiting cougar populations in Manitoba and that severe cold was somewhat important. Snow depth and type was considered not overly important in limiting cougar populations. Do you agree or disagree with this statement?

(Agree) 0-----1-------2-------3-------4------5(unsure) ----6-------7------8------9-----10 (No)

Give Reasons_____

Q9. In 1973, a cougar was shot and killed at Stead, Manitoba. THIS IS THE ONE SOLID PIECE OF EVIDENCE OF COUGARS IN MANITOBA, so then why would you think there would be such a disagreement to whether it was a resident cougar or not?

(Yes)0----1----2----3----4----5 (sometimes) ---6----7----8----9----10 (No)

Lack of knowledge of incident:

Lack of information:

Other_____

Explain: _____

_____

Q10: The majority of respondents thought that yes, the legal status of a cougar affects its protection measures. What type of protection would be most effective?

Federal SARA: (Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

The provincial Endangered Species Act:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

National Recovery Plan:

(Yes) 0----1----2----3----4----5 (sometimes)----6----7----8----9----10 (No)

No additional legislation:

(Yes) 0----1----2----3----4----5 (sometimes) ----6----7----8----9----10 (No)

Other: (Yes) 0----1----2----3----4----5 (sometimes) ----6----7----8----9----10 (No)

Explain: _____

_____

Name (PRINT):_____Affiliation:_____

Date: _____ Signature: _____

APPENDIX 2

Round 1 Non-Manitoba Survey explanations

What prey species do you think would be important in the diet of cougars in Manitoba?

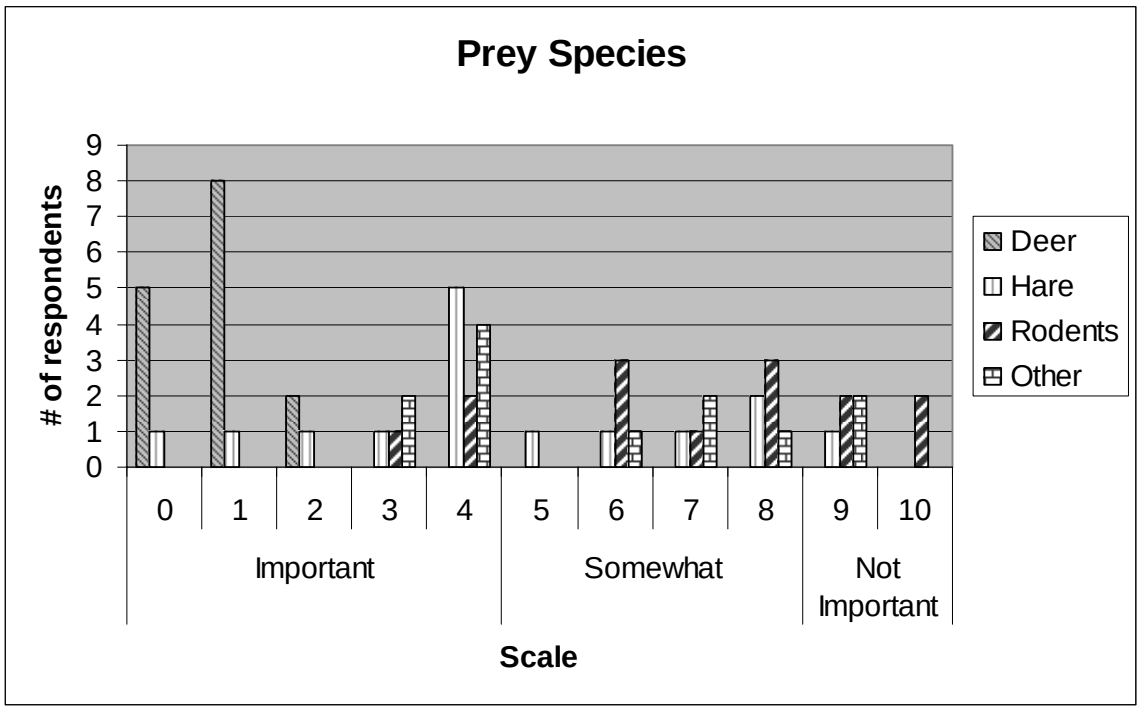


Figure 24. Summary of responses to the question shown above.

Experts Opinions (point form):

-other, could be elk or moose

-Deer-depends on their abundance

-Rodents: depends on what specifically – for e.g., beavers considerably more important than wolves.

-Other: other ungulates?

Will the protection of cervid populations encourage the growth of a cougar population?

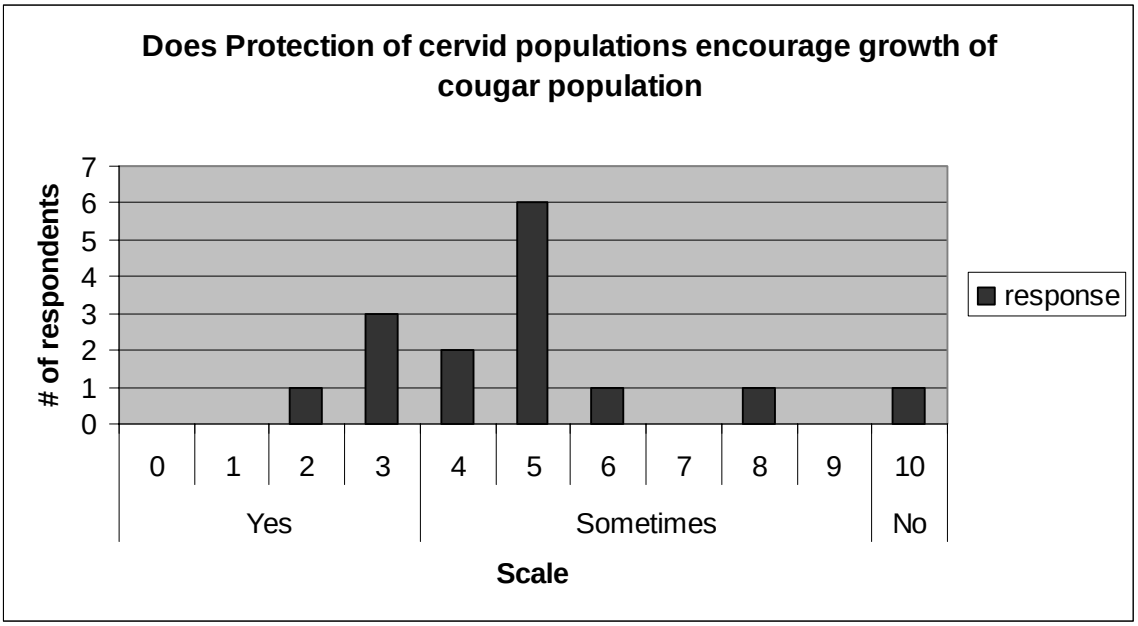


Figure 25. Summary of responses to the question shown above.

Experts Opinions (point form):

Only if there are cougars present and other carnivores will not prevent access through competition (e.g. Wolves)

-Assume you mean halting or decreasing allowable human harvest - depends on lots of factors, including the existing density of cougars, and perhaps the densities of other predators.

- This is not a yes or no question. I don't know if you are over-harvesting or not but if you suspect cougars are the reason for a decline, it is likely that other factors (i.e. habitat, mule deer/whitetail competition) are to blame. Keep in mind that cougars are not like muskrat populations (showing exponential growth in relation to food supply) there is a ceiling to population growth. Cougars kill cougars and this density dependence drives population growth.

-Depends on a number of factors including competition with other predators (wolves, bears) and how well the cervids actually respond to the protection given.

-In most situations, increase in prey base will increase predator survival; however, habitat will play a larger role along with protection of female cougars or presence of females on the landscape.

-Management is protection. Cougars will thrive in a habitat with deer population. Deer protection is ludicrous. You simply need to manage for deer presence, and cougars will be there whether you want there to be or not.

-certainly it depends on the circumstances, but an adequate prey base is essential for cougar population growth and/or re-colonization of vacant range.

-what is meant by protection: no hunting? Regulated hunting? Habitat manipulation to encourage ungulates? Cougar populations do well wherever ungulates are present as well as where ungulates are limited.

-"protection" needs to be detailed as sufficient protection from other sources of mortality to maintain deer/cervid numbers/densities high enough to provide adequate prey base for cougar. This protection may take the form of control over hunter harvests, and/or other predators.

-depends how you define protection? Literature of cougars in Manitoba includes: a published report of cougar predation on elk (in riding Mountain National Park), which suggests elk would be potential if not regular prey for cougars. In Yellowstone, cougars regularly kill elk, but there is in my experience, a pattern suggesting they prefer killing (mule) deer.

-ensuring an adequate prey base such as deer will ensure cougars have adequate food but harvest and other causes of mortality (roads, railways) must be considered.

What habitats do you think cougars would prefer in Manitoba?

Non-Manitoba Experts
First choice: 1. Presence of kittens or young 2. Single animal vs. 2 or more 3. Other

Table 14. Summary of responses to the question shown above.

Experts Opinions (point form):

Would be most dependent on topography (hiding cover) and prey density, rather than actual veg. type.

-difficult to rate these generalized classes - depends on assumptions about they influence prey densities, stalking cover, security cover and climatic conditions that may influence cougar energetics.

-Cougars have huge home ranges and will use almost any habitat type within their range to at least travel from one area to another.

-Cougars are dependent upon terrain with adequate ambush cover. The top 4 are most likely to provide this although other types may if given opportunity to achieve appropriate density.

-They will prefer habitats selected with deer. They will highly prefer deer winter "yard" habitats.

-A mosaic of all the above with suitable prey and cover would likely be optimal.

-Cougars use habitats where there is adequate cover for cougars to stalk prey and provide for their security either in the form of trees, shrubs, cliffs, broken terrain.

-cougar will follow their major prey species, utilizes whatever habitat the prey does, with seasonal shifts in elevation and vegetation.

-cougars seem to show up in areas, at times, where least expected, including suburban/urban areas. Be prepared for this scenario.

-areas with a combination of habitat that support prey but provide cover.

Summary of responses to the question,

Do you think that cougar sightings in Manitoba represent resident animals or migrating cougars from other regions?

Experts Opinions (point form):

Some animals would be resistant until they were eliminated (most likely shot or hit by vehicle), most would probably be immigrants from other areas with permanent populations.

-Cougar sightings can happen anywhere within their range. An increase in sightings does not necessarily mean an increase in cats. Where the sighting occurs could impact this distinction. On the fringe of habitat range or in the core habitat would need to be known.

-Black Hills

-Most sightings are unreliable. It is impossible to tell. Better would be to look at any mortality - if young males they are likely wanderers from another area – if females, likely to be resident.

-Cougars can disperse up to 500 miles, especially males. Females will follow as long as deer are present and people do not kill the dispersers.

-Cougar sightings could be of animals that have been released or escaped.

-If habitat and prey is adequate the cougars may be resident.

-if proximal to occupied range, most likely are migrants.

-Nero and Wrigley and others have speculated on presence of cougar population since the days of the Stead specimen, 1975. There are lots of sightings but limited hard evidence for individual cougars, let alone a viable, self-sustaining population. But, I am open and willing to believe there is a population, albeit small, present, as well as some transient cougar activity. Saskatchewan sure seems to have a small population of cougars, and one would suspect Ontario and more Eastern provinces could sustain a population of cougars too, so if they are not there/here already, they soon will be.

Are the majority of cougar sightings in any region taken seriously and accurately documented/ reported to the proper authorities?

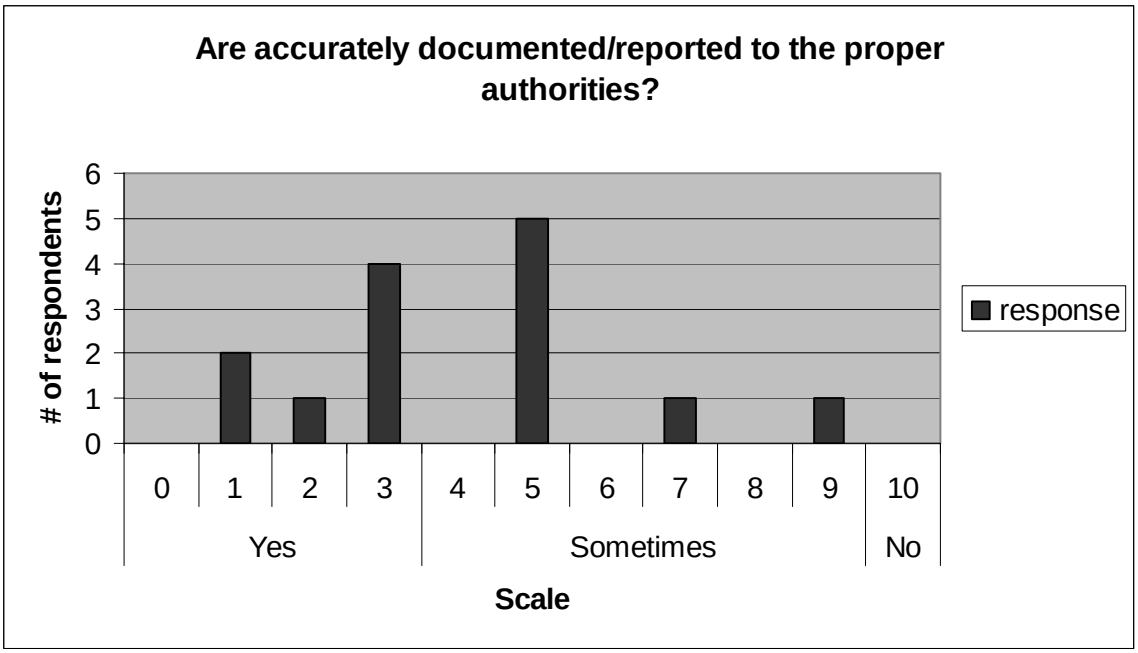


Figure 26. Summary of responses to the question shown above.

Experts Opinions (point form):

-the results from the experts depict a level uncertainty.

-Yes, but depends on level of local knowledge, regarding cougars and what they look like. People in Banff for example often mistake coyotes for cougars. In the Yukon, they are taken very seriously and followed upon as they seem to be migrating into the territory on occasion.

-In WA they are. We have developed a database for this and have a network of reporting options and responders tied into the State Police 911 program.

-Depends on who takes the report. If they are open-minded it gets recorded if not then they tend not to be recorded.

-In Texas, we take sightings and mortality reports. No investigation to confirm is undertaken unless it is a human safety concern. E.g. attack – threat high – ex. In a city.

-have a reporting system.

-New Brunswick has an Eastern Cougar Report Form.

-Most authorities are skeptical of sightings by the public; and not enough staff is available to check them all out.

-even in cougar ranges in NA reported observations of cougars are not valid observation.

-Dog, bobcats, coyotes are often identified as cougars.

-depends upon location on continent (N.A.) and proximity to established cougar populations.

-Most sightings are never reported and even fewer are documented – anywhere that I know of.

Summary of responses to the question,

What are the main factors limiting cougar populations in North America?

Experts Opinions (point form):

-*The three most important factors found were prey composition and abundance, severe cold and snow depth and finally, disturbance by people.*

-Prey abundance and lack of cover would be the number one factors as risk of mortality greatly increases if either is lacking.

-The importance of each factor would vary with scale – I have rated assuming the broadest scale of geographic range. For example, prey and competitions would be of increasing importance at finer scales. Disturbance by people depend on type and level.

-Generally a combination of all the above.

-Habitat loss and fragmentation combined with people's fear of the animal resulting in calls for predator control are much more limiting factors than any listed above.

-They will exist in populated areas as long as there is ample food present.

-trapping, hunting

-certainly it is a combination of all the above

-cougars live among communities throughout their range; they appear unaffected by snowmobile activity where one works, and live in close proximity to human residence.

-hunting limits cougar populations in Idaho. Deer and elk population fluctuations and now wolves.

-different factors in different regions of North America limit cougar numbers. In the West, much of the available cougar habitat seems saturated, so arguably cougar numbers themselves are limiting cougar numbers. Or lack of habitat, but really this isn't true because available habitat is being used. If you'd asked are cougar numbers limited in the west? I would say no. But if habitat is affected further by urban and suburban sprawl, then these would have to be considered limiting factors. Hunting does to, to some degree, and I've accounted for this under human disturbance. In the Midwest and east, the main thing limiting cougar numbers is cougar numbers – not to the point of them saturating habitat – but to the point that there is no nearby source of cougars to fill what I consider vast expanse of available habitat in the region, where prey densities are high and

cover is plentiful. The second factor limiting cougars in this region is human intolerance, which I would lump into human disturbance – people in the Midwest and east may just not be ready for cougars, and it seems likely that a high percentage of cougars that survive dispersal from Western populations to the Great Plains or Midwest are killed by people, intentionally (i.e. shot) or unintentionally (run over by vehicle). Dead cougars have little chance of continuing an eastward dispersal and filling habitats available further to the East in North America.

-highways

Summary of responses to the question,

What percentage of cougar sightings from the public do you believe are actually a cougar?

Experts Opinions (point form):

-Depends on the area, -Usually domestic dogs (labs and retrievers), depends on location -one chases down lots of reports and over 80% turn out to be coyote, dogs, etc. -in eastern US , likely less than 10%, in western – likely over 50%.

Summary of responses to the question,

Does the presence of kittens with the sighting of a cougar make for a reliable judgment of a resident cougar population?

Experts Opinions (point form):

-Females with kittens have very small home ranges, so that one individual could certainly be classified as resident.

-sort of, depends on how you choose to define a “resident” population. Such a short-term reproducing population could still be ephemeral or dependent on consistent or periodic immigration.

-Again, sightings by non-professionals are unreliable.

-I say yes because you said kittens. Yearlings may constitute an animal on the move. However, a female would not have kittens unless she was a resident (parental care dictates that).

-May still be mistaken identify i.e. lynx with kittens

-In part, multiple family groups would be better.

-Depends on the location of the sighting. If it borders another province or state it would be difficult to determine.

-Small animals reported as cougars are almost always mistaken identity.

-females will not travel far when accompanied with kittens. Likely females may not enter until established and have a home range.

-This is a conservation measure/indicator of residence - established local reproduction. However, lack of kitten sightings does not necessarily indicate lack of reproduction.

-1). if the animal in the sighting is correctly identified; 2). if they are not released captives.

-depends on size of kittens and size of residence.

-not unless the sighting is accompanied by hard evidence that the animal was in fact a cougar with kittens.

Summary of responses to the question,

The majority of cougar sightings describe a cat with a long tail. What other animals could be mistaken for a cougar?

Experts Opinions (point form):

-Wolves are often mistakenly identified as cougars also due to their similar size.
-depends on the person, their background, knowledge, etc., and also the situation. For example, some people are not aware of the smaller cats, so they may say they saw a cougar simply because it's the only cat they can think of. But if they were shown a picture of the different species they would probably not choose cougar.
-Tracks are almost always confused with dogs/coyotes. Sightings of feral dogs assumed to be cougars are prevalent
-We have had cases of all the above as mistaken identity. Also red fox.
-The majority of people are not well informed of what animals look like. Often rely on guide books.
-Dogs represent the most common mistaken ID in northwest Montana.
-The majority of New Brunswick sightings are of fisher and bobcat.
-bear, fisher (NS), otter
-otter
-all have been reported as cougars before.
-most sightings in NE US were mistaken identities. All species above, plus fisher and black bear were misidentified as cougar.

-any of the listed may be mistaken for cougars, even bobcats when a long tail is described.

-tracks are often reported – dog, other cats, some photos of cougars were house cats.

What percentage of cougar sightings do you think go unreported to the authorities due to fear of not being believed, or not knowing who to contact?

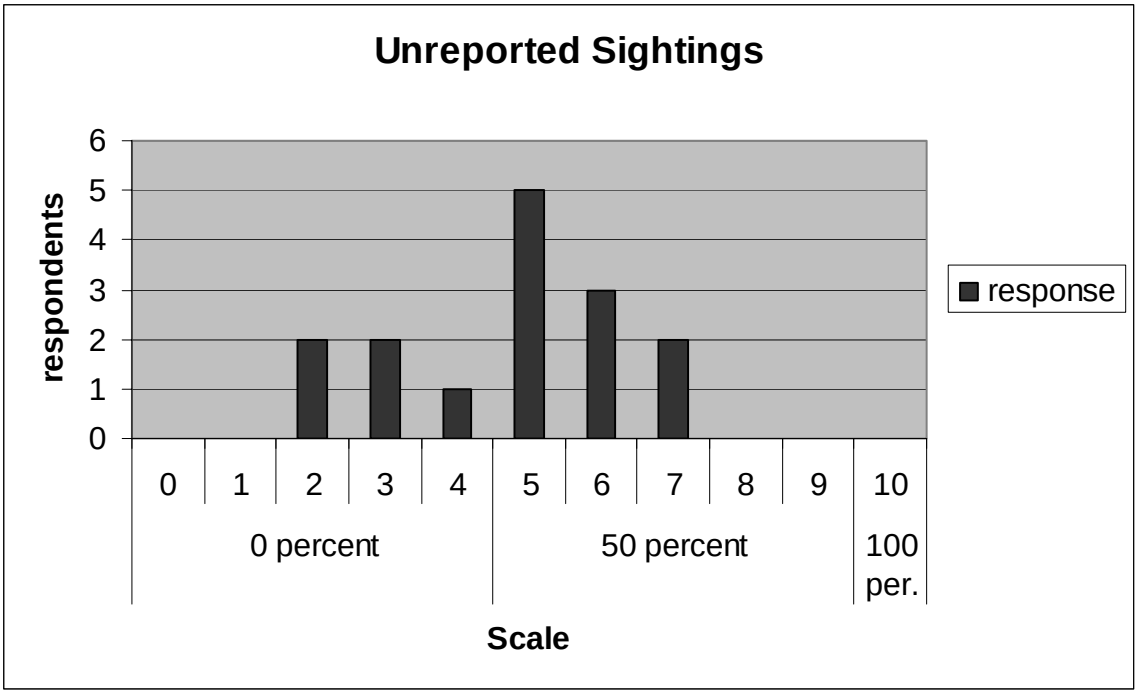


Figure 27. Summary of responses to the question shown above.

Experts Opinions (point form):

-Or not caring to make the effort – again probably depends on the area and the perceived significance of the sighting.

-I think 50% of sightings go unreported. 30% of these are due to factors noted above, and another 20% due to the observer just not caring to or not bothering to report it.

Do you think that the general public is aware of the presence of cougars in Manitoba?

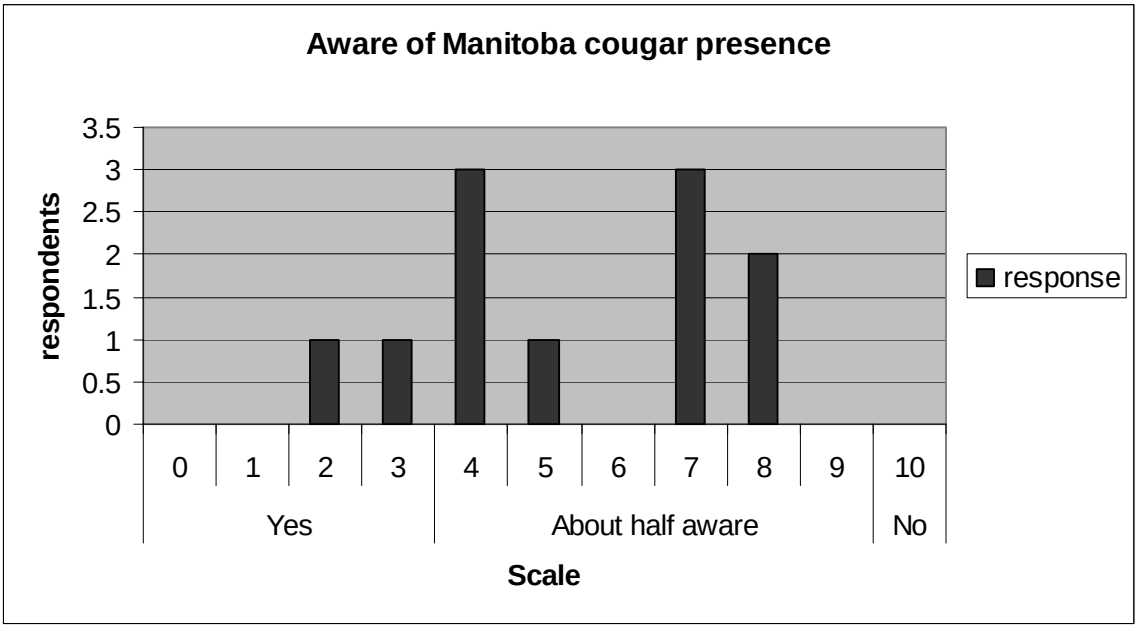


Figure 28. Summary of responses to the question shown above.

Experts Opinions (point form):

–I would say likely more believe they are present where or when they are not.

-rural populations are more likely to have an accurate perception.

-this is just a wild guess, based on largely on my belief that most people on the average are oblivious and or uninformed about the natural world around them.

Summary of responses to the question,

Does the legal status of the cougar in a state or province significantly affect protective measures and conservation efforts?

Experts Opinions (point form):

-assuming you mean management/conservation status or ranking.
-If it's not legally protected then protective and conservation efforts are futile
-Legal status does not necessarily mean any active management is taking place.
-Texas has no limit on numbers or season dates. Cougars may be taken at any time. Our mortality data show stable numbers are voluntarily reported as harvested annually. Long term data from Texas Wildlife Services 1920's-2003 indicate long term increase in population.
-They need to be a GAME ANIMAL or the general public and hunters will not support their presence. Very important.
-Eastern cougars are listed as a regionally endangered species, which prohibits any harvest or trade. There are currently no recovery plans for cougar.
-bounties, unlimited seasons, seasons, full protection will certainly result in different outcomes.
-classified as game species, with regulated seasons and harvest are also accompanied by interest in active conservation. Full protection states may or may not have an associated conservation program.

-if killing cougars is prohibited entirely or partly, then the only people who will do it are violators, those being attacked, and control personnel under permit. Thus, fewer may be killed, unless depredation permits are many.

-some poaching, but mostly safe.

-public education is also critical

Do you think that the home range selected by a cougar is affected by human residence?

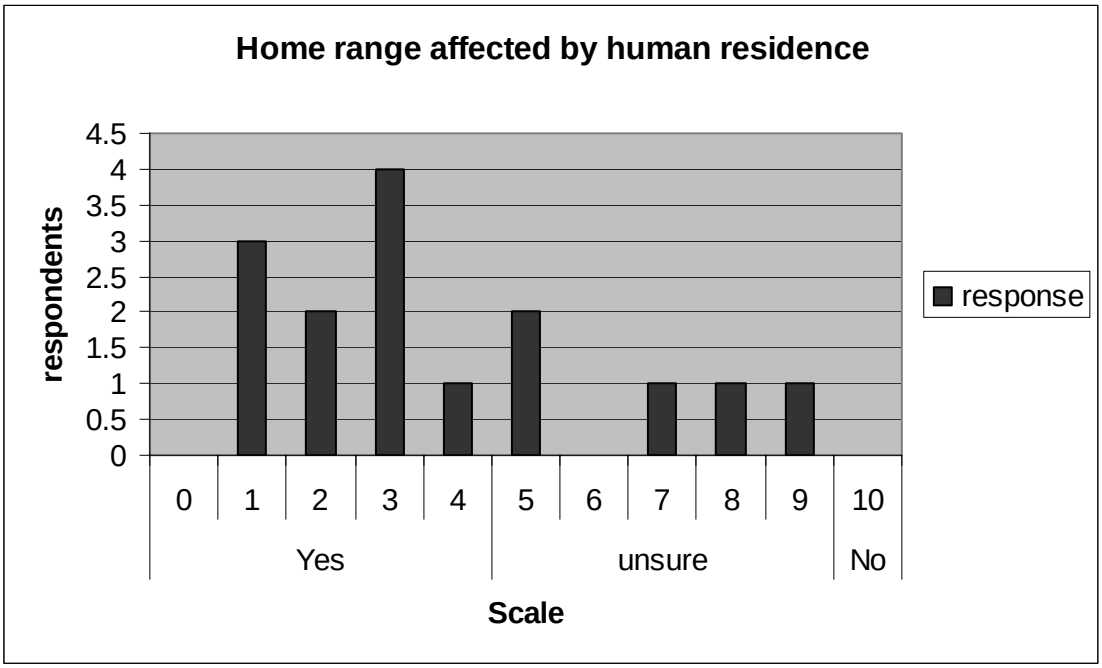


Figure 29. Summary of responses to the question shown above.

Experts Opinions (point form):

Somewhat, they can become very used to the presence of humans over time and occasionally see humans as prey in rare occurrences (e.g. Banff). Other predators such as grizzly bears and wolves have more effect on home range than human use though.

-again, depends on types, levels, concentrations, human population densities, and their behaviour.

-Certainly cougars occupy habitat close to humans but if human disturbance is high the habitat becomes “less attractive” to cougars.

-In general, if the opportunity to avoid human presence is available, they are likely to avoid it.

-Some cougars may pass close to residences while traveling, home range but activity near residences in limited.

-Presence of deer will dictate where they will reside (cover is important too, no prairie???)

-one would assume that home range selected by a cougar is affected by human residence.

-will live in close proximity to people and even urban areas. (Nova Scotia)

-seems like several studies have demonstrated a degree of aversion to human activity.

-cougars live close to human residence throughout Western North America as well as elsewhere I presume.

-to the degree that human presence equates with changes in both vegetation, and distribution of prey species for cougar.

-cougars may be either attracted by pets, tame deer, other prey, or may avoid human residence if attractants are not present and especially if they have had uncomfortable experiences with people

-most cougars avoid human residences, but some do come out to town.

-I think that where there is prey, hunting cover, and denning sites, even with human residence, cougars can exist and might even select or maintain home ranges.

Cougars observed in Manitoba often appear unconcerned for a period by the presence of an observer on foot or in a vehicle. Do you agree that cougars farther west, where they may be hunted, have learned to be more secretive?

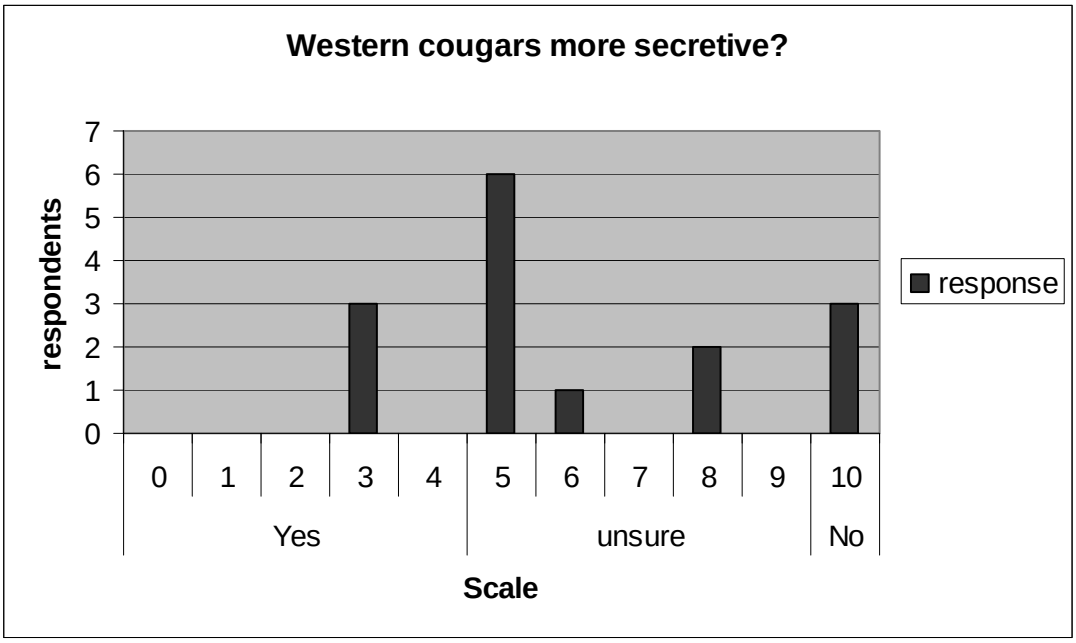


Figure 30. Summary of responses to the question shown above.

Experts Opinions (point form):

-Even where they are not hunted, (i.e. in national parks) they are still very secretive. It is their nature to be quite secretive.

-They are all secretive and nocturnal. They will be in Manitoba as well. If an individual cougar is being seen regularity, we remove it.

-Each year there are 40-50 reports of cougars here. The majority of sightings are of fisher or bobcat. Most of my responses regarding habitat, prey, etc. are speculation as our cougar population if unknown. Most people believe that if there are one or two cougars in New Brunswick, there are probably the result of a release or escape. For, example, cougars can be bought in the U.S. as pets.

-they are mostly nocturnal hunters, seldom seen.

-it is my feeling that the pattern of sightings of cougars anywhere there are cougars remains fairly consistent, with some observations more glimpses, and others occurring over a longer time frame. Cougars also seem to show up in suburban, urban, and wild areas across their range, regardless of hunting policies.

Round 1 Manitoba Survey explanations

Summary of responses to the question,

Do you think there is sufficient habitat to sustain indefinitely a cougar population in Manitoba?

Expert opinions (point form):

-assuming current levels of human population and development remain indefinitely, I think there is plenty of habitat. However, it is reasonable to expect people and development to slowly increase in cougar range, resulting in conflicts with cougar management. Viewing this long-term (centuries), the future does not look bright.
-the northern 2/3 of Manitoba could certainly support a natural population of cougars
-There are still large tracts of undisturbed habitat with healthy prey (deer) populations associated with the southern boreal forest and parkland interface that I don't anticipate will change significantly in time.
-I think that this has been demonstrated by their occurrence here over a considerable period.

Summary of responses to the question,

Animal populations need an influx of unrelated individuals to maintain genetic variation. Do you think Manitoba has enough cougars to permit a healthy gene pool?

Expert opinions (point form):

-not enough info to state definitely

-hard to answer this question, know so little

-although the Manitoba populations is small, it would not require the occasional arrival of many OUTSIDERS, with a different genetic background to maintain genetic diversity, of course, this depends on unrelated animals being available in adjacent provinces and states.

-Extent of its range and abundance is very hard to determine but in all likelihood that influx is not happening sufficiently to maintain genetic variation in the long run.

-Possibly-but there is no data available.

Summary of responses to the question,

Are there relatively undisturbed wildlife corridors available to allow for cougars passing from one area to another?

Expert opinions (point form):

–There are still tracts of wilderness, or at least some natural habitat on agricultural lands, connecting Manitoba with Saskatchewan, North Dekota, Minnesota and Ontario.

-It really depends upon the area you are referring to. No corridors needed in northern 2/3 of Manitoba, but not enough corridors in southern 1/3 of Manitoba.

-Based on reliable sightings or indirect observation, wildlife corridors are important but not self limiting to cougar movements. Because of their secretive nature, I believe that they can traverse open farming areas and sparse habitat without being detected. Wildlife corridors are a bonus if they are present since they are likely to contain prey.

-This secretive animal should have no problem moving about.

Summary of responses to the question,

The majority of cougar sightings describe a cat with a long tail. What other animals could be mistaken for a cougar?

Expert opinions (point form):

-would be mistaken by folks unfamiliar with what cougar look like.
-One thought that the Fisher would be in some rare cases mistaken for a cougar.
-any of the long-tailed mammals could be incorrectly identified and there is the good record of a cat (house) identified as a cougar by biologists. There are so many variables involved with a sighting, there are bound to be some poor ones. Fortunately, there are so many GOOD sightings; it makes the likelihood of their being a cougar quite positive.
-upon poor lighting condition any of the about would be mistaken for a cougar by someone with an imagination. House cats have been known to confuse even professional wildlife biologists.
-Depends upon circumstances, observer experience-this has already been demonstrated.

Summary of responses to the question,

Considering deer, hare, and small animal prey, is there an adequate food supply to sustain a cougar population across the southern third of Manitoba?

Expert opinions (point form):

-“what do I consider to be a cougar population?”

-there is so much wild landscape, and good-quality agricultural-forested lands, that prey is relatively abundant over Manitoba cougar range. Cougar would quickly abandon poor areas or areas with fluctuating low numbers, and seek out areas with more opportunity to hunt successfully.

-there are sufficient deer at this time to support a cougar population, but that could change with a few winters with deep snow.

-There is a healthy deer population and has been for the past 20 years; in many years there is adequate alternate prey in either hare or jackrabbit and even cottontail rabbit and I have never considered prey abundance as a problem for cougars in Manitoba.

-Cougars seem to have been here for a long time already, and the deer population is high.

What prey species do you think would be important in the diet of cougars in Manitoba?

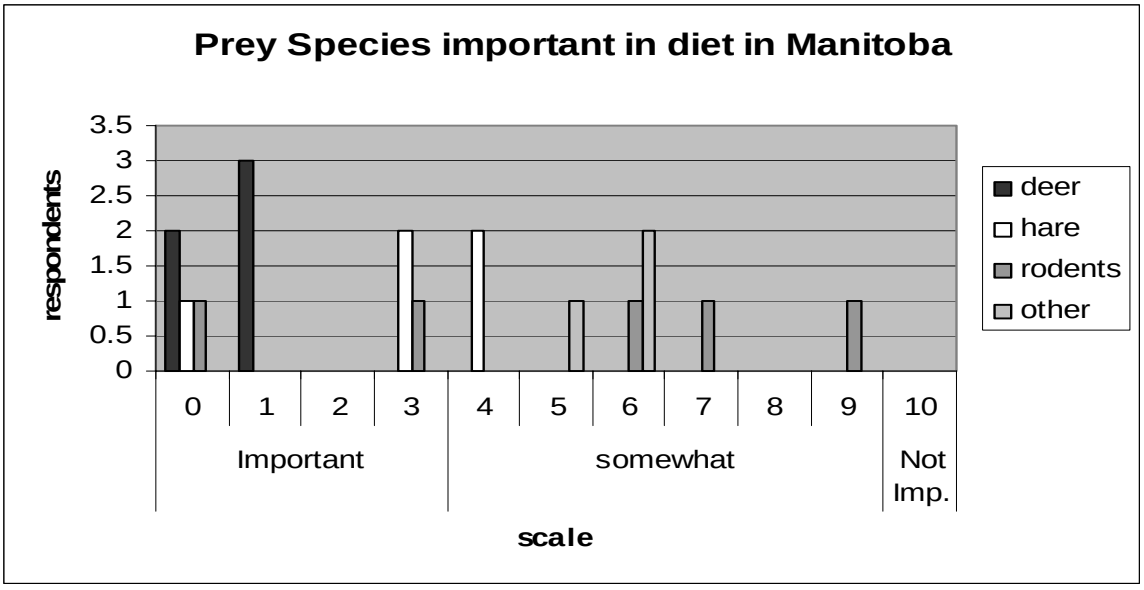


Figure 31. Summary of responses to the question shown above.

Expert opinions (point form):

-other suggestion by one was birds (6)

Summary of responses to the question,

Considering available habitat in Manitoba, what size of cougar population could Manitoba sustain?

Expert opinions (point form):

-depends on what area of Manitoba you are referring to.

Summary of responses to the question,

Do you think that cougar sightings in Manitoba represent resident animals or migrating cougars from other regions?

Expert opinions (point form):

-This is an educated guess – to determine for sure need some telemetry data – otherwise pure speculation.

-a cougar can travel over 20 km's in one night, and since habitat is good along Manitoba borders, I think some cougars move in and out, or talk long journeys in search of a mate

or home range. Since we have a breeding population, this is good evidence that many cougars, especially in central areas, remain in the province.

-Cougars are very elusive; it is very difficult to see them even when there are relatively large populations.

- I believe that there always were cougars moving into Manitoba and it was only in the past 30 years that a minimum critical mass has been able to establish residence in Manitoba. Individuals continue to move into Manitoba and help maintain a very small population that probably has very limited reproduction success. Therefore, the sightings are a combination of resident and migrating cougars.

-In the absence of records of marked individuals, this is fairly speculative.

Summary of responses to the question,

Are the majority of cougar sightings in any region taken seriously and accurately documented/ reported to the proper authorities?

Expert opinions (point form):

–there are likely over 500 reasonably good records on file, which suggests that many of the better records are preserved, but of course, many observations go unreported for a variety of reasons. At the very least, Manitoba Conservation had had staff recording records for decades. Some public relations efforts have also encouraged public response.

-Some observers are wary of reporting sighting to friends and neighbors because they are fearful of ridicule.

- There is always the element of disbelief by some people that they will be taken seriously if they report a cougar sighting.

-Highly variable, depending upon observer/authority contact, individual interest and training, etc.

What habitats do you think cougars would prefer in Manitoba?

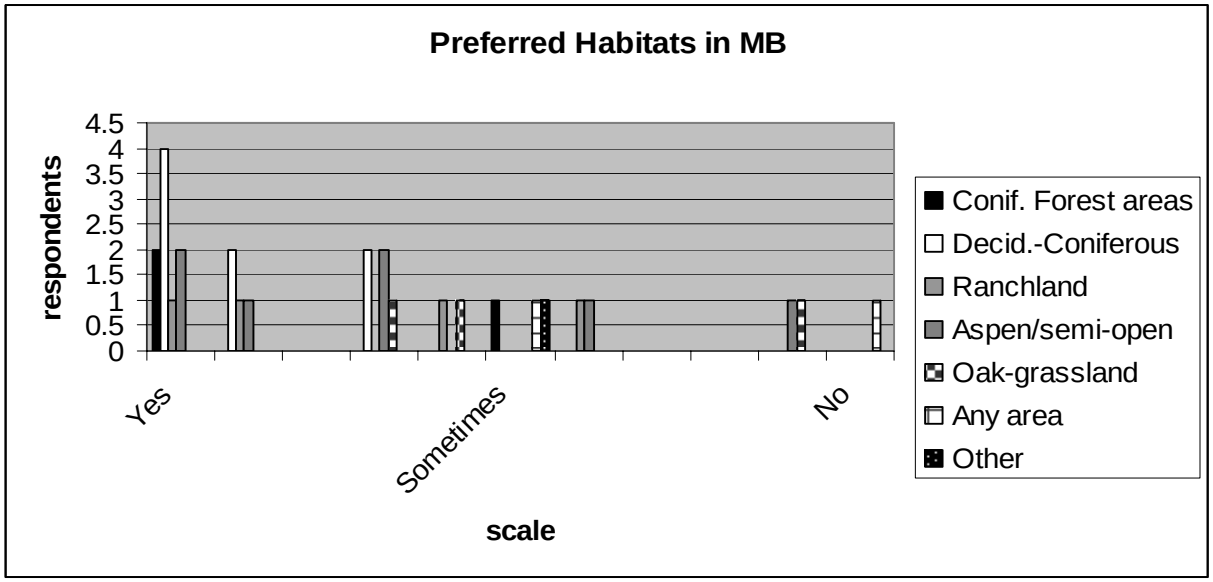


Figure 32. Summary of responses to the question shown above.

Expert opinions (point form):

What habitats do you think cougars would prefer in Manitoba?

Summary of Manitoba Expert Choices
1. Deciduous-coniferous
2. Coniferous. Forest areas
3. Aspen/semi-open aspen

Table 15. Summary of responses to the question shown above.

-Have photographed cougar tracks in the boreal area and have seen tracks in Spruce Woods – they likely can make it in agriculture areas and boreal area where adequate food supply prevails.

-The wilder the habitat the better, since it is more likely to provide the essentials of food, shelter and less disturbance from people. Cougars are so adaptable, the type of vegetation/topography becomes secondary to the about factors.

-I believe cougar can exist in most habitats if they are not lulled off by humans.

-They move about-though not often in urban areas

Summary of responses to the question,

In Manitoba, what percentage of cougar sightings from the public do you believe are actually a cougar?

Expert opinions (point form):

-none

Summary of responses to the question,

Does the presence of kittens with the sighting of a cougar make for a reliable judgment of a resident cougar population?

Expert opinions (point form):

-Kittens certainly cannot migrate any great distance and with conception being comparatively short (compared to large ungulates) females will not likely undertake long migrations in late winter with all its hazards prior to birthing.

-research shows that only residents are successful breeders. Transients are less likely to be able to find sufficient prey to nurture a family.

-I doubt that a cougar with small cubs could do such long distance traveling.

- It is very likely due to the behaviour of cougars during the reproductive or birthing period.

-Seems fairly likely.

Summary of responses to the question,

What are the main factors limiting cougar populations in Manitoba?

Expert opinions (point form):

-*Severe winter cold. snow depth, human intervention, and prey species are the main.*

-probably severely fragmented habitat as southern part of province

-The cougar had a distribution which went from northern B.C. southward to South America - adaptive species

-humans hunting and removing deer/elk/moose I think are more important than competition with other wildlife predators. Manitoba is at the very northern limited for this species—one of the widest ranging and adaptable of all carnivores. Winter stress,

lack of prey availability in winter and human disturbance/activities I believe all act to maintain low numbers, compared to Alberta and BC.

-highly variable factors are hard to relate.

Summary of responses to the question,

Do you think that the general public is aware of the presence of cougars in Manitoba?

Expert opinions (point form):

–cougars are seldom observed, due to their secrecy, and this animal is seldom in the local or national news—hence few people know about it here. More and more Manitobans are becoming urban, lessening opportunities to learn about them in nature.

-there has not been much publicity over the past two decades.

Summary of responses to the question,

In 1973, a cougar was shot and killed at Stead, Manitoba. Do you believe this was a resident cougar in Manitoba?

Expert opinions (point form):

-as the regional biologist investigating the issue my guess at the time was YES.

-the animal was sub adult in south-central Manitoba; there it is unlikely to have traveled long distances (e.g. 500 km) from Sask. or Ontario.

-Based on apparent age and sex of the animal, it was probably a young migrating cougar.

Summary of responses to the question,

Does the legal status of the cougar in a state or province significantly affect protective measures and conservation efforts?

Expert opinions (point form):

-Legally protecting the cougar helps publicize its occurrence here, and ensures a basic level of research interest and concern by Manitoba Conservation and lastly, helps discourage senseless shooting/trapping/disturbing the animals.
-If considered a varmint every hunter will take a shot once, if protected; only the poachers will kill them.
- Probably not in reality since a landowner will protect his property as in the Stead case regardless of whether there is a wildlife regulation or law prohibiting the killing of a cougar. Over time, there is an education process and a public awareness that the status of cougars is and should be protected.
-sure, it's a good beginning. Informed resource staff helps ensure status of wildlife is recognized.

APPENDIX 3

Round 2 Non-Manitoba Survey explanations

Summary of responses to the question,

There are APPROXIMATELY 150,000 deer in Manitoba. If deer are the main prey species of cougars, why are there not more cougars or cougar sightings in Manitoba?

-We have a very healthy cougar and deer population in Banff, but rarely if ever get sightings reported due to the elusive and secretive nature of the animals. Most people aren't aware of what cougar sign looks like or actual cougars look like and often get them confused with wolves and coyotes or even dogs.

-I'm not familiar enough with Manitoba's cougar population to say if your population is large or not.

It is generally accepted that many puma observations don't get reported. While this is likely true, it is an assumption that somehow should be tested, if possible.

-Also, having recently been in Manitoba for the first time, in January 2004, I am not convinced today there is a resident population of pumas present in the Province. This may reflect a change in my beliefs since I completed the first questionnaire in late 2003 or early 2004, as I formerly accepted the notion that there was small resident population of pumas in Manitoba.

-Regarding the study of pumas, the definition of “hard” is open to debate. Studying any low density, widely ranging species is challenging in many respects, but where the species is present it can be readily studied with the appropriate people power, funding, equipment, etc…

-Presence of deer would be the primary determinate for presence of cougars; 150,000 deer should provide an adequate prey resource to maintain a cougar population

-Although the primary prey (deer) are abundant in most southern areas of Canada, other factors such as habitat, etc. may be limiting.

-While all of the above may, in part, be true, there really is insufficient information provided to give a good answer. What kind of cougar hunting season is there? What does the habitat look like (is there insufficient stalking cover)? There is more to a cougar population than what it eats. Further, what kind of density does 150,000 deer translate into? Perhaps there are, indeed, too few deer. So, I may choose to put a “5” on all of the above possibilities, but the question of why there are not more cougars in Manitoba have not been answered.

-Habitat condition prevented migration to Manitoba.

-Possible explanations for few cougar, given adequate prey base, include: high mortality, disease, even genetic factors.

-If you have hounds men (coon, bears, etc.) you will know quickly if you have cougars, as they will tree them.

-Being near the edge of the range and with the severe winter climates, maybe the population density is naturally held low. I need to know density of deer in occupied range, not number

a) Do you think there is any need to further protect or increase the present deer population of 150,000 to encourage a higher cougar population?

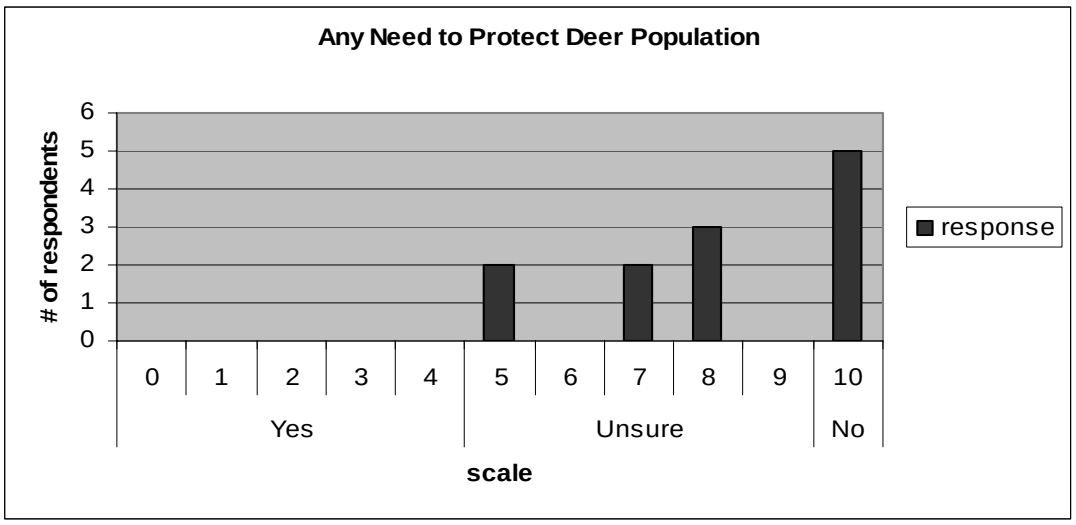


Figure 33. Summary of responses to the question shown above.

-Most of the deer population in Manitoba is currently unexploited by predators with the exception of wolves in the northern and eastern part of the province. Man is currently the only predator of the majority of deer in the province. The prey base is there, but there isn't enough hiding cover or topography in a lot of instances.

-Again, there are many issues to deal with here; I am not familiar enough with Manitoba's biological, political, and social situation to say anything regarding cougar population size

-I am not intimately familiar with Manitoba's deer population or mgt plan, but my sense is that there is a suitable number of deer, as well as a suitable amount of habitat, to support a puma population. What may be missing is a regularly available "supply train" from some other nearby population to provide the breeding stock or seed to get a population started.

-As indicated above, prey may not be the limiting factor.

-Deer have become a nuisance species in many areas. If they haven't yet they will become one without active management as provincial population and development grows.

-If they show up, that's ok, 150, 000 not that many deer.

-This begs the question, is the management objective to increase, maintain, or decrease cougar? If to increase, next step is to understand what is limiting the cougar population, is it food, or something else?

-no, but healthy prey equals healthy cougars.
-I need to know density of deer in occupied range, not number

b) What OTHER type of protection do you feel MIGHT AID in the growth of cougar population?

-COMMENTS: I wasn't sure if these questions related to Manitoba specifically, or to some general area where puma mgt might be of interest. Habitat, corridor and sanctuary protection can all be helpful, certainly, if the habitat is appropriate to pumas and, in fact, if such protections are even necessary. Again, in Manitoba, my sense is that there is adequate prey and habitat right now, and simply just a dearth of pumas due to the lack of "seedling" individuals from which a new self-sustaining population could sprout. Efforts to more strictly manage a species like the puma with habitat protection, corridor identification and establishment and protection, and/or the creation of wildlife sanctuaries, in Manitoba or elsewhere, can backfire if the public is not supportive of pumas or if the public resents formal intrusion by government into local wild lands mgt.

Other: corridors for movement and population growth.

-cougars are quite tolerant of people. People are not tolerant of cougars.

Summary of responses to the question,

The majority thought that the home range of a cougar was most likely affected by human residence. Do you think that cougars attempt to avoid humans at all cost when developing their home range, or are they ADAPTING to sharing home ranges with humans?

-There are many examples of cougars sharing habitat with humans in North America (Banff National Park, most of California)

-Puma studies in the West suggest that pumas are not the obligatory wilderness animals we once thought they were. In southern California and in Colorado, for instance, the cats seem to be able to exist in close proximity to seemingly high densities of people. Again, habitat and prey base seem to take precedence over human presence as factors critical to puma existence.

-Throughout British Columbia and Western States cougars have been found to coexist with humans to some degree.

-They certainly choose to avoid humans in most cases

-some places have cougars in their downtown.

-people and cougars overlap her in Montana, the key ingredient is deer.

- Do avoid, but some will share

Summary of responses to the question,

The majority of respondents thought that prey composition along with abundance and competition with other predators would be the main factors in limiting cougar populations in North America. Do you agree with this statement? Yes or No. If NO, why not.

-Competition with other predators including man, is probably a more important limiting factor. There is an abundant prey base across most of North America and cougars can adapt

to various types of prey dependent of availability quite readily. Competition with wolves may an important limiting factor as proved by some recent scientific publications.

-I include hunting under the umbrella of "other predators". Hunting can affect cougar population abundance.

-As noted above, I really feel prey base and general habitat quality (a combination of area size, topography and cover) are the most important factors limiting cougar presence, coupled then with the lack of nearby populations to provide seed stock. Pumas are top carnivores and in the West co-exist with grizzly bears, black bears, wolves, coyotes, wolverines, etc…. While sometimes there is inter-specific strife (i.e. pumas killing coyotes or bobcats, or wolves killing pumas, etc…), I don't think the presence of other predators is a key factor in limiting puma presence or populations, or even the establishment of new puma populations. Keep in mind that arguably, as what was once perhaps the most widely distributed terrestrial mammal in the New World, pumas are the most adaptable carnivore out there. Competition then would seem to favor this animal over the other, less adaptable species mentioned above.

-Although prey composition and abundance may be a limiting factor, along with competition from other predators, habitat and weather (e.g. winter) may also be contributing.

-Certainly, suitable habitat with denning cover and stalking cover is key. If the answer was simply enough prey and lack of competitors, cougars would be all over Illinois and Kentucky.

-and hunting.

-In areas of high human populations, intense farming, etc., space is restricted by humans and connectivity of habitats is disrupted. This problem has not yet reached the state of being a main factor throughout North America. Witness the spread of cougars from the Black Hills toward the southeast.

Summary of responses to the question,

The most consistent response was that coniferous forest, deciduous-coniferous and aspen parkland/semi-open aspen ARE PROBABLY the most common habitat for cougars in Manitoba. Coniferous-forested areas, oak grassland or other areas that provided safe coverage were also reported as being important habitat for cougars in Manitoba. Do you agree with this statement, or DO YOU feel that since the cougar is highly adaptable, that they could almost live anywhere?

-Topography rather than vegetative cover may be a more important factor as cougars require good or excellent topography with cliffs, ravines etc. to allow them to effectively kill large ungulates. Flat, open or even flat treed terrain would not be very suitable as it may make it difficult to ambush their prey easily. Coniferous trees provide better ambush opportunities as they don't lose their leaves so grassland-oak would probably not be very suitable cougar habitat.

-I believe that all the mentioned habitats are important for cougar but only areas capable of providing favorable breeding habitat and habitat suitable for raising young should be considered year-round cougar habitat. I think cougars can use the other habitats for travel but it is not acceptable to think cougars are so adaptable that they can make a living there

-seems there are two different angles being discussed. One is the abundance of habitat ("…the most common habitat for cougars…") and the other is cougar preference for habitat ("…important habitat for cougars…" and "…they could live almost anywhere…").

I have only a general sense of Manitoba habitat, but in this frame of reference, I feel the Province has plenty of suitable puma habitats. In terms of what specific habitats are most common, I can't say, but that aside, I would agree that pumas would probably prefer mixed forest and aspen parklands. But I also agree that since the puma is so adaptable that other habitats may also provide some level of support for the species. The real key is learning where deer are most abundant and then extrapolating that such areas would be preferential habitat for pumas.

-Cougar are very adaptable to a variety of habitats; refer to their distribution in the western Hemisphere and their occupancy of a wide variety of habitats, from deserts to temperate rain forests.

-I am not familiar with habitat characteristics for cougar.

-Clearly, cougars are adaptable. But in Manitoba, they can only live in what grows there, so this seems like a rather obvious point.

-Forest obligate species. Even in desert areas occur in higher elevation forests.

-not well around livestock if native game is not abundant.

-Cougars will survive wherever deer survive

Summary of responses to the question,

A cougar sighting in Manitoba may or may not be a resident animal, depending on the situation. What factors do you believe would help determine if a cougar sighting was a resident cougar or a migrating cougar from another area?

-This could be 2 siblings dispersing from their Mom's territory

-Again, kittens are likely a "yes" but "young" may be siblings on the move.

-persistent observations

-DNA testing

-you will not know without a radio-collar. You need to radio some cats if you have them for monitoring purposes.

Summary of responses to the question,

The majority of respondents felt that of cougar sightings in any region were taken

seriously and accurately documented/ reported to the proper authorities in most cases.

Do you think that the general public would agree?

-Yes, but that doesn't mean the information being reported is entirely accurate, because most of the time it is probably not.

-I know Washington's database is kept diligently and I think the general public would agree with that.

-In Manitoba, reports of pumas seem to be met with objectivity and interest, but in many areas where puma presence is rumored or suspected, the general public feels that professional and/or agency biologists or experts are not taking the reports seriously. Moreover, there are unfounded but nonetheless growing numbers of citizens convinced that some agencies are intentionally denying or even discrediting puma reports because they are covertly releasing pumas in a secret, left-wing, environmentalist, biodiversity-motivated restoration project aimed at reducing deer numbers and restoring the original fauna to an area.

-Some members of the public do not report potential cougar sightings for fear of being criticized.

-I disagree with the basic statement. Based on my experience in the East, I believe that most reported sightings are incorrect, and that the authorities seldom take them seriously. I have no idea what the public might think because they are usually the source of the erroneous sightings.

-Professionals are relying on knowledge of a the public to provide the sighting information – errors are inherent.

-for the most part, we got a lot of yellow labs and retrievers reported as cougars.

-Witness the very many complaints on the Eastern Cougar list server about agencies failing to take reports seriously. The situation may well be different in Canada. I do not agree that most sightings are reported.

Summary of responses to the question,

a) Do you feel that the general Manitoba population is not as familiar with or educated as much about cougar characteristics as the population in more densely cougar populated areas?

-Local familiarity is very important for people to be able to understand and interpret cougar sign and sightings accurately. There is most likely not enough local familiarity in Manitoba and a lot of the word of mouth information is probably of the "old wives tale" or urban myth variety rather than being based on scientific fact.

-My sense is that the general public anywhere is woefully ignorant of the natural world around them. However, where there is a recognized puma presence, for instance in the intermountain West, people seem to have an awareness of the species. This awareness is less evident in Manitoba. But, having said this, in both cases, the awareness should be much more (i.e., even where there are pumas and some awareness about the animal, people are still sadly ignorant, misinformed, and/or disinterested).

-Typically areas that experience cougar/human interactions will promote safety and educate the public.

-Pubic in general lack knowledge of cougars regardless of cougar density/presence.

-Areas where cougars are numerous and interact with humans regularly are areas where public are best knowledgeable about the species.

b) Do you feel lack of cougar knowledge plays a major role in false cougar sightings?

-Even in Alberta and BC where cougar sightings and sign are relatively common, erroneous reports happen on a daily basis.

-Washington investigates hundreds of call per year that are confirmed as yellow labs, coyotes, bobcats, and feral pets.

-A general lack of knowledge with regards to other wildlife also plays a role as many possible cougar sightings are of other wildlife such as fishers, coyotes, etc.

-Most people cannot accurately describe a cougar and are inept at determining weight, length, and distance.

-particularly, basic knowledge of size, shape, color and habitats is critical to public reporting accuracy.

-dogs are commonly reported as cougars, (light colored)

-Unless one is truly expert, distance, perspective, and lighting can lead to misidentification. There are few people who have sufficient expertise to avoid this problem.

Summary of responses to the question,

The majority thought that 50% of cougar sightings go unreported. Do you think the reason could be:

-lack of knowing who to contact.

-I think many folks grow up knowing cougars are a part of the ecosystem and a sighting doesn't constitute a "complaint" and therefore feel no need to call.

-main reason is don't know anyone interested in it.

Summary of responses to the question,

The experts were divided evenly on whether they thought the general public was aware of a cougar presence in Manitoba. Why do you think that so many are not aware of a possible presence of cougars in our province?

-Warning signs cause unnecessary alarm. If you want people more aware of cougars, conduct outreach to them. Generally wildlife agencies don't education beyond their core constituents: i.e. hunters and fishers.

-interest

Summary of responses to the question,

The majority of respondents thought that yes, the legal status of a cougar affects it protection measures. What type of protection would be most effective?

-The most common responses among the experts were that "sometimes", the most effective protection choice would be the: Federal SARA and National Recovery Plan

-It would have to be a provincially managed plan as cougars are managed very differently in the two westernmost provinces where there are active hunting seasons. A national recovery plan or even SARA listing would not be worthwhile or practical due to the great variation in regional populations.

-I think cougars can be effectively managed by the Province's wildlife Department. The key is to have population estimates and a management plan in place.

-I am not sure what SARA stands for, but suspect it is some sort of national endangered species protection program. I generally support protecting rare species under such national laws, and in fact there may be legal mandate to do so, but there are cases, and the puma in Manitoba may be one, where it makes some sense to have protection afforded via lower levels of govt. Here again, perhaps even a Provincial endangered species designation and mgt program might be perceived as too heavy handed by the general public, especially outdoors people, and thus undermine the true intent of the protection in the first place.

Sometimes, listing the animal as “non-game with no season”, rather than threatened or endangered, may be the most effective and palatable option.

-cougars are not endangered species within their range.

-Provincial Recovery Plan by Fish and Wildlife aging.

-Game animal status with regulated hunting seasons has allowed cougars to flourish in Montana.

-currently no status federally as considered data deficient (OMNR)

Round 2 Manitoba Survey explanations

Most experts agreed that Manitoba has enough habitat to support a cougar population.

If so, why is Manitoba's population not larger than believed to be?

To what degree do you feel each of the above may affect the population?

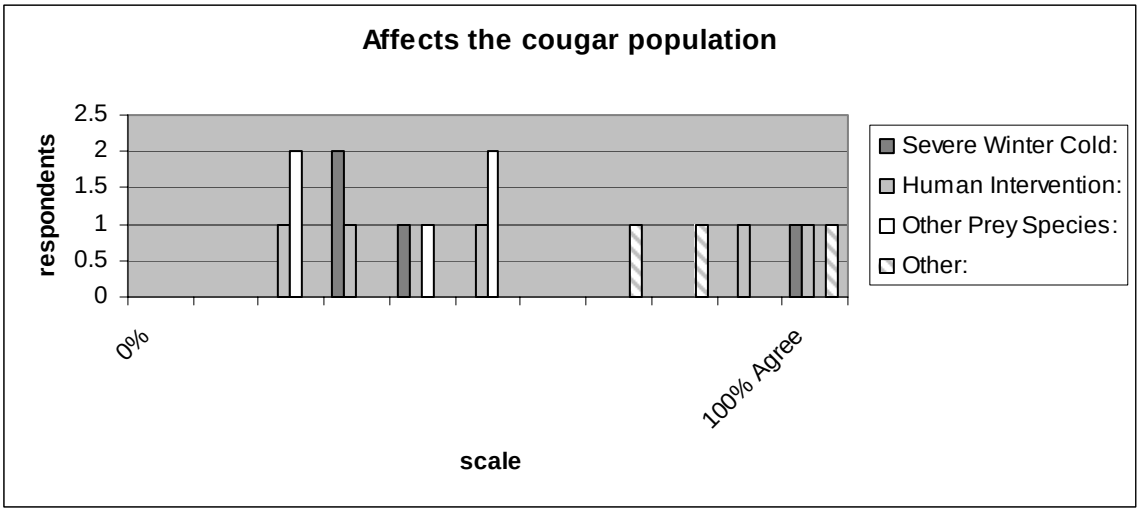


Figure 34. Summary of responses to the question shown above.

A. SEVERE WINTER COLD: Winter cold may affect the survival of younger cougars. The majority of respondents thought severe cold was moderately important, but snow depth and type was not considered overly relevant.

-I disagree with several points. I think winter cold, wind, snow depth, crusting, and especially length of winter are all important factors in limiting the numbers of both adult

and young cougars in Manitoba, although I would agree that the young will be hardest stressed. The length of winter (i.e., up to six months of snow cover) is a point not often raised, but our cougars are stressed for a longer period than cougars living elsewhere – for example in warmer climates or on mountains where the animals can move up and down elevations to find more suitable living conditions. Our cougars can retreat nowhere to achieve this. The Manitoba sub adult shot in 1973 had most of the hair frozen and pulled off on the hips from laying in the snow, resulting in a huge loss of body temperature. This would not be serious in 80% of the cougar's range, but here, the cold could eventually have killed this animal from heat loss.
-disagree; snow depth should be a factor.

B. HUMAN INTERVENTION: cities, farm buildings, roads, railroads, etc. The majority of respondents thought that human disturbance was a large factor in limiting cougar population.

-All the big cats are uncomfortable when people are around and this factor can be quite complicated – sound, smell, habitat disturbance, reduction in prey species, and likely other factors. They all combine to cause stress in the animal, some individuals more so than others. If starving, however, observations have demonstrated that individual cougars can overcome the natural avoidance of people and to approach in close proximity – such as entering towns, cottage communities, and even to attack people. Also witness the large number of sightings of cougars watching passing cars and tractors, if outside the flight distance. The presence of people would be more important in extreme southern

Manitoba, where people and developments (e.g., agriculture and roads) are common, but less so in the northern parts of the range.

C. OTHER PREY SPECIES ABUNDANT: Coyotes, wolves, fox, owls, etc. may kill off young cougar cubs.

-While I agree that cougar predators may have an effect in reducing cougar populations (Big cats are not always the best mothers.), I do not believe this is a highly significant factor. Few animals would approach a mother cougar with cubs, and the latter would be threatened only if they became lost. Predators, including black bears, are not all that abundant in the North, and notable absent or in lower numbers in southern Manitoba.

D. OTHER. Specify.....Disease and parasites

-At the northern edge of a species' range, animals are obviously stressed by a number of limiting factors. Consequently, individuals are more likely to suffer from diseases and parasitism, since their general health and immune system may be compromised. Other large animals (deer and moose) are often weakened by tick infestations.

-minimum viable population, the total number of cougars in Manitoba is probably quite low naturally for unknown reasons.

-I believe that the size of the deer population and the depth of the snow are major factors controlling the cougar population. I also feel that there a lot more cougars around but they

are very secretive and keep hidden. By the way I saw cougar tracks at my property 2 miles northwest of Sidney Manitoba in May this year.

-probably simply not enough to jump start the population – mortality=natality *(this statement received after first cougar kill confirmation)*

Summary of responses to the question,

The majority of experts feel Manitoba has enough undisturbed corridors available to maintain genetic variation for a healthy cougar population.

a) Which of these corridors do you feel cougars would use often?

-Shrubby fence rows or any other cover that serves to give the traveling animal a greater sense of security

-where there are sufficient prey species. *(this statement received after first cougar kill confirmation)*

b) Do you feel that the following are a threat to suitable corridors?

-I think everything humans do, either their direct presence or indirect habitat disturbances (even smells like smoke and exhaust), cause stress in cougars, since the animal has evolved to avoid detection (i.e., stalk prey and avoid predators). The species and individual animals can only adapt so far to humans without having significant deleterious consequences.

-Cougars seem to tolerate human intrusions such as roads, vehicle activity to some extent in other areas in Western Canada and California.

The majority felt there is an adequate food supply to sustain a cougar population across the southern third of Manitoba. The majority of responses suggested that deer would be the main prey species of cougars in Manitoba.

What percentage do you feel the following would make up in their usual diet?

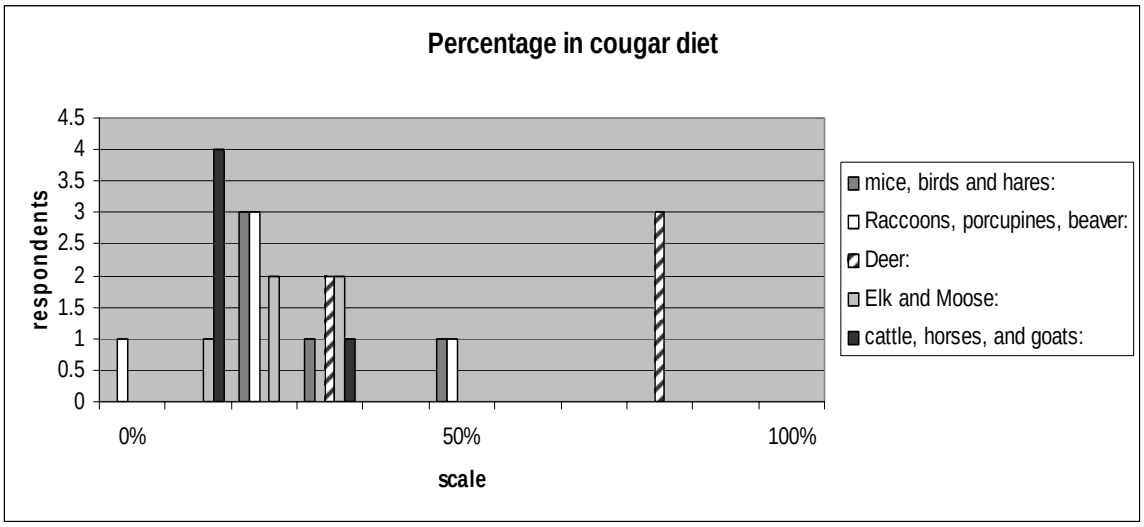


Figure 35. Summary of responses to the question shown above.

-I think cougars will be feeding on anything they can capture (and carrion) and consequently they will be utilizing the most abundant prey items, namely small animals such as mice, hares and birds.

Experts believed the most preferred habitat in Manitoba for cougars were coniferous forest areas, deciduous-coniferous areas, mixed forest, and mountainous (hilly) areas.

a) Do you feel cougars chose these areas in Manitoba because of?

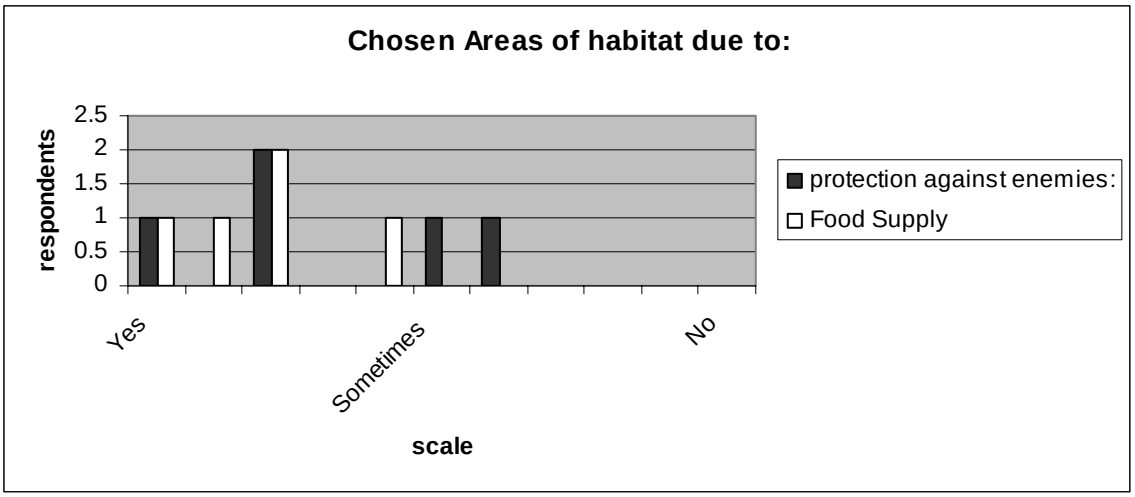


Figure 36. Summary of responses to the question shown above.

A: their secluded coverage for protection against enemies

B: food supply (which also uses forested areas as coverage).

-I don't know how one would separate the importance of these two factors, since they are so critical and integrated.

b) Cougars are known to have lived in many different habitats across North America from deserts and swamps to mountains and prairies.

Since the cougar is highly adaptable, do you feel they will eventually adapt to living in more populated areas if secluded areas and food supply are not abundant?

- Although some species appear to have adapted well to the presence and works of people (e.g., raccoon, Canada goose), evidence shows that big cats are not so adaptive. Perhaps this is because of their evolutionary history as dominant predators relying on stealth, need for secrecy, and solitary habit (Only the lion is sociable, largely based on prey and hunting factors.

-No, or cougars would have become much more abundant in Manitoba by now.

-Cougars are commonly seen on Vancouver Island now because of the influx of humans into the area and their negative impact of the cougars.

What factors do you believe best determine whether cougar sightings in Manitoba represent resident animals or migrating cougars from other regions?

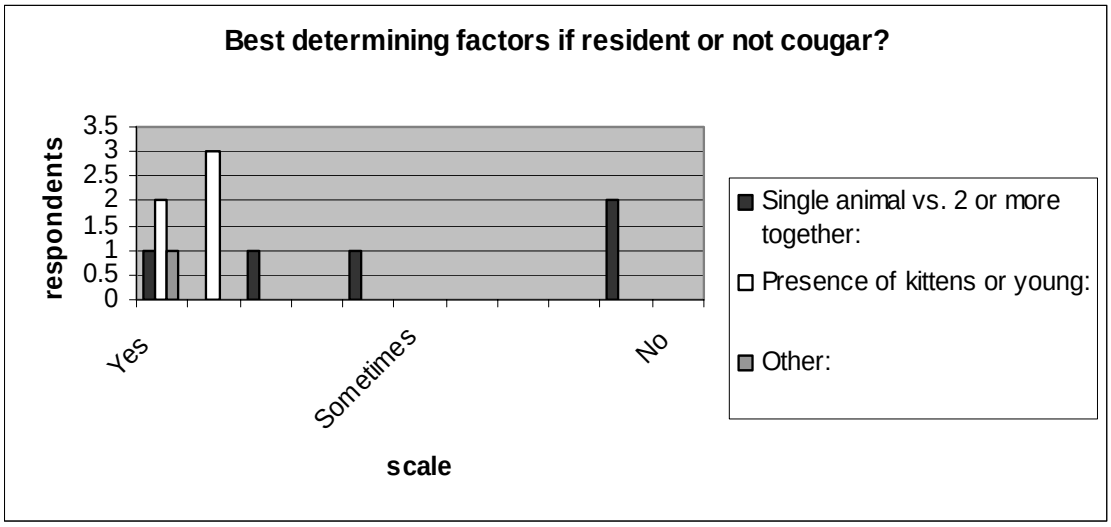


Figure 37. Summary of responses to the question shown above.

-I can see a conclusion of transiency for a few sightings over many years, but when the sightings number in the hundreds over decades, and along with reproduction evidence, it is clear that cougars are resident

Summary of responses to the question,

The majority of responses believed the presence of kittens indicate a resident cougar population. However, taking into consideration that many sightings are false, and kittens well hidden by their parents, what percentage of cougar kitten sightings, do you believe are actually accurate?

-While I accept that some observations may confuse cougar families and other species, cougars are so different than other cats and possibly other species that I conclude most sightings of a female and young are true.

-Once you see cougar kittens, almost always accompanied by a mother, the actual sighting of this combination is hard to mistake.

Summary of responses to the question,

The majority of Manitoba experts believed 70% of cougar sightings from the public were actually a cougar. Therefore, 30% of sightings mistakenly identify other animals such a deer, bobcat, lynx, fox, house cat from a distance, etc. for a cougar. The majority of cougar sightings describe a cat with a long tail. Other factors such

as coat color and cat species also play a part in sightings. As sightings alone can not be determined as scientific fact that cougars exist, what other measures can be taken to collect scientific data? How do you rate the following methods?

A: Cougar DNA kits attached to trees in areas of cougar sightings, in hopes of obtaining DNA from a cougar who may scratch against the scented kit.

-This evidence is very accurate and foolproof.

-Chances of cougar attending to a scented kit is probably quite low due to low number of cougars in most areas.

B: Collecting DNA samples from the vicinity of a suspected cougar livestock kill.

- Same as above

- maybe, if cougar hair or other evidence is actually found.

The majority of respondents thought that disturbance by people was an important factor in limiting cougar populations in Manitoba and that severe cold were somewhat important. Snow depth and type were considered not overly important in limiting cougar populations. Do you agree or disagree with this statement?

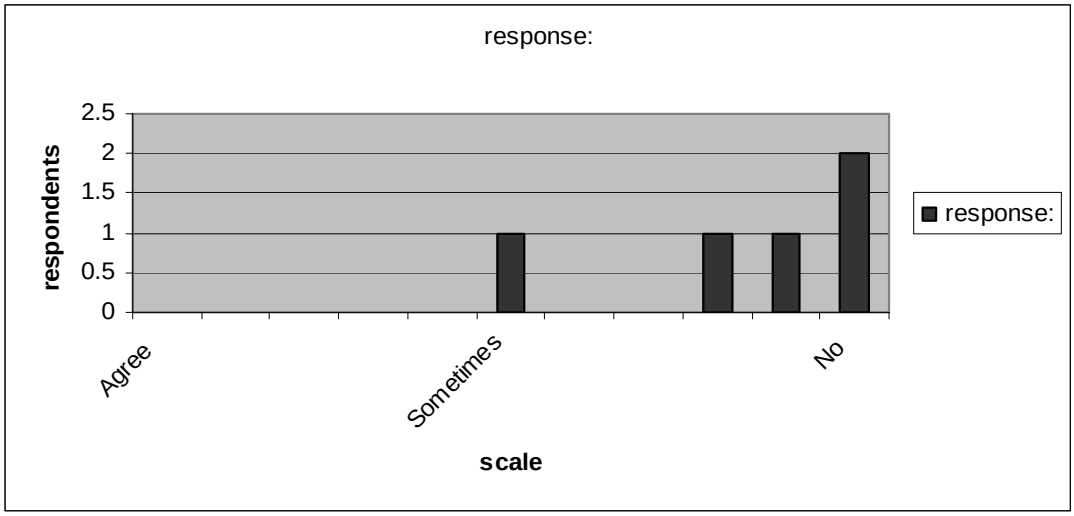


Figure 38. Summary of responses to the question shown above.

-For the reasons given in an earlier question, Snow depth and type would not differ significantly from those at other parts of the range where cougars are more abundant. However, with our exceptionally long winters, even average snow depth and type may become limiting to cougar survival. It makes a big difference for an animal having to walk/jump through and sleep in 75 cm of snow for three months and six months. The winter and annual energy budgets are completely different.

-I disagree with the disturbance by people portion, agree with the rest.

-They are known to avoid deep snow.

-Deep snow and lack of deer could limit cougar numbers.

Summary of responses to the question,

In 1973, a cougar was shot and killed at Stead, Manitoba. THIS IS THE ONE SOLID PIECE OF EVIDENCE OF COUGARS IN MANITOBA, so then why would you think there would be such a disagreement to whether it was a resident cougar or not?

-There is no way of proving the origin of the Stead individual (or any other animal for that matter), but note that related observations in the area suggest it was present for some time. One can conclude that all the hundreds of other acceptable observations can't be all transients, and other evidence, such as reproduction, bolster the conclusion of a resident population.

-We still have very little circumstantial evidence as to why this cougar showed up at Stead and was shot. I am unaware if DNA analysis has revealed point source location of origin (whether it was Manitoba or elsewhere).

-Being the biologist in that area at the time, I have 1st hand knowledge that people were guessing with no basis to substantiate what was right or wrong. I have since photographed cougar tracks just east of this location. *(this statement was received after the first cougar kill confirmation-4 months after the rest of the surveys were received).)*

Summary of responses to the question,

The majority of respondents thought that yes, the legal status of a cougar affects its protection measures. What type of protection would be most effective?

The most common response among the experts were, "Yes", the most effective protection measure would be: The provincial Endangered Species Act and National Recovery Plan

-Public information and damage restitution (government plan to repay farmers for proven loss of farm stock) would help. In the long term, the government needs to set aside large parcels of land, through one or other of its current programs (e.g., Ecological Reserves), to offer the cougar undisturbed, quality habitat, and freedom from human activities (no roads, forestry, mining, and recreation).

-Federal and provincial legislation by itself will not adequately protect cougars in Manitoba, it will take interest and voluntary support by landowners wherever cougars are sighted or found. RMNP already affords legal protection to cougar without more added.

APPENDIX 4

Prairie Habitat questionnaire

Prairie Region Questions: (Iowa, Illinois, Nebraska, Minnesota, Saskatchewan, North Dakota, South Dakota)

1. Please describe cougar habitat in your jurisdiction, particularly in prairie/agricultural areas.

2. Are cougars found in prairie or grasslands areas in your state/province?

3. a) What types of prey species are common and likely taken by cougars in your area?

b) -Is domestic livestock commonly taken as prey by cougars?

4. What specific type of prairie or grassland habitats do they occupy?

5. What factors are most important in controlling cougar populations in prairie or grasslands?

6. a) Do you feel that wolves affect cougar populations, and how so, in prairie or grassland areas?

b) If wolves are present, do they have a significant effect on cougars, such as predation and competition for prey?

7. Are cougars increasing or decreasing in your area, and what do you think are the reasons for the change?

8. What is the importance of natural corridors in your state in allowing cougars to move to new locations across large expanses of open farmland or prairie areas?

APPENDIX 5

CBC Manitoba, 11/9/04 - article from Manitoba cougar shot November 1, 2004

Grandview wants rare cougar for display

WINNIPEG - Grandview Mayor Ernie Garica wants to turn a big cat into a big draw.

He's laying claim to a cougar that was shot near the western Manitoba town recently. It was the first to be taken anywhere in the province since the 1970s.

According to Garica, the animal was shot by the owner of a house in his area because it was bothering some dogs.

Garica says he wants to keep the cougar in Grandview so he can put it on display at the local museum.

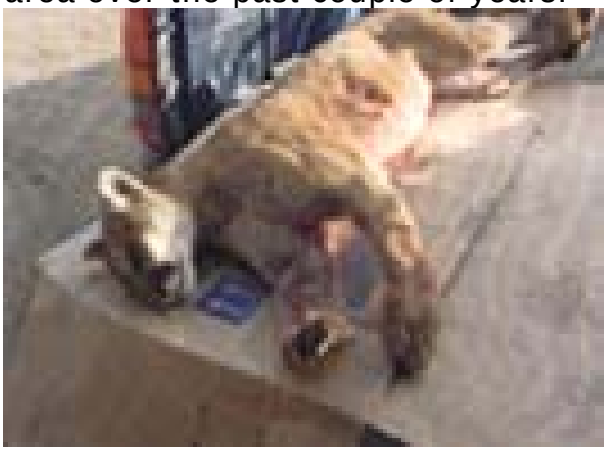
"We have all kinds of people go through the museum in the summer time, and if they hear about a cougar being mounted there, it's just like years ago, there was the biggest lake trout in a museum in Regina," he says. "I know hundreds of people who went there just expressly to see it."

This is the first cougar to have been captured in Manitoba in more than 30 years.

"Everybody wants to make sure that it stays here. It's our cougar, and we don't want it to end up in a museum in Winnipeg or somewhere," he says. "We appreciate the fact that they want to do some tests on it and check it out. I believe they can tell where it comes from, the west or the south or whatever.

"But after they're done with it, we have to convince the director of wildlife to please send it back to Grandview."

Garica says there have been a number of sightings of the cougar in his area over the past couple of years.



Found in http://www.easterncougarnet.org/CBC%20Manitoba.htm

Friday, January 7, 2005

Cougars could be breeding again in Manitoba, biologist says

Broadcast News

Thursday, January 06, 2005

WINNIPEG -- After nearly a century on Manitoba's endangered species list, the cougar may be making a comeback.

Over the past three months, two female cougars have been found dead around Riding Mountain National Park.

In early November, a Grandview man shot and killed a cougar because it was bothering area dogs.

Then on Dec. 30, a hunter just northeast of Erickson found a cougar in one of his coyote traps.

Together, the animals make up the first cougar findings in the province since the 1970s.

Government biologist Bill Watkins suggests there may be a breeding population of cougars in Manitoba -- something wildlife experts thought would never happen again.

At the turn of the century, cougars were almost completely removed from Manitoba and many northern states by encroachment on their habitat.

Found in: http://www.canada.com/winnipeg/story.html?id=6f922c5b-f53f-40ab-8cd0-d29aa63fd1e4

Thu, January 6, 2005 Winnipeg Sun News

Comeback for cougar? (NOTE: LATER FOUND THAT SECOND COUGAR A MALE, NOT A FEMALE!)

By PAUL TURENNE, STAFF REPORTER

After going 32 years without examining a cougar, the provincial conservation department has acquired its second specimen in three months, giving officials hope that there might be a breeding population in Manitoba. On Dec. 30, a trapper discovered a dead adult female cougar in one of his coyote traps northeast of Erickson, about 1 1/2 kilometres south of Riding Mountain National Park.

The trapper phoned the conservation department, who came to pick her up.

The cougar will be transported today from an office in Brandon to Winnipeg, where she will undergo a post-mortem examination.

It's the second specimen they'll study in three months. In November, a farmer near Grandview, just north of Riding Mountain, shot a female cougar and the province claimed that animal as well.

Bill Watkins, a zoologist with Manitoba Conservation, said he hopes the two cougars will provide enough evidence to establish whether there is a breeding population in the national park.

Cougars were prevalent across North America, including Manitoba, up until the 1800s, but their population has dwindled since then, said Watkins.

SIGHTINGS

Although there are 20 to 25 cougar sightings in Manitoba every year, there has been no concrete evidence to date that there is a breeding population here, he said.

Watkins said he hopes we have one.

"It's kind of a magnificent, wonderful animal to have as part of our natural heritage," he said.

There has never been a reported cougar attack on humans in Manitoba, and there are not enough of them to threaten livestock populations, he said.

It's significant that the two recent specimens are both female, because females don't stray as far from their birthplaces as males, and examination can determine whether they have ever had kittens, said Watkins.

The town of Grandview has been granted the hide of the first cougar to stuff and put in its museum but it doesn't have it yet because the investigation into the shooting is not yet complete.

The province has already had two requests for the second cougar's hide, including one from Parks Canada, to put it in an interpretive centre in Riding Mountain, said Watkins.

APPENDIX 6

Delphi Method Survey Participants

Jurisdiction	Expertise	Affiliation
USA		
Jay Tischendorf		
Great Falls, Montana	worked on the Yellowstone Cougar Study Jay was recommended by Todd Lester-Pres ECF	American Ecological Institute-DVM Eastern Cougar Found.
Jim William		
Kalispell, Montana		Regional Wildlife Manager
John Young		
Austin, Texas		Texas Parks and Wildlife Department
David S. Maehr		
Lexington, Kentucky	Associate Prof. University of Kentucky Was chief of field research for the Florida Panther Project for 9 years	Dept. of Forestry
Steve Hadeau		
Boise, Idaho		Idaho Department of Fish and Game
Lee Fitzhugh		
California	Wildlife Enhancement Specialist California's well known cougar expert	Dept. of Wildlife, Fish,& Conservation Biology
	Project C.A.T.	Conservation Biology
Gary Koehler		
Washington	(cougars and teaching) Principle Investigator	Washington Dept. Fish and Wildlife
Rich Bedausoleil		
Wenatchee,	Bear/Cougar	Washington Dept. of

Washington	Specialist	Fish and Wildlife
Craig McLaughlin, PH.D		
Salt Lake City, Utah	Mammals Program Coordinator-cougar expt.	Utah Division of Wildlife Resources

CANADA

Pamela Mills		
Nova Scotia, Canada	Techician, Wildlife Resources Biodiversity Program	Nova Scotia Dept. of Natural Resources Wildlife Division
Rick Riewe		
Winnipeg, Manitoba		Zoology Dept., University of Manitoba
Merlin Shoesmith		
Winnipeg, Manitoba		Adjunct Professor University of Manitoba
R.W. Nero		
Winnipeg, Manitoba	Co-author, “Manitoba’s Big Cat”	Manitoba Conservation retiree
Vince Crichton		
Winnipeg, Manitoba		Manitoba Conservation
Bob Wrigley	Co-author, “Manitoba’s Big Cat”	
Winnipeg, Manitoba		Assiniboine Park Zoo
Cade Libby		
Fredericton, New Brunswick	Furbearer Mgmt. Biologist	Fish and Wildlife Branch DNR
Todd Shury		
Calgary, Alberta		Zoo Animal Health Centre & Banff National Park
Cheryl Chetkiewicz		
Alberta	University of Alberta	Alberta Conservation,doing cougar research
Neil Dawson		
Thunder Bay,	Wildlife Assessment	Ontario Ministry of

Ontario	Program Leader	Natural Resources & Northwest Science & Information

Clayton Apps

Calgary, Alberta	Wildlife Research Inc. & University of Calgary

Prairie Region Survey Participants:

1. Sam Wilson
Nongame Mammal/Furbearer Program Manager
Nebraska Game and Parks Commission

2. Jeff Keith
Saskatchewan Conservation Data Centre
Saskatchewan Environment

3. Con Christianson
DNR, Minnesota

4. Greg Link
Asst.Chief, Wildlife Division
North Dakota Game and Fish Department

5. Jonathan Jenks
South Dakota

6. Michael Shaw
Wildlife Research Supervisor
Oklahoma Dept. of Wildlife Conservation

7. Bob Bluet
DNR, Illinois, USA