Attitudes of Area Residents and Various Interest Groups Toward the Riding Mountain National Park Wolf *(Canis lupus)* Population

By: Carla Ponech

A Practicum done in partial fulfilment of the requirements for the degree Master of Natural Resources Management

Natural Resources Institute
The University of Manitoba
Winnipeg, Manitoba
R3T-2N2

National Library of Canada
Acquisitions and Bibliographic Services
395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale du Canada
Acquisitions et services bibliographiques
395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-23460-6

Canada

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

*****

COPYRIGHT PERMISSION PAGE

ATTITUDES OF AREA RESIDENTS AND VARIOUS INTEREST GROUPS TOWARD THE RIDING MOUNTAIN NATIONAL PARK WOLF (*Canis lupus*) POPULATION

BY

CARLA PONECH

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirements of the degree of

MASTER OF NATURAL RESOURCES MANAGEMENT

Carla Ponech 1997 (c)

Permission has been granted to the Library of The University of Manitoba to lend or sell copies of this thesis/practicum, to the National Library of Canada to microfilm this thesis and to lend or sell copies of the film, and to Dissertations Abstracts International to publish an abstract of this thesis/practicum.

The author reserves other publication rights, and neither this thesis/practicum nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

Abstract

This practicum explores knowledge of, and attitudes toward, the wolf (*Canis lupus*) population in the Riding Mountain National Park region of Manitoba. The purpose of this practicum was to identify and document the attitudes and knowledge of RMNP area residents, Manitoba members of Canadian Parks and Wilderness Society (CPAWS), Manitoba members of the Sierra Club, the Riding Mountain Landowners Association (who represent livestock producers), trappers in the RMNP region, and Manitoba Outfitters in the RMNP region. The attitudes and knowledge of the groups were examined and compared among groups.

This study specifically addressed the following objectives: to measure and document attitudes toward wolves in the RMNP region; to measure and document knowledge about the wolf; to identify any differences which may exist between the various interest groups; to identify factors which may be related to knowledge scores (for example age, education level, gender, etc.); and to identify factors which may be related to attitudes toward maintaining the population of wolves in the RMNP region.

Data for this paper was collected from 649 individuals through a mail survey. Groups surveyed included: 800 randomly selected area residents (43% response), the 12 members of the Riding Mountain Landowners Association (67% response), 93 Manitoba members of the Sierra Club (54% response), 270 Manitoba members of the Canadian Parks and Wilderness Society (69% response), 74 Manitoba Trappers (39% response), and 45 Manitoba Outfitters (58% response).

The purpose of the survey was to determine peoples' attitudes and beliefs about wolves, hunting options, impacts on big game populations, impacts on the livestock industry in the region, and responsibilities for compensation programs for livestock predation. In general, a positive attitude toward wolves was found across groups. All groups surveyed had a less than 50% correct knowledge score, indicating that there is quite a low level of knowledge of wolves in the area.

There were significant differences in both attitude and knowledge scores between groups. The most positive attitudes were expressed by members of the two environmental groups surveyed and the least positive attitudes being expressed by the Manitoba outfitters and trappers. Area residents and livestock producers had attitudes toward wolves which were midway between the other four groups. The highest knowledge scores were obtained by Manitoba outfitters. This was significantly different from the knowledge score obtained by the area residents (who had the

lowest score), but not significantly different from the other four groups. There was also significant differences in attitude scores between those who hunted in 1995 and those who did not hunt in 1995. Individuals who hunted in 1995 had less positive attitudes toward wolves than individuals who did not hunt in 1995.

Factors related to knowledge scores included: education level, age, and gender. There was a significant difference between individuals with an elementary school education and all other groups. The largest difference in knowledge scores were between individuals with an elementary school education and individuals with a PhD. Individuals in the 46-55 age group had the highest knowledge score and were significantly different from all other groups while individuals aged 26-55 had the next highest knowledge scores. People aged from 56 to over 85 had the lowest knowledge scores. People 15-25 years old had scores most similar to those people aged from 56 to over 85. There were significant differences in the knowledge scores between genders. More specifically, mens' knowledge scores were higher than womens'.

Factors related to attitudes toward maintaining the current population of wolves in the RMNP region included: willingness to have wolves in the region; and the level of knowledge which individuals had of wolf ecology. More specifically, as peoples' attitudes became more positive toward wolves, their willingness to have wolves in the region increased. Similarly, as the level of knowledge of wolf ecology increased, the willingness to have wolves in the region increased.

The information collected from this survey offered the opportunity to target specific weaknesses in education and aids management decisions by pinpointing specific issues which are important to the various groups sampled. Differences which exist between attitudinal research results from proposed reintroduction sites and areas with existing wolf populations are also discussed.

Acknowledgements

I would like to dedicate this Practicum to my momma, Karen Ponech. Her courage, strength, wisdom and support have shown me that just when you think you have reached your limit, you can always find a bit of extra strength to finish what you start; no matter what the odds are.

I would also like to thank my partner Rob Quesnel and the rest of my family for their continued support. I would also like to give special thanks to Alistair Bath and John Sinclair for all the time they have invested in this work. In addition, thanks to all my other practicum committee members for their time, energy and input. No thank you would be complete without thanking Judy Zieske for providing me with all the information and support I needed to keep me on track.

Two of the most challenging parts of this research were compiling all the demographic information needed to conduct a survey, and the stats. This would have been even more challenging if I had not had the help of all the women in the Municipal offices surrounding Riding Mountain National Park, and the help of Llewellyn Armstrong at the Statistical Advisory Service on campus. Thank-you.

Thank you also to Barry Verbewski and Ed Engen at the Department of Natural Resources for their help tracing wolf trapping records over the last twenty years. You both helped me more than you know.

Last, but certainly not least, thank you to the Riding Mountain Biosphere Reserve and Riding Mountain National Park for funding this project.

CONTENTS

List of Figures

List of Tables

Page Number

List of Appendix

Chapter 1: INTRODUCTION

1.1 Introduction

It is believed by some (Baker, 1993; Munson, 1994) that peoples conceptions and misconceptions about ecological principles are based in their prior knowledge and experience. Part of our understanding of wolves comes from our cultural beliefs which have been developed over centuries. To many people, wolves have come to symbolize greed, lust, deception and suffering and the sacrificial death of wolves may provide atonement (Lopez, 1978).

It is interesting to note that the above stated characteristics are all emotions or actions which are human in origin. Animals act to initiate feelings of "pride and respect; hatred, contempt and fear; pleasure and affection" (Baker, 1993). Many of these are incompatible which leads to an irreconcilability between instinct and rational thought which the wolf has come to symbolize.

Socialization is the method through which we begin to develop our sense of the world. Throughout time, children have been told fairy tales and fables about wolves which initiates their fear of wolves. For example, The Three Little Pigs, The Seven Little Goats, The Wolf and the Crane, The Wolf and The Goat, and Little Red Riding Hood. The fable Little Red Riding Hood has been present in American culture since 1697 (see Figure 1). Although the fable has changed through centuries to permit Little Red Riding Hood with the opportunity to escape the wolf, the message of the story remains essentially unchanged. What is important when discussing the socialization of children to fear wolves is that the wolf is created by an adult mind. Often, children have no other occasion to discover more positive information about wolves, so the only image they conjure up when they hear of a wolf is of a creature which may attack and kill them.

Figure 1: Red Riding Hood

1.2 Historical Perceptions of the Wolf

As outlined by Lopez (1978), during the middle ages, the Roman church had a great deal of influence over people. The church described the wolf as a real devil existing in the real world. They condemned people for committing the "sins of the wolf: seducers and hypocrites, magicians, thieves, and liars". The church would go out and look for people who had these characteristics because they believed them to be werewolves. Once the werewolves were found, they would be burned at the stake which increased peoples fear of the wolf.

It was the mind of this time, more than any other, which was obsessed with the image of the wolf. The belief in werewolves was strong and widespread. It was also a time when peasants referred to their feudal lords and other hated nobles as "wolves". The fear of wolves bordered on hysteria. There was occasion that wolves did kill travellers and transmit rabies. Wolves also exhumed bodies during the black plague which threatened peoples spirituality. The livelihoods of many people who raised livestock could be wiped out in a single night by a pack of wolves (Lopez, 1978).

The wolf, since classical times, was also a representation of things in transit. Since it was associated with twilight, there became a link to half light. This created a duality: the wolf of the dawn which represented a movement from the Dark Ages into the period of enlightenment and civilization. The second image was the animal of dusk who represented bestiality and ignorance. This was the common tale wolf while the wolf of the light became the dog. This was the time period that provided the "roots of wolf imagery - from which all the wolves of today spring" (Lopez, 1978).

The wolf was not constant in North American literature until the seventeenth century. During this time period the wolf was seen as a representation of the land's hostility. The colonists had no idea how to deal with wolves. Wolves would come into their yards at night and kill their livestock. Already fighting against a wilderness that was new to them, the colonists began setting out poisoned meat and raiding wolf dens to kill their pups. To justify these actions, tales were created about how wolves ate their prey while it was still alive. As a result, the first wolf bounty law was passed in America in

1630. Payments to "wolfers" were made in cash or goods. People were given 20 shillings by the magistrate upon delivery of the head of a wolf. It was mandatory for natives to hunt wolves but they only received 10 shillings per wolf.

At the beginning of the eighteenth century, people were striving for self-sufficiency. Since sheep production became the way to achieve this, the wolf became the enemy. All canine predation was ascribed to wolves rather than acknowledging predation by feral dogs. Since it was the wolf who was associated with evil, whenever canid tracks were close by, the wolf was blamed. The response to livestock kills was an indiscriminate killing of a large number of wolves rather than the few wolves that were actually doing the damage.

During the nineteenth century, strychnine was used to kill wolves. This was a convenient method since wolfers just had to lace an animal carcass with the substance and the wolves would feed on it and die. During the period from 1840-1860 two dollars a hide was paid for wolves. By 1860 wolfers were making money from hides and the bounties paid on wolves. By 1895 wolves were virtually wiped out from Texas to the Dakotas and from Missouri to Colorado.

It was during this period that the livestock industry began which provided more incentive to kill wolves. Wolfers were hired by livestock producers. Wolves which could no longer find natural prey (due to over harvesting) turned to livestock for sustenance (Lopez, 1978). During the period from 1875 to 1895, the harvest of wolves reached a peak. The use of poison continued during this period and resulted in the deaths of millions of animals.

The first bounty on wolves was passed in Montana in 1885. Montana was the centre for livestock production in the northern plains. During the first year the bounty was operational, $1.00 was given for each pelt and some 5,450 pelts were turned in. During the two subsequent years 2,224 and 2,587 pelts respectively were turned in. The wolf bounty was raised by the legislature to $5.00 by 1899. By 1905, the bounty on wolves dropped to $3.00 due to the large expense incurred by the legislature. In the period from 1883-1918 there were 80,730 wolves bountied in Montana for a total of $342,764.00

(Lopez, 1978).

By the twentieth century, killing wolves with strychnine was considered too dangerous because of all the animals which were killed unintentionally through its use. In 1905 the wolf predation on livestock was light in Montana, but livestock producers were still concerned about wolf predation. This resulted in a raise of the bounty up to $10.00 until 1911 when it increased to $15.00. In 1915, the federal government provided money for wolfers as grazing often occurred on public lands. Bounty fraud became part of wolfing (Lopez, 1978). The wolf's ears or nose was required for proof of a wolf kill. As a result, the ears of a wolf could be turned in in one county, and the nose be turned in in another county resulting in two payments for one wolf. Road kills, or the noses of badgers and dogs were often turned in (Lopez, 1978). The bounty law was repealed in 1933 as wolves were virtually wiped out. By 1945, there were very few wolves left in the United States.

The "war" on wolves began in Canada by 1950 (Lopez, 1978). By 1955 there were 2,000 wolves killed per year, and between 1951 and 1961 there was 17,500 wolves poisoned. The federal government began to research methods of pest control for wolves. This action was initiated in response to the loss of millions of dollars in the livestock industry per year that was attributed to wolf predation, and because of the great reduction in some game herds which were ascribed to wolves. The methods commonly used to control wolf populations were hunting, trapping, capturing and killing young in a den and poison (Lopez, 1978).

Although there has been significant declines in wolf distribution over time, the wolf population in Canada is currently approximately 45,000-65,000 animals. Extirpation has occurred in the southern areas of British Columbia, the prairie provinces, southern Ontario, southern Quebec, the Maritime provinces and Newfoundland (Hummel, 1990). The annual wolf harvest numbers in Canada are approximately 4,000 per year and are often in response to livestock predation (Peterson, 1986).

1.3 Study Background

One of the farthest reaching effects that humans have had on wolf populations, is destruction of critical habitats through human development. Human expansion into areas of wilderness has fragmented habitats. As the connectivity between wilderness reserves is reduced, the effects of fragmentation become more profound. As described below, fragmentation of habitats can have various and negative effects on wolf population dynamics.

Riding Mountain National Park (RMNP) is a 2944 km2 area which was formed out of habitat fragmentation (see Figure 2). Intensification of farming since 1950 has virtually eliminated connected areas of wilderness between RMNP and outlying boreal forests. Since 1957, a corridor which existed between RMNP and the closely situated Duck Mountain Provincial Park (DMPP) has been reduced from 51.03 per cent forest cover down to 16.01 per cent in 1993 (Walker, pers. com., 1996). Mladenoff et al. (1995) suggest that wolves may not travel across large expanses of agricultural land. Subsequently, habitat fragmentation could lead to genetic inbreeding. At present, there has been some genetic samples taken from the RMNP wolf population which indicate that there is a continuous population of wolves in the RMNP region.

Despite being an 'island', RMNP is still a functioning ecosystem. As such, wolves are a top carnivore in the ecosystem and as noted, can provide an indication of ecosystem health (Hummel, 1990; Noss, 1995). The close proximity of the wolf population in RMNP to local residents who live in the surrounding area, presents the possibility for wolf/ human conflicts.

The wolf population in RMNP numbers some 32 animals, although this number appears to be declining (see Figure 3). As discussed below, reduction in numbers may be attributed to a number of interrelated factors. All of these, however, revolve around the direct impact that human development has had, and continues to have, on the RMNP wolf population (Young, 1994).

There is currently no defined wolf management plan in Manitoba (Goulet, pers. com., 1997). As outlined by Stardom (1983), the Manitoba provincial strategy for wolf

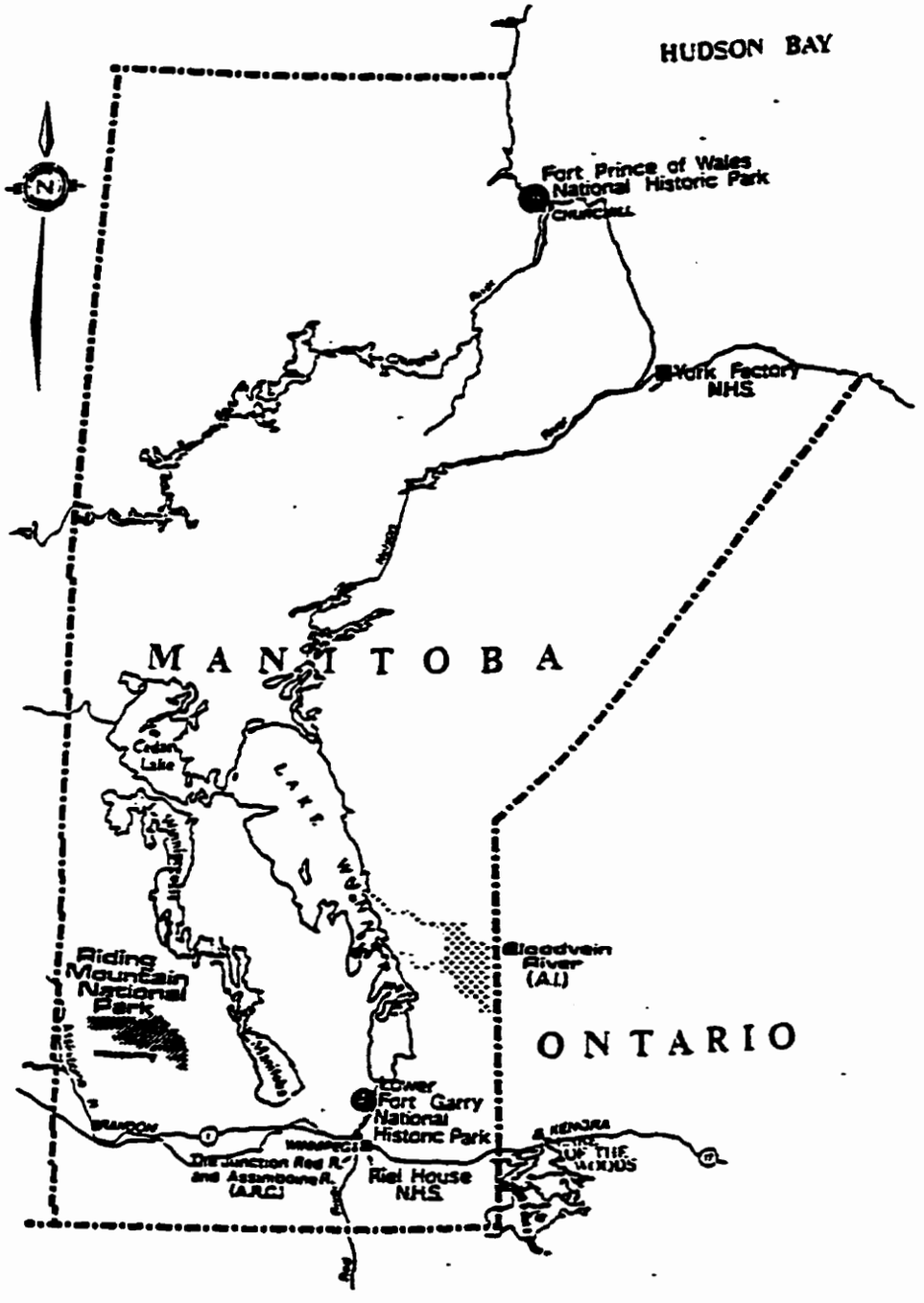

Figure 2: Regional Setting of RMNP

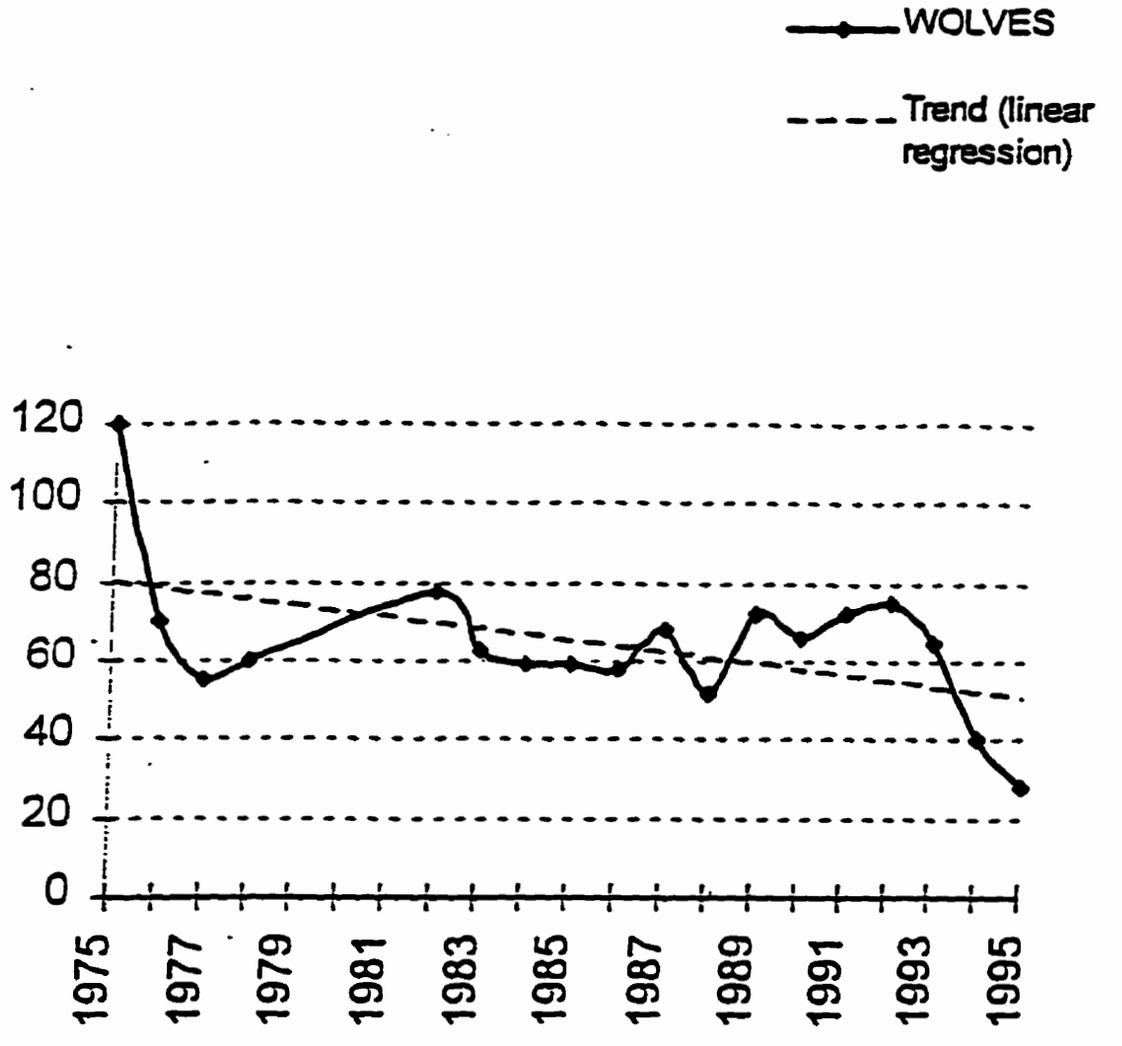

Figure 3: Estimated Wolf Population in RMNP (1975-1995)

management has three objectives: the primary objective is to maintain the provincial population at about 4,000 wolves; the second objective is to convince the public that wolves are an important part of a natural ecosystem; and the third objective is to use site-specific humane wolf control measures in response to wolf predation on livestock.

Although RMNP provides wolves with full protection, hunting, trapping, and predator control occur outside the park boundary. In general, there are lengthy wolf hunting seasons in Manitoba (August 29 to mid-June). Wolves can be hunted using any big game hunting tag. For residents of Manitoba, big game tags include: deer, elk, moose, or caribou. Non-resident big game tags include: bear, deer, or moose. Although there is a request in the 1996 Hunting Guide to report wolf kills in hunting areas 23 and 23A to a local wildlife officer, reports are generally not forthcoming (Bidlake, pers. com. 1996).

In order for wolves to co-exist with humans, there needs to be incorporation of community attitudes and participation to effectively plan for the future (Hummel, 1990). Impacts such as hunting, trapping, poaching, killing in response to livestock predation, and other anthropocentric practices all impact the wolf population and directly involve community members. As noted by Stardom (1983), planning for wolf conservation in the RMNP region should include programs to provide the general public with information which will promote awareness and understanding of the species, and information which will promote sound husbandry practices in areas where there may be wolf-livestock problems.

As noted, in the RMNP region of Manitoba*, the incidence of wolf predation on livestock has been minimal (Goulet, pers. com. 1995). A common misconception is that any canid tracks in the area of a carcass signifies that the livestock was killed by wolves. Livestock are also killed by coyotes or feral dogs and the kill sites of these canids are not difficult to distinguish from a wolf kill site for a trained person. In addition, it is also difficult to determine if the livestock was killed by a wolf or if the wolf is scavenging on

*Note: for this report, the RMNP region is defined as the area including: RMNP and the areas east to Lake Manitoba; South to the Trans Canada highway; North to DMPP; and west to the Saskatchewan border.

the carcass. Livestock predation by wolves is a legitimate concern of landowners who raise livestock. While there was previously no compensation available to landowners who lost livestock to wolf predation, recently a compensation fund for confirmed predation on livestock by wolves was set up with private money (Goulet , pers. com. 1995). This differs from Alberta where the Alberta government pays about 73% of the market value of livestock lost to wolf predation and Minnesota has an upper limit of $400 paid per claim (Duffield et al. 1993).

One of the primary reasons for doing this study was to document information on public attitudes toward and knowledge of wolves in the RMNP region. Although there had been some information gathered on regional attitudes and knowledge, biologists were interested in having a more broad information base. Recognizing the important role that the public plays in achieving wildlife management goals, the information gathered from this research will be provided to regional wildlife managers hpoefully to aid in the development of a wolf management plan for the RMNP region. To date, much of the attitudinal research done in the United States (Bath,1991; Manfredo et al. 1994; Tucker and Pletscher, 1989) and Canada (Lohr et al. 1996) has been focused on the reintroduction of wolves into areas where they were extirpated. This research differs in that it was done in a region where there is an established wolf population. This may provide differing results because the public already presumably has an objective knowledge (Bright and Manfredo, 1996). On the other hand, people who do not have experience living near wolves will likely have attitudes which are based on the likelihood of certain outcomes (Fishbein and Ajzen, 1975). For example, in the United States Kellert (1985) found wolves to be one of the most disliked wildlife species and suggested it was due to perceptions that wolves were dangerous to human safety and property as well as historical and cultural antipathies. Since wolves have existed in the RMNP for years the public may have less fear of the animal.

The primary goal of this study was to identify, document and analyse the attitudes and knowledge of RMNP area residents, Manitoba members of Canadian Parks and Wilderness Society (CPAWS), Manitoba members of the Sierra Club, the Riding

Mountain Landowners Association (who represent livestock producers), trappers in the RMNP region, and Manitoba Outfitters in the RMNP region.

This study specifically addressed the following objectives:

1. to measure and document attitudes toward wolves in the RMNP region;
2. to measure and document knowledge about the wolf;
3. to identify any differences which may exist between groups;

    Ho1: There is no significant difference in attitude scores between RMNP) area residents, Manitoba members of Canadian Parks and Wilderness Society, Manitoba members of the Sierra Club, the Riding Mountain Landowners Association, Trappers in the RMNP region, and Manitoba Outfitters in the RMNP region.

    Ho2: There is no significant difference in knowledge scores between RMNP area residents, Manitoba members of Canadian Parks and Wilderness Society, Manitoba members of the Sierra Club, the Riding Mountain Landowners Association, Trappers in the RMNP region, and Manitoba Outfitters in the RMNP region.

    Ho3: There is no significant difference in attitude scores between individuals who hunted in 1995 and those who did not hunt in 1995.

4. to identify factors which may be related to knowledge scores (for example age, education level, gender, etc.);

    Ho4: There is no significant relationship between knowledge score and education level.

    Ho5: There is no significant relationship between knowledge score and age.

    Ho6: There is no significant difference between knowledge score and gender.

5. to identify factors which may be related to attitudes toward maintaining the population of wolves in the RMNP region; and

Ho7: There is no significant difference between attitude scores and willingness to have wolves in the RMNP region.

Ho8: There is no significant relationship between knowledge scores and willingness to have wolves in the RMNP region.

Ho9: There is no significant relationship between knowledge scores and attitude scores.

6. to provide recommendations to wolf managers and to those running educational programs in the RMNP region.

This practicum is divided into five chapters. The first chapter is an introduction to current and historical human attitudes toward wolves and information on the study area. Chapter two provides more detail on current attitudes toward wolves, a brief discussion of Human Dimensions Research and detailed discussion of human values of nature. Chapter two also discusses peoples' knowledge of wolves and how knowledge is related to attitudes toward wolves. Exploration of these issues may provide information to wildlife managers which will aid in the development of wolf management plans. In addition, information gathered will also aid in developing educational programs about wolves in the region. Chapter three describes the design and implementation of the survey and information on how the population samples were chosen. In addition, chapter three also discusses: the response rates of each group surveyed; the reliability of the attitudinal and knowledge portions of the survey; and other statistical procedures used to address the first five objectives of the study. Chapter four provides all of the statistical results for each of the five objectives of the study. Finally, chapter five provides conclusions and recommendations for management (objective 6).

Chapter 2: HUMAN ATTITUDES TOWARD THE WOLF

2.1 Current Attitudes Towards the Wolf

Attitudes have been defined as an organized set of feelings which will influence a individual's behavior (Mitchell, 1979). It is agreed to by many psychologists that attitudes can be broken down into three main components. These components are: affective, cognitive and behavioral (Mitchell, 1979). The affective component is the one which relates to how a person feels about an object. The cognitive component relates to beliefs about some object (which may or may not be true) and the behavioral component is how a person will act or respond in the presence of the object. Individuals will organize their affective and cognitive components into an attitudinal system which then governs their responses to a particular object (Mitchell, 1979).

Kellert (1985) found in the United States that there was more conflict in attitudes about wolves in the late 1980s than there was historically. More specifically, although there is generally a more positive attitude toward wolves today, Kellert (1985) indicated that wolves and coyotes were among the least liked animals. A more recent study (Kellert et al., 1996) indicated that while attitudes toward wolves is generally positive in Canada, they may be diminishing in parts of the country. For example, in southern Alberta hunters, trappers and ranchers recently killed 34 of the estimated 60-100 animals in the region (Marty, 1995).

Wolf management is controversial in some areas of Canada because wolf reduction is used to increase big game populations for human subsistence (Peterson, 1986). For example, the most common reason cited by 16 hunters and trappers outside Algonquin Park, Canada, for killing wolves was the perceived competition with wolves for deer (Forbes and Theberge, 1996). Wolf control measures were also used in the Yukon, Canada, where predation appeared to be preventing a timely recovery of the Western Arctic caribou herd which had suffered a major decline in population numbers due to premature over harvest (Haber, 1996). Wolf control measures have also been used in Alberta, Canada, as a way to reduce the incidence of wolf predation on livestock.

Bjorge and Gunson (1985) found that the use of wolf control measures reduced cattle mortality from 3.4% in the four years prior to control to 2.0% in the two years following control.

Studies done in the United States found that positive attitudes toward wolves were more prevalent among urban than rural residents (Llewellyn, 1978) and people who lived father away from wolf reintroduction sites than for people who lived closer to those sites (Bath, 1989; Kellert, 1985). More recently, awareness and appreciation of nature and wildlife has increased and wolves are thought by some to be a symbol of wilderness (Bright and Manfredo, 1996; Kellert et al., 1996). Bright and Manfredo (1996) found that attitudes toward wolves in Colorado were more linked to values that people held regarding wolves right to exist and the emotions that their potential reintroduction elicited.

2.2 Human Dimensions Research (HDWR)

Human dimensions of wildlife management (HDWR) has "grown out of a concern about how people's values affect and are affected by wildlife management" (Purdy and Decker, 1989). Wildlife management attempts to integrate wildlife populations, wildlife habitat and the interactions that wildlife have with people (Decker and Purdy, 1988). Human dimensions studies the relationship between people and wildlife management problems (Manfredo, 1989). Human dimensions emphasises the concepts, tools and techniques that give assistance in representing the public and give leadership on wildlife issues (Manfredo and Vaske, 1996). While the focus in the past has been on wildlife populations and habitat requirements, the understanding of wildlife and the interactions that people have with wildlife (in a management context) have been improving.

HDWR became visible in the 1960's and has gained popularity since that time. As outlined by Purdy and Decker (1989), HDWR initially focused on hunting characteristics such as demographics, increasing urbanization, aging, and changes in family structure. HDWR then began to focus more on the motivations for hunting as they related to values of wildlife. Out of that research came the realization that applying only consumptive

values of wildlife to hunters was simplistic and not entirely accurate. This initiated more research on values and the development of the Wildlife Attitudes and Values Scale (WAVS) in 1980. The WAVS was developed from other frameworks which used attitude assessment as the focus. More recently, HDWR has focused on predators and the sociopolitical ramifications of wolf reintroduction (Bath, 1989).

Another topic which is popular in Human Dimensions research is wildlife-related recreation. Topics such as predicting the effectiveness of wildlife education programs (Morgan and Gramann, 1989), grizzly bear distribution and human conflicts (Mace and Waller, 1996), beliefs and behaviors of back country campers toward grizzly bears (McCool and Braithwaite, 1989), and theory development on persuasive communications (McCool and Braithwaite, 1992; Ajzen, 1992) and behavior change (Fishbein and Manfredo, 1992).

People who have an interest in land use decisions (for example individual citizens, landowners, developers, conservation groups, future generations, wildlife professionals and educators) are primary stakeholders. Land use decisions are varied among users and can be motivated by spiritual, psychological, physical, emotional or financial factors (Knuth and Nielsen, 1991). Because of the individual differences among users, wildlife management decisions must promote desirable attitudes and behavior toward biological resources.

One method used by HDWR to alter individual values is the use of education which is specific to people's existing knowledge. Manfredo (1989) found in his review of literature on HDW that the legal and political issues in wildlife management partially arise out of public understanding of wildlife management problems. This suggests that there is a need for education on various wildlife management issues. Tucker and Pletscher (1989) suggested that public involvement in wildlife management would be a form of education that may be effective. In some cases, providing education was not enough to increase knowledge, but supplementing education with experience could increase the learning of participants (Morgan and Gramann, 1989). On the other hand, many studies have not yet addressed the specific educational requirements of the public (Boxall and

McFarlane, 1995). An investigation into the ecological conceptions and misconceptions about wildlife management issues could provide information needed by wildlife professionals to adequately educate the public and ultimately aid in the promotion of wildlife conservation programs.

HDWR faces a couple of challenges. One challenges is an improvement in the integrity of HDWR research through development of a theory of HDWR. Theory does not only allow generalizations to be made, but provides a "structure for integrating and building upon previous findings, and it extends us beyond...descriptive research " (Manfredo, 1989). Another challenge facing HDWR is to demonstrate the uses of this approach. How much HDWR training is received by biologists, wildlife managers, or ecologists? HDWR is conspicuously absent from the curriculum of many environmental programs which may suggest that HDWR is still evolving.

There is currently an increase in the concern to conserve our biological resources for future generations to enjoy. In order for effective conservation practices to become reality, there is a requirement for the coordination of public and private land managers (Mangun et al., 1991). Differences in the attitudes, perceptions, values and behaviors of various groups can act as social barriers to the conservation of biological resources. As such, the "conservation of biological resources must have grass-roots professional support to become a reality...especially in regions where the majority of land is in private ownership" (Decker et al., 1991).

The initial focus of HDWR was on applied science and its methods and not nearly enough attention was given to the philosophical aspects of science (Wilm, 1974). Leopold (1940) wrote that unless we can rewrite the objectives of science the task of wildlife management is predestined to failure. The failure Leopold spoke of would come from the barrier which exists between the science of wildlife management and art of wildlife management. The art of wildlife management is the management of people rather than the management of species. Achievement of this can be accomplished through a mutual understanding between research programs and the people who now exist outside those programs, the landowner.

An interdisciplinary approach to wildlife management can provide an integration of various fields of knowledge such as sociology, economics, and ethics to form the basis for effective conservation action (Clarke et al., 1996). Using interdisciplinary problem solving concepts and skills could integrate and synthesize knowledge and actions more effectively by reducing the fragmentation across organizations and disciplines which currently exist (Clarke et al., 1996). Further, incorporating a coalition of community leaders, citizen environmental groups, individuals, researchers, and practicing professionals into the decision making process can aid conservation because mutually accepted goals can be found (Decker et al., 1991). In addition, the enlightenment of the aforementioned groups can occur through educational programs which teach the values of the richness of species and the importance to humans of maintaining the integrity of the ecosystem which houses this richness.

Conservation of the RMNP wolf population requires management practices which sustain the wolf population while also meeting the short and long term needs of humans. Management, then, must include conservation actions such as protection of wolves through sustainable population(s), research into the biology and ecology of the species, monitoring in order to detect changes and manage (or control) the population (Woodley, 1993), interpretation and education to name a few.

2.3 Values

Wildlife values are standards which influence peoples perceptions of wildlife (Peyton and Decker, 1987). More specifically, values have been defined by Purdy and Decker (1989) as "the perceived worth or significance of things and typically are expressed in relation to the worth of other things". The value of wildlife can be placed broadly into two categories. These are instrumental (or social and economic) values and intrinsic values (Rolston III, 1994).

2.3.1 Instrumental Values

The instrumental value of wildlife includes all of the values that humans place on

wildlife (social and economic). Things which do not have a market value are often assumed to have no economic value. As noted, the WAVS was developed in 1980. The purpose of its development was to obtain information about peoples' noneconomic, social value of wildlife (Purdy and Decker, 1989). According to Kellert (1996), there are nine basic values of nature. These include: utilitarian value, naturalistic value, ecologistic/scientific value, aesthetic value, symbolic value, dominionistic value, humanistic value, moralistic value, and negativistic value. A brief description of these values is given in Table 1.

Western society is driven to a significant degree by economics. As such, perhaps the easiest conceptualization of value is understood in terms of utilitarian (or economic) value. Rolston (1994) believes that the unhealthy relationship that humans have with the environment is the result of the social system which forces marginalised people onto marginalised land so that people can serve their short term survival requirements without the option to look at the long term effects of these actions.

In terms of wildlife, monetary values can be derived from use (consumptive) values such as hunting and trapping, and from non-use (non-consumptive) values such as recreation, wildlife photography and observation, or, indirect use values which include reading about wildlife or watching television programs about wildlife which do not require direct interaction (Bishop, 1991).

Rasker and Hackman (1996) found in their study on economic development and the conservation of large carnivores that there was an assumption that conserving vast areas of land would result in significant economic costs in terms of jobs and income forgone. The results of the study showed that in southern British Columbia and Alberta environmental protection is now being used as an economic development strategy. For example, conflict between growth and preservation values became a prominent issue in Canmore, Alberta, when development was proposed for the Wind Valley, a regional core area for large carnivores. Alberta's Natural Resources Conservation Board (NRCB) excluded Wind Valley from the development plans in order to maintain the quality of life provided to local residents by the Valley (Rasker and Hackman, 1996).

Rasker and Hackman (1996) also found that from 1969 to 1992 wilderness counties in the northern Rockies of the USA showed a growth in personal income by 93% (34,500 new jobs and more than $987 million in [real] personal income) whereas resource extracting counties only grew by 15% (2152 new jobs and $70 million in [real] personal income). In addition, preserved areas increased the job base whereas resource extracting counties showed a decline in jobs.

Duffield et al. (1993) estimated the annual net social benefits and costs associated with wolf reintroduction into Yellowstone and found that the total benefits of reintroduction into Yellowstone outweighed the costs by approximately 10 times.

Table 1
Values of Nature

Naturalistic:	Primary interest and affection for wildlife and the outdoors.
Ecologistic/ *Scientific*:	*Ecologistic has* primary concern for the environment as a system, for interrelationships between wildlife species and their habitats. *Scientific value has* primary interest in the physical attributes and biological functioning of animals.
Humanistic:	Primary interest and strong affection for individual animals, principally pets. Regarding wildlife, focus on large attractive animals with strong anthropomorphic associations.
Moralistic: strong	Primary concern for the right and wrong treatment of animals, with opposition to exploitation of and cruelty toward animals.
Aesthetic:	Primary interest in the artistic ...characteristics of animals.
Symbolic:	Primary interest is quantifying qualities and traits through fantasy, dreams, or stories.
Utilitarian:	Primary concern for the practical and material value of an animal.
Dominionistic:	Primary satisfaction derived from the mastery or control over animals typically in a sporting situation.
Negativistic: indifference,	primary orientation is an avoidance of animals due either to dislike, or fear.

Taken from Kellert, 1985 and 1996. *Italics mine*

Estimates of costs included the value of forgone benefits to hunters, estimated wolf recovery program costs, and animal damage control costs which together amounted to $400,000, $478,000 and $25,000 respectively. The overall value of wolf recovery to the USA population was estimated to be $10,121,500. Net social benefits associated with wolf reintroduction to the Greater Yellowstone Area was estimated to be $9,686,500.

The benefits of wolves in Manitoba were identified by Stardom (1983) as fur production value, and the costs having wolves in Manitoba include the loss of other furs to trappers, loss to livestock owners of cattle killed or injured by wolves, and the cost of wolf control programs in the province. Overall, it was noted that wolf "debits" are considerably less than the total benefit to the Manitoba economy (Stardom, 1983). The consumptive value of wolves is the value that a trapper or hunter receives from their pelt. In Manitoba, the value of wolf pelts in the open area around RMNP has fluctuated between $16.66 in 1967/1968 to a high of $174.00 in 1990/1991 (see Table 2).

One economic theory is a Pareto Criterion which states that society is clearly better off if members of society are made better off while no one is made worse off (Bishop, 1987). But rarely does any action taken by society not leave someone worse off. Bishop (1987) writes : "because wildlife has no special place in the economic viewpoint, it must sink or swim in competition with all the other things from which humans derive satisfaction". That one value may be preferred to another value in one situation does not guarantee the same outcome in another situation (Lindblom, 1974). As noted, WAV provides a method of obtaining information about peoples non-economic social value of wildlife (Purdy and Decker, 1989). This information, once obtained, can aid wildlife managers in their decision-making process by providing information on both the problems, and the opportunities to achieve management goals. Attitudes were selected because they could provide a broad look at the values, feelings and beliefs of both the individual and different social groups (Purdy and Decker, 1989).

TABLE 2: Value of Wolf Pelts in Manitoba

Fur Year	Pelts Reported Sold	Average Auction Value ($)	Value to Trapper ($)
1967/68	139	16.66	2315.74
1968/69	118	27.00	3186.00
1969/70	138	38.00	5244.00
1970/71	167	23.00	3841.00
1971/72	324	37.68	12,208.32
1972/73	332	53.08	17,622.56
1973/74	349	63.72	22,238.28
1974/75	395	62.22	24,576.90
1975/76	383	101.00	38,683.00
1976/77	78	78.31	6,132.46
1977/78	146	146.38	21,427.10
1978/79	165	165.00	27,225.00
1979/80	118	118.00	13,924.00
1980/81	93	93.00	8,649.00
1981/82	132	132.00	17,424.00
1982/83	93	92.50	8,556.00
1983/84	83	83.00	6,889.00
1984/85	92	92.00	8,464.00
1985/86	70	70.00	4,900.00
1986/87	291	98.50	28,663.50
1987/88	237	69.00	16,353.00
1988/89	193	95.00	18,335.00
1989/90	181	101.00	18,281.00
1990/91	171	174.00	30,798.00
1991/92	244	116.27	28,369.88
1992/93	264	115.00	30,360.00
1993/94	445	97.00	43,165.00
1994/95	278	77.00	21,406.00
1995/96	-	120.00	-

Manitoba Department of Natural Resources 1996

2.3.2 Intrinsic Value

The intrinsic value of wildlife is the value that wildlife has in and of itself. That is, the value wildlife has as part of a functioning ecosystem which sustains all life (including human life). Wolves can provide a regulatory function for prey populations (Mech, 1974) and supply food resources to countless other species through their foraging behavior. As wolves are particularly sensitive to human disturbance, they have the additional value of

providing an indication of the ecological integrity of an ecosystem (Noss, 1995). Although the health of an ecosystem is determined by many factors, "the presence of viable populations of certain species sensitive to human activities, notably large carnivores, also indicates that an ecosystem has some degree of integrity" (Noss, 1995).

2.4 Knowledge of the Wolf

As noted, values are defined as "the perceived worth or significance of things and typically are expressed in relation to the worth of other things" (Purdy and Decker, 1989). Attitudes are fairly stable, evaluative dispositions that make a person think, feel, or behave positively or negatively about some person, group or social issue (Gleitman, 1981). Knowledge is distinct from attitudes as it emphasises understanding (Gleitman, 1981). People try to maintain constancy in their thought processes in order to measure the accuracy of their knowledge. Social comparisons tend to be done with groups which share some common sentiments and social assumptions (Gleitman, 1981). If information is consistent over time, and is validated by others, beliefs* are reinforced.

Cognitive dissonance results when there is inconsistency between two cognitive elements (for example peoples' experiences, beliefs, attitudes, or feelings). Festinger (1954) found that when physical reality becomes increasingly uncertain, people tend to rely more on social reality. For example, if a persons behavior is inconsistent with their attitudes they will either change their attitude or their behavior. People may be presented with information that a wolf is a competitor, or an animal which serves a regulatory function within an ecosystem. To some, these two perceptions of a wolf may be incompatible.

One method of reducing cognitive dissonance is to put a victim (for example wolves through human persecution) in a bad light, implying that the victim got what they deserved because they were bad or evil. This serves to maximize the culpability of the victim of your action. People do not like to hear things that conflict with their beliefs and

*Note: a belief is a person's assumption that a behavior will result in certain outcomes and their evaluation of these outcomes (Fishbein and Manfredo, 1996)

will attempt to reduce dissonance by rejecting evidence to the contrary. As a result, people tend to believe the plausible arguments on their side, and the implausible arguments on the other side (Aronson, 1992).

2.4.1 Findings from Previous Research

Increases in human activities such as livestock production are a long term threat to wolves. One study done in the United States on the attitudes of livestock producers toward wolves (Kellert, 1985) found that of the groups studied, livestock producers had the most negative attitudes toward wolves. The occurrence of predation on livestock in Canada by wolves varies from virtually none to high levels. Wolves are reported to prey on calves (5-9 months old) and yearlings over adults in Alberta (Dorrance, 1982). Bjorge and Gunson (1985) found that a reduction of wolves in northwestern Alberta from 40 to 4 reduced livestock mortality from 3.4%-2% in the two years following wolf control. The authors noted that although there was a reduction in livestock mortality, more emphasis needs to be placed in preventative husbandry management rather than pest management.

Tucker and Pletscher (1989) found that two groups (other than livestock producers) which may directly affect wolf numbers are hunters and local residents. Their results showed that 51.6% of the residents in Northwestern Montana did not believe that wolves killed livestock in areas occupied by wolves while 41.3% of the hunters did not agree that wolves killed livestock in the study area. Many of the beliefs of those who thought wolves would kill livestock were based on misconceptions regarding wolves which led the authors to the conclusion that more education was required on interactions between wolves and livestock.

Hunters (77.3%) showed considerable opposition to hunting restrictions and were not willing to subordinate human uses of ungulates to provide a richer food source for wolves. Hunters were seen to hold strong opinions about wolves and thought it would be challenging and rewarding to hunt a wolf. Kellert (1985) found that in Minnesota, one third of the hunters, trappers and farmers said they would kill a wolf while hunting deer.

Other studies (Bath, 1987a; 1987b) have also shown that misconceptions

regarding wolf ecology lead to the subsequent fear of wolves damaging property. Bath (1987a) found in Wyoming that even if compensation for predation on livestock was given, many ranchers did not change their opinions about wolf predation on livestock. Nor was it changed if livestock losses were to be kept below 1% (ie less than 1% of the cattle ranging in an area are killed by wolves in a given year). In general, residents who had a negative view of wolves were also found to have poor knowledge of the animal (Bath, 1987a).

In his research, Bath (1987a) found that pro-wolf people tend to be involved in environmental groups and were well educated. People also tended to have a higher knowledge of wolf ecology if they were from urban areas. In addition to environmental groups, people who frequented National Parks tended to have positive attitudes toward wolves. Among this group there was, however, some who feared that wolves may attack people in parks which indicates a need for education pertaining to wolf attacks on humans.

Chapter Summary

Historical attitudes toward wolves have undergone significant transformation over the latter part of this century (Kellert et al., 1996). HDW developed out of concerns about how individual peoples' values of nature may influence long-term management goals for some animal species. Values can vary from negative to positive and are summarized in a WAV scale developed by Purdy and Decker (1989). Several HDW studies have examined the social aspects of wolf reintroduction (Llewellyn, 1978; Kellert, 1985,1989; Bath, 1989,1991; Pate et al., 1996; Tucker and Pletscher, 1989). Bath (1987a, 1987b, 1989) reports that knowledge scores are quite low for studies done in the United States. In general, results show that as knowledge scores increase, attitudes become more positive.

Chapter 3: METHODS

3.1 Survey Design and Implementation

A mail survey was chosen for this research due to the advantages mail surveys offer over face to face interviews or telephone surveys. The advantages of using mail surveys for this type of research are: firstly, there is a known opportunity for all members of a population to be included; second, mail surveys are standardized so response measures are consistent; third, because they are standardized there is less room for the researcher to interpret individual surveys differently (Dillman, 1978); and fifth, mail surveys have been the most commonly used and effective method of doing attitudinal research (Bath, 1987a, 1987b, 1989; Kellert, 1985,1989; Tucker and Petscher, 1989). In addition, mail surveys keep overall per interview costs low and costs consistent between different geographical areas (Dillman, 1978).

Mail surveys are not without disadvantages. One disadvantage reported by Bath (1987b) was that having a sample of livestock people fill out the survey at the same time may have resulted in a type of group response, whereas having people fill out the survey alone may have produced different results. In addition, people may use surveys as a means to try and change government policy by misrepresenting their positions (Dubois, pers. com., 1997). Other disadvantages of using mail surveys are: firstly, they are insensitive to substitution of respondents; second, there is likelihood that unknown bias from refusals to partake will be avoided; third, they have low success with tedious or boring questions; and fourth, they have a slower speed of administration (Dillman, 1978).

The survey was divided into three sections (see Appendix 2). These sections included: an attitudinal portion with eighteen items, a knowledge section with fifteen items, and a social demographic section with four items. The survey developed for this study used questions developed by Bath (1987a, 1987b) as a framework. The questions were modified for this study through consultation with wolf biologists and survey researchers from the RMNP region and Newfoundland respectively. Results for each group surveyed are reported in the following chapter.

The attitudinal portion of the survey used a seven point Likert answer format where the choices ranged from "strongly agree" to "strongly disagree". A score of one depicted a positive attitude toward wolves, a score of four depicted a moderate attitude toward wolves and a score of seven depicted a negative attitude toward wolves. An attitude score was computed by adding up the eighteen individual attitude scores then averaged to provide one attitude score for each group.

The knowledge portion of the survey included physical characteristics about wolves, myths about wolves and questions pertaining to wolf-livestock interactions. The responses available to the respondent in this portion of the survey were "yes", "no" or "I'm not sure". Incorrect answers and "I'm not sure" answers counted for zero points and correct answers counted for 1 point (with a total of 15 possible points).

One week prior to mailing the survey an introductory letter was sent on September 10th, 1996 to inform people that they would be receiving a survey within the week (see Appendix 1). The survey was mailed one week after the introductory letter (September 17th) which included a cover letter which briefly explained the study. A return self addressed, stamped envelope was enclosed with the survey for easy return. One week following the survey (September 24th), a reminder/thank-you letter was mailed out to either remind people to send in their survey (if they had not already done so), or to thank those respondents who had already replied (see Appendix 3). All of the mailing occurred on a Tuesday to ensure that surveys would be received within the week they were sent. A separate mailing took place for members of the Landowners Association which followed the above outlined process. Mailings for this sample occurred on January 7th, 14th, and 21st. The later date used for members of the Landowners association may have increased response rates as it occurred after harvest, whereas the initial mailing occurred closer to harvesting time. Surveys returned after February 17th were not included in the results.

3.2 Sampling

Surveys were mailed out to: 74 trappers in the RMNP region who had trapped wolves between 1984-1990; 45 Manitoba Outfitters which operate in the RMNP region and advertise in Manitoba Natural Resources "Hunting and Fishing Adventures" guide; all Manitoba members of the Sierra Club (93); all Manitoba Members of the CPAWS (270); the 14 members of the South Riding Mountain Landowners Association; and a randomly-selected sample population (800) of residents in the RMNP region.

Figure 4 shows the municipalities which surround RMNP (collectively referred to as the Riding Mountain Biosphere Reserve). Table 3 indicates the municipality populations of the RMNP region, the proportional sample size from each municipality, the number of responses received from each region, and the response rates for each municipality. To select the 800 area residents, names were chosen from municipality phone directories using Dillman's (1978) random sampling methods. A sample interval was chosen which allowed for one pass through the phone book (Bath, 1987a). In cases where an area resident was visible on more than one list, they were included in the group where their name first appeared. For example, some area residents were also members of the outfitters association, landowners association or trappers.

3.3 Response Rates

Of the 800 surveys sent to area residents, 64 could not be forwarded, 24 were not valid* and 344 were valid. This resulted in a response rate of 48%. Of the 74 surveys sent to trappers, 12 could not be forwarded, one was not valid and 28 were valid. This resulted in a response rate of 46%. Of the 54 surveys sent to Manitoba Outfitters, two could not be forwarded, two were not valid and 26 were valid. This resulted in a response rate of 52%. Of the 93 surveys sent to the Manitoba Members of the Sierra Club, 7 could not be forwarded, one was not valid and 50 were valid. This resulted in a response rate of 59%.

---

*Note: Surveys which were "not valid"were rejected due to the low number of questions answered by the respondent.

Of the 270 surveys sent to the Manitoba members of CPAWS, five were undeliverable, seven were not valid, and 186 were valid. This resulted in a response rate of 72%. Of the 12 surveys sent to the Riding Mountain Landowners Association, all were forwarded, one was not valid and eight were valid. This resulted in a response rate of 73%. Sending a follow-up reminder/thank you letter increased the response rates of most of the respondents. The follow-up increased the area residents response by 17%, trappers by 25%, outfitters by 27%, members of the Sierra Club by 20%, members of CPAWS by 12%, and the Riding Mountain Landowners Association by 25%.

In comparison to other mail out surveys the response rates were average (Bath, 1987a). This may be attributed to this being a controversial topic. Average response rates may also be attributed to inclusion of an introductory letter, the shortness of the survey, and the presentation of questions on colored paper. The original method outlined by Dillman (1978) suggested follow-up phone calls which may have increased response rates further, but due to the large sample size this procedure was not used.

The response rates shown in Table 3 for each municipality shows that there was the greatest degree of response from municipalities located east, west, and south of the park. Stardom (1983) reported that the highest, and most consistent complaints about livestock predation typically occur in the Interlake region of Manitoba which is located on the east side of the park. Lower response rates where shown in areas north of the park and south west of the park. More specifically, areas which showed a response rate of 50.0% or higher included: Clanwilliam, Strathclair, Shellmouth, Rosedale, Ochre river, McCreary, and Boulton. Areas which had a response rate of 40-49% included: Gilbert Plains, Ste. Rose, Rossburn, and Dauphin. A response rate between 30-39% is reported for Silver Creek and Shoal Lake; and a response rate of between 20-29% is reported for the LG District of the park and Grandveiw. Overall, however, it does not seem that there is a geographical pattern in the response rates.

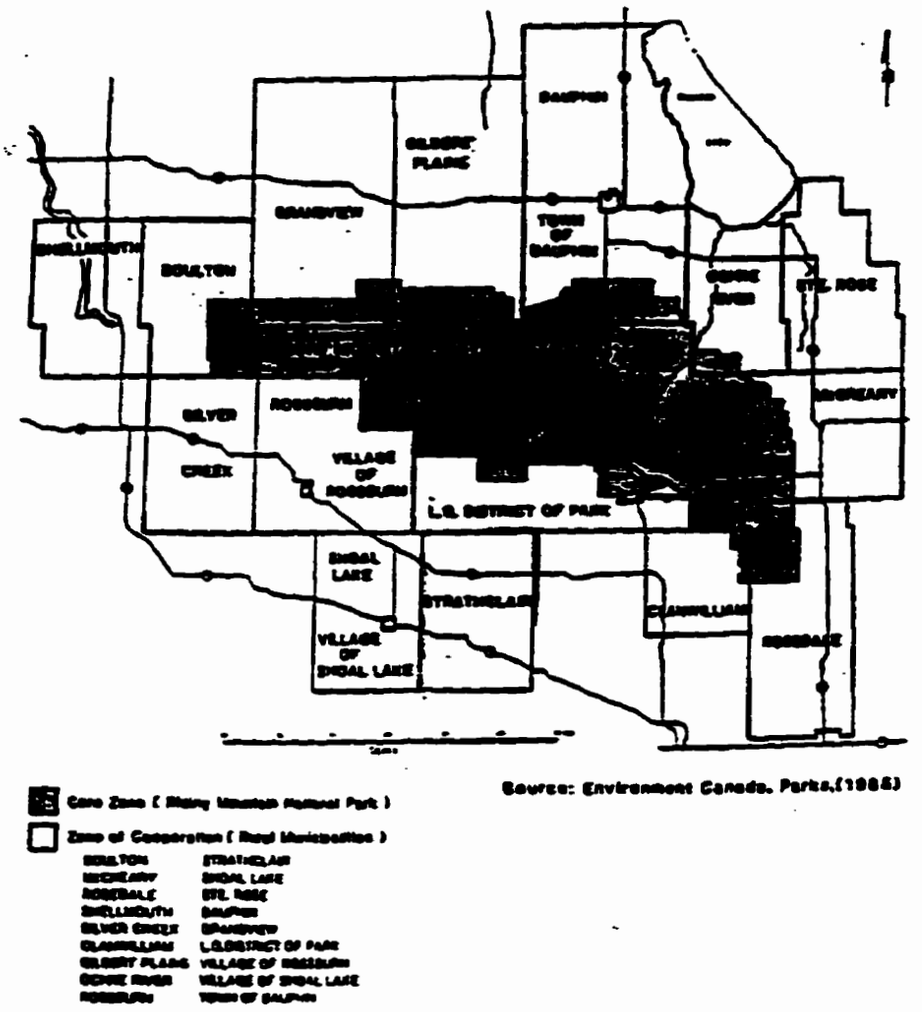

Figure 4: Riding Mountain Biosphere Reserve

Table 3

Sample sizes used for the resident surveys in the RMNP region.

Municipality	Population	Sample	No. Of Responses	Response Rate
Shellmouth	760	24	13	54.2%
Boulton	378	12	6	50.0%
Grandview	1,003	32	9	28.1%
Gilbert Plains	1,071	36	15	41.7%
Dauphin and Town of Dauphin	11,122	366	152	41.5%
Ochre River	991	32	17	53.0%
Ste Rose	1,008	34	16	47.1%
McCreary	646	22	11	50.0%
Rosedale	1,614	52	28	53.8%
Clanwilliam	481	16	10	62.5%
L.G. District	935	30	8	26.7%
Strathclair	1,055	34	20	58.8%
Village of Shoal Lake And Shoal Lake	1487	48	16	33.3%
Rossburn and Village of Rossburn	1267	42	17	40.5%
Silver Creek	594	20	6	30.0%
Totals	24,412	800	344	

*Statistics Canada, 1991. Profile of Census Divisions and Subdivisions in Manitoba; Part A.

3.4 Reliability

The research instrument was pretested by two Riding Mountain regional biologists, a geography professor at Memorial University of Newfoundland, and a ethics committee member at the University of Manitoba's Natural Resources Institute. Comments of the aforementioned people contributed to the final instrument. Collective scale reliability was assessed with Cronbach's alpha for the ordinally scaled 18 attitudinal items (α=0.851). Cronbach's alpha is used to test the reliability of internal consistency. A reliability of 1 indicates that the participants responses are consistent for the scale items. A reliability estimate of .60 was determined to be acceptable (Nunnally, 1970). If a high internal consistency exists, then the questions are all measuring the same thing. In this particular case it was used to measure an attitude score.

Kuder Richardson Formula 20 (KR20) was used to test the dichotomously coded knowledge items. Collectively, KR20 produced a reliability of .60 for the 15 knowledge items. While .60 is acceptable, it is quite low. The low reliability score may be associated with the multidimensional nature of peoples' knowledge. For example, participants may have left one or several questions blank or individuals may be knowledgeable in some areas and not in others. The knowledge responses included "yes", "no", and "I'm not sure" options. Correct answers were coded as one, incorrect answers and "I'm not sure" were coded as zero. There was a total possible score of 15 if all answers were correct.

3.5 Statistical Procedures

Nine hypotheses were listed in accordance with the six objectives of this study. Objectives one and two were accomplished through the use of descriptive statistics. Hypotheses one and two compare attitude scores and knowledge scores between all groups while hypothesis three compares the attitude scores between individuals who hunted in 1995 and individuals who did not hunt in 1995. A one way analysis of variance (ANOVA) was used to measure the differences between groups for hypotheses one and two.

There are several advantages to using ANOVA over other statistical procedures.

One advantage of using ANOVA is that it determines if differences between samples are due to chance (or sampling error) or whether there are systematic treatment effects which have caused the scores in one group to differ from scores in another group (Gravetter and Wallnau, 1992). ANOVA was used as it is a procedure which can determine differences which exist for two or more populations. This analysis process divides the total variability into two basic components: between treatments variability and within treatments variability. Other advantages of using ANOVA include its ability to test more than two groups, it can be used for either independent or repeated measures and it can also be used for studies which have more than one independent variable (Gravetter and Wallnau, 1992). In addition, using ANOVA decreases the chance of Type I Error* by providing a level of significance (or Alpha level) which defines the probability of committing a Type I Error. For example, having an Alpha (equal to $\propto$) of less than .001 means there is a risk of .1% of committing a Type I Error (Gravetter and Wallnau, 1992).

ANOVA determined that there was significant differences for hypotheses one and two. An elaboration of the results will be given in the next chapter. The Duncan post-hoc test was then done to determine which groups were significantly different.

Hypothesis three was tested through the use of an independent samples t-test. Conceptually, the scores calculated from ANOVA or a t-test are used in similar ways. That is, the t-test is also used to calculate the mean differences in treatments (Gravetter and Wallnau, 1992). The three assumptions made when using an independent-measures t-test are that the values in the sample must consist of independent observations, the population sampled must be normal, and the two populations from which the samples are selected must have equal variances (Gravetter and Wallnau, 1992). An independent t-test was chosen to evaluate the mean differences between two populations: hunters and non-hunters.

Hypotheses four through six compare knowledge scores with factors which may

---

*Note: Type I Errors consist of rejecting the null hypothesis when Ho is actually true. Type II Errors consists of failing to reject the null hypothesis which is really false. Type II Errors are less common and are not as serious as Type I Errors.

be related to knowledge scores (such as education level, age and gender). These hypotheses were tested using ANOVA in order to identify the point where education, age, or gender became a significant factor. An elaboration of the results is given in the next chapter.

Hypotheses seven and eight sought to identify factors which might be related to attitudes toward, or knowledge of, wolves in the RMNP region. More specifically, to test if there was a relationship between attitude or knowledge scores and peoples' willingness to have wolves in RMNP. Pearson's Correlation Coefficient was used to determine if there was any relationship between the variables (attitude and willingness or knowledge and willingness). Pearson's is a statistical technique which is used to measure the relationship between two variables (Gravetter and Wallnau, 1992). Pearson's Correlation Coefficient measures the direction of the relationship, the form of the relationship (linear or other) and the degree of the relationship (Gravetter and Wallnau, 1992). Willingness to have wolves in RMNP was coded as 1 = in favor, 4 = neutral and 7 = not in favor. An inverse relationship was found for hypothesis 7, indicating that there was a relationship between attitude score and willingness.

Hypothesis 9 was tested with a step-wise multiple regression analysis. Regression is a correlation analysis which is used to measure the relationship between variables (Gravetter and Wallnau, 1992). Using a multiple regression analysis will provide a formula which will represent the relationships between attitude and knowledge scores and peoples' willingness to have wolves in the RMNP region. More specifically, regression analysis will enable predictions to be made about relationships between the three variables. For example, how knowledge score may predict willingness, or, how attitude score may predict willingness. It will show the effects of both variables (attitude and knowledge) at the same time.

The sample sizes used in this study were largely representative of the populations which were sampled. The confidence levels determined for the groups surveyed were: area residents 95% ± 6%; trappers 95% ± 20%; outfitters 95% ±20%; members of the Sierra club 95% ±15%; and members of CPAWS 95% ±8% (Sheskin, 1985).

Chapter Summary

The survey instrument used for this study was divided into three sections: an attitude section, a knowledge section; and a section which inquired about peoples' willingness to have wolves in the RMNP region. Surveys were sent out to area residents and five other interest groups. The total number of surveys sent out to all groups was 1296. There were 642 surveys returned which resulted in an overall response rate of 49.5%. Response rates of each group were average compared to other mail out surveys.

The reliability of the attitudinal portion of the survey was quite high (α=0.851) while the reliability for the knowledge portion was low (=.60). Cronbach's Alpha was used to test the reliability of the attitudinal items and KR20 was used to test the reliability of the knowledge items. Other statistical procedures used to determine significant differences between groups for attitudes, knowledge and willingness to have wolves in the RMNP region included descriptive statistics (frequency tables), ANOVA, Pearson's Correlation Coefficient, Multiple Regression, and Cross Tabulations.

Chapter 4: ATTITUDES TOWARD AND KNOWLEDGE OF WOLVES

This chapter is divided into three sections: attitudes toward wolves, knowledge of wolves, and peoples' willingness to have wolves in RMNP. Results for individual question responses are reported within the appropriate sections. Results are presented in tables which include a summary table. Section 4.1 looks at hypotheses one and three; section 4.2 addresses hypotheses two, four, five, and six; and section 4.3 discusses hypotheses seven eight and nine.

4.1 Attitudes Toward Wolves

As noted, the attitudinal portion of the survey consisted of nine survey questions. A summary of the individual question responses is given in tables one through nine. The results of each question are discussed in conjunction with the tables presented. Significant differences were found to exist between the members of the six groups surveyed.

4.1.1 Individual Question Results

As outlined in the first two chapters, attitudes toward wolves has changed considerably over the last two decades. The study reported here does not support the finding of studies done in the United States which found that livestock producers and hunters had the most negative attitudes toward wolves. This study does support the findings of other wolf attitudinal studies (Lohr et al.1996) which have found that environmental groups tend to have the most positive attitudes toward wolves.

TABLE 4

Which answer best describes your attitude toward wolves?

	n	%Strongly Like	%Like	% Neither Like nor Dislike	%Dislike	%Strongly Dislike
Area Residents	*344*	*19.2*	*33.3*	*41.4*	*3.9*	*2.1*
Manitoba Trappers	*28*	*14.3*	*28.6*	*46.4*	*3.6*	*7.1*
Manitoba Outfitters	*26*	*17.4*	*30.4*	*39.1*	*8.7*	*4.3*
MB. members Sierra Club	*50*	*35.3*	*43.1*	*19.6*	*2.0*	*0.0*
MB. members CPAWS	*186*	*44.7*	*37.8*	*16.0*	*1.0*	*0.5*
Landowners Association	*8*	*0.0*	*75.0*	*25.0*	*0.0*	*0.0*

TABLE 4 SUMMARY*

	%Like	%Dislike
Area Residents	*52.5*	*6.0*
Manitoba Trappers	*42.9*	*10.7*
Manitoba Outfitters	*47.8*	*13.0*
MB. members Sierra Club	*78.4*	*2.0*
MB. members CPAWS	*82.5*	*1.5*
Landowners Association	*75.0*	*0.0*

*NOTE: % Like= the combined totals of % Strongly Like plus the % Like. %Dislike=the %Dislike plus the %Strongly Dislike. The % who neither liked or disliked wolves was excluded in order to simplify the table summary.

Table 4 indicates the attitudes of six different interest groups toward the wolf. A positive attitude (like) was evident for all six groups. The Manitoba members of CPAWS had very positive attitudes toward wolves (82.5% like), as did the Manitoba members of the Sierra Club (78.4% like). The livestock producers also had positive attitudes toward wolves (75%), although not as favourable as the previous two groups. Manitoba Outfitters (47.8% like) and Manitoba Trappers (42.9% like) also had positive attitudes toward wolves but were the least positive of the six groups. Rather, a majority of trappers (46.4%), area residents (41.4%) and outfitters (39.1%) had neutral attitudes toward wolves (neither like nor dislike).

TABLE 5

I feel I have a kinship with wolves..

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*15.9*	*3.6*	*13.8*	*36.8*	*16.5*	*7.5*	*6.0*
Manitoba Trappers	*17.9*	*3.6*	*21.4*	*28.6*	*7.1*	*14.3*	*7.1*
Manitoba Outfitters	*25.9*	*0.0*	*18.5*	*37.0*	*11.1*	*7.4*	*0.0*
MB. members Sierra Club	*0.0*	*5.9*	*5.9*	*15.7*	*31.4*	*17.6*	*23.5*
MB. members CPAWS	*4.3*	*0.5*	*2.7*	*33.7*	*25.0*	*12.5*	*21.2*
Landowners Association	*12.5*	*12.5*	*37.5*	*37.5*	*0.0*	*0.0*	*0.0*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral,A=Agree, MA=Moderately Agree, SA=Strongly Agree.

*TABLE 5 SUMMARY**

	%Agree	%Disagree
Area Residents	*30.0*	*33.3*
Manitoba Trappers	*28.5*	*42.9*
Manitoba Outfitters	*18.5*	*44.4*
MB. members Sierra Club	*72.5*	*11.8*
MB. members CPAWS	*58.7*	*7.5*
Landowners Association	*0.0*	*62.5*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 5 asks respondents to what degree they would agree or disagree with the statement "I feel I have a kinship with wolves". "Kinship" suggests a sharing of characteristics or a relationship which is associated with holding a humanistic value for wolves. Most members of the Sierra Club (72.5%) agreed with the statement, and many Manitoba members of CPAWS (58.7) agreed with the statement. Area residents (30.0%), Manitoba Trappers (28.5%) and Manitoba outfitters (18.5%) also agreed to the statement but to a much smaller degree. A majority of the livestock producers disagreed with the statement (62.5%). One possible reason for the large number of neutral responses is the

TABLE 6

Wolves are an important component of a healthy ecosystem.

	%SDA	%MDA	%DA	%N	% A	%MA	%SA
Area Residents	*3.9*	*3.0*	*2.7*	*8.3*	*24.9*	*14.5*	*42.7*
Manitoba Trappers	*7.1*	*3.6*	*3.6*	*3.6*	*32.1*	*32.1*	*17.9*
Manitoba Outfitters	*7.7*	*3.8*	*11.5*	*0.0*	*38.5*	*7.7*	*30.8*
MB. members Sierra Club	*0.0*	*2.0*	*0.0*	*0.0*	*38.5*	*9.8*	*84.3*
MB. members CPAWS	*0.5*	*0.0*	*1.1*	*0.5*	*7.0*	*6.4*	*84.5*
Landowners Association	*0.0*	*0.0*	*12.5*	*12.5*	*50.0*	*0.0*	*25.0*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral,A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 6 SUMMARY*

	%Agree	%Disagree
Area Residents	*82.1*	*9.6*
Manitoba Trappers	*82.1*	*10.7*
Manitoba Outfitters	*77.0*	*23.0*
MB. members Sierra Club	*86.8*	*2.0*
MB. members CPAWS	*97.9*	*0.5*
Landowners Association	*75.0*	*12.5*

**NOTE: % Agree= the combined totals of% Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of%Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

fact that a large percentage of respondents indicated they had neutral attitudes toward wolves (that is, they neither liked them nor disliked them)(see Table 4).

Table 6 asks respondents to what degree they would agree or disagree with the statement "Wolves are an important component of a healthy ecosystem". Almost all members of the CPAWS (97.9%) agreed with the statement, a majority of Sierra Club members agreed (86.8%), as did area residents (81.2%), trappers (81.2%), Outfitters (77.0%) and the livestock producers (75.0%).

TABLE 7

Because healthy populations of wolves exist in Northern Manitoba, there is no reason to have wolves in the Riding Mountain region.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*40.7*	*8.0*	*22.6*	*11.9*	*9.3*	*2.7*	*5.9*
Manitoba Trappers	*37.9*	*6.9*	*24.1*	*3.4*	*13.8*	*3.4*	*10.3*
Manitoba Outfitters	*37.0*	*7.4*	*22.2*	*7.4*	*14.8*	*0.0*	*11.1*
MB. members Sierra Club	*74.5*	*9.8*	*11.8*	*2.0*	*0.0*	*0.0*	*2.0*
MB. members CPAWS	*66.3*	*11.2*	*15.0*	*3.7*	*0.5*	*0.5*	*2.7*
Landowners Association	*50.0*	*25.0*	*25.0*	*0.0*	*0.0*	*0.0*	*0.0*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral,A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 7 SUMMARY*

	%Agree	%Disagree
Area Residents	*17.9*	*71.3*
Manitoba Trappers	*27.5*	*68.9*
Manitoba Outfitters	*25.9*	*66.6*
MB. members Sierra Club	*2.0*	*96.1*
MB. members CPAWS	*3.7*	*92.5*
Landowners Association	*0.0*	*100*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 7 asks respondents to what degree they would agree or disagree with the statement "Because healthy populations of wolves exist in Northern Manitoba, there is no reason to have wolves in the Riding Mountain region." All of the livestock producers disagreed with the statement. A large majority of Sierra Club members (96.1%) and CPAWS members (92.5%) also disagreed with the statement. Area resident (71.3%), trappers (68.9%) and outfitters (66.3%) also disagreed with the statement but to a lesser degree than the first three groups.

TABLE 8

Having a greater number of wolves in the Riding Mountain region would cause more damage to livestock than the damage done by the existing wolf population.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*14.2*	*7.1*	*14.2*	*16.0*	*29.6*	*8.0*	*10.9*
Manitoba Trappers	*10.3*	*13.8*	*10.3*	*13.8*	*31.0*	*10.3*	*10.3*
Manitoba Outfitters	*7.7*	*11.5*	*7.7*	*11.5*	*38.5*	*11.5*	*11.5*
MB. members Sierra Club	*16.0*	*14.0*	*16.0*	*26.0*	*22.0*	*2.0*	*4.0*
MB. members CPAWS	*19.6*	*10.3*	*15.2*	*35.3*	*14.7*	*2.7*	*2.2*
Landowners Association	*12.5*	*0.0*	*0.0*	*12.5*	*50.0*	*0.0*	*25.0*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral,A=Agree, MA=Moderately Agree, SA=Strongly Agree.

*TABLE 8 SUMMARY**

	%Agree	%Disagree
Area Residents	*48.5*	*35.5*
Manitoba Trappers	*51.6*	*34.4*
Manitoba Outfitters	*61.5*	*26.9*
MB. members Seirra Club	*28.0*	*46.0*
MB. members CPAWS	*19.6*	*45.1*
Landowners Association	*75.0*	*12.5*

**NOTE: % Agree= the combined totals of% Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of%Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 8 asks respondents to what degree they would agree or disagree with the statement "Having a greater number of wolves in the Riding Mountain region would cause more damage to livestock than the damage done by the existing wolf population." A large percentage of livestock producers (75.0%) agreed with the statement. The outfitters (61.5%), trappers (51.6%) and area residents (48.5%) also agreed but to a lesser extent than did the livestock producers. Members of the Sierra Club (46%) and CPAWS (45.1%) disagreed that having more wolves in RMNP would increase livestock damage.

TABLE 9

Wolves have a significant impact on the livestock industry around Riding Mountain National Park.

	%SDA	%MDA	%DA	%N	% A	%MA	%SA
Area Residents	*16.1*	*6.8*	*21.7*	*30.7*	*14.0*	*6.8*	*3.9*
Manitoba Trappers	*17.2*	*10.3*	*27.6*	*13.8*	*20.7*	*6.9*	*3.4*
Manitoba Outfitters	*22.2*	*7.4*	*11.1*	*25.9*	*18.5*	*7.4*	*7.4*
MB. members Sierra Club	*19.6*	*13.7*	*23.5*	*33.3*	*5.9*	*2.0*	*2.0*
MB. members CPAWS	*23.9*	*13.0*	*16.8*	*42.4*	*2.7*	*0.5*	*0.5*
Landowners Association	*12.5*	*0.0*	*50.0*	*0.0*	*12.5*	*12.5*	*12.5*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral,A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 9 SUMMARY*

	%Agree	%Disagree
Area Residents	*24.7*	*44.6*
Manitoba Trappers	*31.0*	*55.1*
Manitoba Outfitters	*33.3*	*40.7*
MB. members Sierra Club	*9.9*	*56.8*
MB. members CPAWS	*3.7*	*53.7*
Landowners Association	*37.5*	*62.5*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 9 asks respondents to what degree they would agree or disagree with the statement "Wolves have a significant impact on the livestock industry around Riding Mountain National Park." The livestock producers (62.5%) had the highest degree of agreement that wolves are having a significant impact on the livestock industry around RMNP. Members of the Sierra Club (56.8%), trappers (55.1%) and members of CPAWS (53.7%) also agreed that wolves have a significant impact on the livestock industry around RMNP, but to a lesser degree than the livestock producers. Area residents (44. 6%) and outfitters (40.7%) had the smallest degree of agreement with the statement.

TABLE 10

A wolf that kills livestock should be killed.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	20.5	6.5	16.4	13.5	18.2	5.9	19.1
Manitoba Trappers	0.0	6.9	6.9	10.3	41.4	17.2	17.2
Manitoba Outfitters	18.5	0.0	18.5	7.4	18.5	3.7	33.3
MB. members Sierra Club	54.9	13.7	9.8	9.8	9.8	2.0	0.0
MB. members CPAWS	48.7	12.8	20.3	10.2	3.7	1.1	3.2
Landowners Association	0.0	0.0	0.0	12.5	25.0	0.0	62.5

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 10 SUMMARY*

	%Agree	%Disagree
Area Residents	43.2	43.4
Manitoba Trappers	75.8	13.8
Manitoba Outfitters	55.5	37.0
MB. members Sierra Club	11.8	78.4
MB. members CPAWS	8.0	81.8
Landowners Association	87.5	0.0

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 10 asks respondents to what degree they would agree or disagree with the statement "A wolf that kills livestock should be killed."A majority of the livestock producers (87.5%) agreed that wolves that kill livestock should be killed. A large number of trappers (75.8%) also agreed with the statement. Outfitters (55.5%) also agreed with the statement but to a much lesser degree than the first two groups. A majority of CPAWS members (81.8%) and Sierra Club members (78.4%) on the other hand, disagreed that wolves that kill livestock should be killed. Area residents were almost perfectly split on the number of individuals that agreed (43.2%) with the statement and the number of individuals who disagreed with the statement (43.4%). The polarity of

TABLE 11

A wolf that kills livestock should be trapped and relocated.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*15.8*	*2.6*	*12.6*	*10.9*	*29.6*	*10.3*	*18.2*
Manitoba Trappers	*10.3*	*0.0*	*24.1*	*13.8*	*34.5*	*6.9*	*10.3*
Manitoba Outfitters	*25.9*	*0.0*	*25.9*	*3.7*	*22.2*	*3.7*	*18.5*
MB. members Sierra Club	*13.7*	*11.8*	*9.8*	*9.8*	*25.5*	*13.7*	*15.7*
MB. members CPAWS	*9.7*	*7.0*	*9.7*	*17.8*	*25.4*	*14.6*	*15.7*
Landowners Association	*62.5*	*0.0*	*12.5*	*0.0*	*25.0*	*0.0*	*0.05*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 11 SUMMARY

	%Agree	%Disagree
Area Residents	*58.1*	*31.0*
Manitoba Trappers	*51.7*	*34.4*
Manitoba Outfitters	*44.4*	*51.8*
MB. members Sierra Club	*54.9*	*35.3*
MB. members CPAWS	*55.7*	*26.4*
Landowners Association	*25.0*	*75.0*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

responses indicates there is little middle ground, and the public appears to either "love 'em" or "hate 'em".

Table 11 asked respondents to what degree they agreed or disagreed with the statement "A wolf that kills livestock should be trapped and relocated." Area residents (58.1%), members of the CPAWS (55.7%), members of the Sierra Club (54.9%) and trappers (51.7%) agreed with the statement. Members of the Landowners Association (75.0%) strongly disagreed with the statement and outfitters (51.8%) disagreed to a lesser degree with the statement.

TABLE 12

When livestock is killed by a wolf, the rancher should be paid some sort of compensation.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	5.8	2.0	5.8	15.8	36.8	7.3	26.3
Manitoba Trappers	0.0	3.4	3.4	6.9	48.3	6.9	31.0
Manitoba Outfitters	7.4	3.7	3.7	3.7	40.7	14.8	25.9
MB. members Sierra Club	5.9	2.0	9.8	11.8	31.4	23.5	15.7
MB. members CPAWS	8.6	2.7	8.6	15.0	37.4	14.4	13.4
Landowners Association	12.5	0.0	0.0	0.0	12.5	0.0	75.0

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 12 SUMMARY*

	%Agree	%Disagree
Area Residents	70.4	13.6
Manitoba Trappers	86.2	6.8
Manitoba Outfitters	81.4	14.8
MB. members Sierra Club	70.6	17.7
MB. members CPAWS	65.2	19.9
Landowners Association	87.5	12.5

**NOTE: % Agree= the combined totals of% Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of%Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 12 asks respondents to what degree they agreed or disagreed with the statement" When livestock is killed by a wolf the rancher should be paid some sort of compensation." A large percentage of livestock producers (87.5%), trappers (86.5%) and outfitters (81.4%) agreed that ranchers should receive compensation for livestock losses to wolf predation. Members of the Sierra Club (70.6%), area residents (70.4%) and members of CPAWS (65.2%) also agreed with the statement, but to a lesser degree than the first three groups.

TABLE 13

I would be willing to contribute money toward a compensation program for ranchers.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*31.5*	*2.4*	*26.7*	*24.3*	*10.7*	*2.1*	*2.4*
Manitoba Trappers	*35.7*	*7.1*	*25.0*	*21.4*	*0.0*	*7.1*	*3.6*
Manitoba Outfitters	*38.5*	*3.8*	*23.1*	*15.4*	*7.7*	*0.0*	*11.5*
MB. members Sierra Club	*18.4*	*6.1*	*24.5*	*16.3*	*16.3*	*8.2*	*10.2*
MB. members CPAWS	*16.2*	*3.2*	*13.0*	*30.3*	*27.0*	*5.9*	*4.3*
Landowners Association	*50.0*	*0.0*	*25.0*	*25.0*	*0.0*	*0.0*	*0.0*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 13 SUMMARY*

	%Agree	%Disagree
Area Residents	*15.2*	*60.6*
Manitoba Trappers	*10.7*	*67.8*
Manitoba Outfitters	*19.2*	*65.4*
MB. members Sierra Club	*19.7*	*49.0*
MB. members CPAWS	*37.2*	*32.4*
Landowners Association	*0.0*	*75.0*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 13 asked respondents to what degree they agreed or disagreed with the statement "I would be willing to contribute money toward a compensation program for ranchers." Members of CPAWS agreed with the statement (37.2%). Livestock producers disagreed with the statement quite strongly (75.0%). Trappers (67.8%), outfitters (65.4%), area residents (60.6%), and members of the Sierra Club (32.4%) also disagreed with the statement although not as strongly as the livestock producers.

TABLE 14

I think that the Manitoba Government should pay compensation to ranchers for livestock losses that are the result of wolf predation.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*11.9*	*3.0*	*9.2*	*13.1*	*35.7*	*6.5*	*20.5*
Manitoba Trappers	*7.1*	*0.0*	*3.6*	*17.9*	*35.7*	*10.7*	*25.0*
Manitoba Outfitters	*11.5*	*3.8*	*11.5*	*7.7*	*34.6*	*3.8*	*26.9*
MB. members Sierra Club	*12.0*	*4.0*	*6.0*	*8.0*	*42.0*	*12.0*	*16.0*
MB. members CPAWS	*9.1*	*1.6*	*8.0*	*17.6*	*39.6*	*13.4*	*10.7*
Landowners Association	*0.0*	*0.0*	*0.0*	*0.0*	*25.0*	*0.0*	*75.0*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

*TABLE 14 SUMMARY**

	%Agree	%Disagree
Area Residents	*62.7*	*24.1*
Manitoba Trappers	*71.4*	*10.7*
Manitoba Outfitters	*65.3*	*26.8*
MB. members Sierra Club	*70.0*	*22.0*
MB. members CPAWS	*63.7*	*18.7*
Landowners Association	*100.0*	*0.0*

**NOTE: % Agree= the combined totals of% Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of%Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 14 asked respondents to what degree they agreed or disagreed with the statement "I think that the Manitoba Government should pay compensation to ranchers for livestock losses that are the result of wolf predation." Livestock producers were in 100% agreement with the statement. Trappers (71.4%) were also in strong agreement with the statement. Members of the Sierra Club (70.0%), outfitters (65.3%), members of CPAWS (63.7%), and area residents (62.7%) were also in agreement with the statement, although they did not agree as strongly as the first two groups.

TABLE 15

Wolves are having a significant negative impact on big game hunting opportunities near Riding Mountain National Park.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*25.1*	*8.9*	*21.0*	*28.4*	*10.7*	*2.4*	*3.6*
Manitoba Trappers	*17.9*	*10.7*	*28.6*	*10.7*	*14.3*	*7.1*	*10.7*
Manitoba Outfitters	*26.9*	*7.7*	*26.9*	*11.5*	*11.5*	*3.8*	*11.5*
MB. members Sierra Club	*38.0*	*22.0*	*8.0*	*32.0*	*0.0*	*0.0*	*0.0*
MB. members CPAWS	*44.8*	*14.4*	*13.8*	*24.3*	*0.6*	*0.6*	*1.7*
Landowners Association	*25.0*	*0.0*	*37.5*	*0.0*	*25.0*	*0.0*	*12.5*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

*TABLE 15 SUMMARY**

	%Agree	%Disagree
Area Residents	*16.7*	*55.0*
Manitoba Trappers	*32.1*	*57.2*
Manitoba Outfitters	*26.8*	*61.5*
MB. members Sierra Club	*0.0*	*68.0*
MB. members CPAWS	*2.9*	*73.0*
Landowners Association	*37.5*	*62.5*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 15 asked respondents to what degree they agreed or disagreed with the statement "Wolves are having a significant negative impact on big game hunting opportunities near Riding Mountain National Park." Members of CPAWS (73.0%) disagreed the most strongly with the statement. Members of the Sierra Club (68.0%), livestock producers (62.5%), and outfitters (61.5%) disagreed less strongly and trappers (57.2%), and area residents (55.0%) indicated the lowest degree of disagreement with the statement.

TABLE 16

The provincial government should allow more wolves to be harvested.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	*19.5*	*3.5*	*17.1*	*34.2*	*15.0*	*3.8*	*6.8*
Manitoba Trappers	*7.4*	*3.7*	*22.2*	*22.2*	*25.9*	*3.7*	*14.8*
Manitoba Outfitters	*11.5*	*7.7*	*15.4*	*34.6*	*15.4*	*3.8*	*11.5*
MB. members Sierra Club	*53.1*	*16.3*	*14.3*	*16.3*	*0.0*	*0.0*	*0.0*
MB. members CPAWS	*49.2*	*9.2*	*17.8*	*17.3*	*2.7*	*1.1*	*2.7*
Landowners Association	*25.0*	*0.0*	*25.0*	*37.5*	*0.0*	*0.0*	*12.5*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

*TABLE 16 SUMMARY**

	%Agree	%Disagree
Area Residents	*25.6*	*40.1*
Manitoba Trappers	*44.4*	*33.3*
Manitoba Outfitters	*30.7*	*34.6*
MB. members Sierra Club	*0.0*	*83.7*
MB. members CPAWS	*6.5*	*76.2*
Landowners Association	*12.5*	*50.0*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 16 asked respondents to what degree they agreed or disagreed with the statement "The provincial government should allow more wolves to be harvested." Trappers (44.4%) agreed with the statement. Members of the Sierra Club (83.7%) strongly disagreed with the statement, as did members of CPAWS (76.2%). Livestock producers (50.0%), area residents (40.1%) and outfitters (34.6%) also all disagreed with the statement, but to a lesser degree than CPAWS and Sierra Club members. There was a large number of neutral responses to this question from area residents (34.2%), outfitters (32.6%) and livestock producers (37.5%) indicating that the majority of these groups

TABLE 17

I would like to see a wolf in the wild.

	%SDA	%MDA	%DA	%N	% A	%MA	%SA
Area Residents	*3.3*	*2.4*	*3.6*	*9.9*	*26.1*	*12.9*	*41.7*
Manitoba Trappers	*10.3*	*0.0*	*10.3*	*17.2*	*27.6*	*10.3*	*24.1*
Manitoba Outfitters	*11.5*	*0.0*	*7.7*	*7.7*	*30.8*	*3.8*	*38.5*
MB. members Sierra Club	*0.0*	*2.0*	*0.0*	*0.0*	*11.8*	*7.8*	*78.4*
MB. members CPAWS 1.6	*0.0*	*1.1*	*5.9*	*14.5*	*11.8*	*65.1*	
Landowners Association	*0.0*	*0.0*	*12.5*	*12.5*	*62.5*	*0.0*	*12.5*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 17 SUMMARY*

	%Agree	%Disagree
Area Residents	*80.7*	*9.3*
Manitoba Trappers	*62.0*	*20.6*
Manitoba Outfitters	*73.1*	*19.2*
MB. members Sierra Club	*98.0*	*2.0*
MB. members CPAWS	*91.4*	*2.7*
Landowners Association	*75.0*	12.5

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

neither agreed or disagreed that wolf harvests should be increased in the region.

Table 17 asks respondents to what degree they agreed or disagreed with the statement "I would like to see a wolf in the wild." Almost all of the members of the Sierra Club (98.0%) and CPAWS (91.4%) agreed that they would like to see a wolf in the wild. Area residents (80.7%) livestock producers (75.0%), outfitters (73.1%) and trappers (62.0%) also agreed that they would like to see a wolf in the wild, but to a lesser degree than the first two groups.

The law of diminishing returns predicts that the more a person sees a wolf in the

TABLE 18

I would be afraid to hike in Riding Mountain National Park knowing that wolves are present in the park.

	%SDA	%MDA	%DA	%N	%A	%MA	%SA
Area Residents	36.6	7.4	22.4	11.5	10.9	3.8	7.4
Manitoba Trappers	25.0	10.7	25.0	17.9	3.6	7.1	10.7
Manitoba Outfitters	34.6	3.8	30.8	7.7	15.4	0.0	7.7
MB. members Sierra Club	66.0	8.0	18.0	2.0	2.0	0.0	4.0
MB. members CPAWS	65.9	10.3	13.0	7.0	2.2	0.5	1.1
Landowners Association	25.0	12.5	37.5	12.5	12.5	0.0	0.0

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 18 SUMMARY*

	%Agree	%Disagree
Area Residents	22.1	66.4
Manitoba Trappers	21.4	60.7
Manitoba Outfitters	23.1	69.2
MB. members Sierra Club	6.0	92.0
MB. members CPAWS	3.8	89.2
Landowners Association	12.5	64.0

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

wild, the less the satisfaction they receive from seeing a wolf (Phillips and Seldon, 1983). Alternatively, the less a person sees a wolf in the wild, the greater the satisfaction they will gain. The large percentage of people from CPAWS and the Sierra Club who expressed the desire to see a wolf in the wild may relate to the fact that only 51.5% and 70.0% (respectively) of these groups have already seen a wolf in the wild (see Table 39). On the other hand, 100% of the trappers and livestock producers and 88.5% of the outfitters have already seen a wolf in the wild.

TABLE 19

I live too close to wolves.

	%SDA	%MDA	%DA	%N	% A	%MA	%SA
Area Residents	*35.2*	*10.1*	*24.5*	*22.4*	*4.8*	*1.8*	*1.2*
Manitoba Trappers	*28.6*	*14.3*	*28.6*	*14.3*	*10.7*	*3.6*	*0.0*
Manitoba Outfitters	*25.9*	*18.5*	*22.2*	*18.5*	*11.1*	*3.7*	*0.0*
MB. members Sierra Club	*62.7*	*5.9*	*23.5*	*7.8*	*0.0*	*0.0*	*0.0*
MB. members CPAWS	*65.1*	*9.7*	*13.4*	*8.6*	*1.1*	*0.0*	*2.2*
Landowners Association	*0.0*	*25.0*	*25.0*	*50.0*	*0.0*	*0.0*	*0.0*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 19 SUMMARY*

	%Agree	%Disagree
Area Residents	*7.8*	*69.8*
Manitoba Trappers	*14.3*	*71.5*
Manitoba Outfitters	*14.8*	*66.6*
MB. members Sierra Club	*0.0*	*71.1*
MB. members CPAWS	*3.3*	*88.2*
Landowners Association	*0.0*	*50.0*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

Table 18 asks respondents the degree they would agree or disagree with the statement "I would be afraid to hike in Riding Mountain National Park knowing that wolves are present in the park." A large majority of Sierra Club members (92.0%) and CPAWS members (89.2%) disagreed with the statement. Outfitters (69.2%), area residents (66.4%), livestock producers (64.0%) and trappers (60.7%) also disagreed with the statement but to a much lesser degree than the first two groups.

Table 19 asks respondents the degree they would agree or disagree with the statement "I live too close to wolves." A majority of CPAWS members (88.2%) disagreed

TABLE 20

Are you in favor of having wolves in Riding Mountain National Park?

	Yes	*No*	*No Opinion*
Area Residents	*76.4*	*10.6*	*13.0*
Manitoba Trappers	*67.9*	*17.9*	*14.3*
Manitoba Outfitters	*65.4*	*26.9*	*7.7*
MB. members Sierra Club	*96.0*	*2.0*	*2.0*
MB. members CPAWS	*95.7*	*0.5*	*3.7*
Landowners Association	*87.5*	*12.5*	*0.0*

with the statement. Trappers (71.5%) and members of the Sierra Club (71.1%) also disagreed with the statement but to a lesser degree than the CPAWS members. Area residents (69.8%), outfitters (66.6%) and livestock producers (50.0%) also disagreed with the statement but to a slightly lesser degree than the first three groups.

Table 20 asks "Are you in favor of having wolves in Riding Mountain National Park?" A large majority (96.0%) of Sierra Club members, CPAWS (95.7%), and livestock producers (87.5%) agreed strongly with this question. There was also high degrees of agreement from area residents (76.4%), trappers (67.9%) and outfitters (65.4%).

Table 21 states "If I saw a wolf I would try to kill it." A majority of the CPAWS members (96.7%) and Sierra Club members disagreed with this statement. A slightly lesser number of area residents (71.6%) disagreed with the statement. The smallest degree of disagreement was from livestock producers (50.0%), outfitters (38.4%) and trappers (35.7%). A large percentage of trappers (32.1%), livestock producers (25.0%) and outfitters (23.1%) also indicated that they were neutral on the issue.

TABLE 21

If I saw a wolf I would try to kill it.

	%SDA	%MDA	%DA	%N	% A	%MA	%SA
Area Residents	*46.7*	*5.4*	*19.5*	*14.4*	*6.6*	*2.4*	*5.1*
Manitoba Trappers	*7.1*	*10.7*	*17.9*	*32.1*	*14.3*	*0.0*	*17.9*
Manitoba Outfitters	*19.2*	*3.8*	*15.4*	*23.1*	*11.5*	*7.7*	*19.2*
MB. members Sierra Club	*88.0*	*2.0*	*6.0*	*4.0*	*0.0*	*0.0*	*0.0*
MB. members CPAWS	*91.4*	*0.5*	*4.8*	*1.1*	*0.5*	*0.0*	*1.6*
Landowners Association	*25.0*	*0.0*	*25.0*	*25.0*	*12.5*	*0.0*	*12.5*

NOTE: SDA=Strongly Disagree, MDA=Moderately Disagree, DA=Disagree, N=Neutral, A=Agree, MA=Moderately Agree, SA=Strongly Agree.

TABLE 21 SUMMARY*

	%Agree	%Disagree
Area Residents	*14.1*	*71.6*
Manitoba Trappers	*32.2*	*35.7*
Manitoba Outfitters	*38.4*	*38.4*
MB. members Sierra Club	*0.0*	*96.0*
MB. members CPAWS	*2.1*	*96.7*
Landowners Association	*25.0*	*50.0*

**NOTE: % Agree= the combined totals of % Agree, %Moderately Agree, and %Strongly Agree. %Disagree=the combined totals of %Strongly Disagree, %Moderately Disagree, and %Disagree. The % which were neutral were excluded in order to simplify the table summary.*

4.1.2 Attitude Scores

As noted in the methods chapter, an attitude score was computed for each interest group using the 18 items discussed above. This score was computed as follows:

$$\frac{\sum Q1+Q2+Q3+.....+Q17+Q18}{18} = \text{Attitude Score}$$

A score of one indicates a positive attitude toward wolves (strongly like) while a score of seven indicated a negative attitude toward wolves (strongly dislike). A score of 4 indicates a neutral attitude toward wolves.

The respondents from CPAWS (2.4) and the Sierra Club (2.3) had the most

positive attitude toward wolves with average values which fell between "moderately like" (2) and "like" (3). Area residents (3.2), livestock producers (3.5), trappers (3.5) and outfitters (3.6) had average attitude values which fell between "like" (3) and "neither like nor dislike" (4).

The above scores are supported by several question responses. Firstly, by the response to the question which asked "Which answer best describes your attitude toward wolves?" It is also supported by the higher number of environmental group members who disagreed that a wolf that kills livestock should be killed. They thought that non-lethal methods of wolf management (such as relocation) should be used. Thirdly, people who held the most positive attitudes toward wolves were willing to contribute money to a compensation fund in order to ensure wolves would be present in the RMNP region. Other groups had lower (or no) willingness to provide money to compensate ranchers for livestock predation. This may indicate that either they feel that predation is natural, or, alternatively, they may feel that the responsibility to pay compensation should go to a government authority. Finally, people who held more positive attitudes toward wolves strongly disagreed that the provincial government should allow more wolves to be harvested whereas people with slightly less favourable attitudes agreed with the statement.

Analysis of variance was used was used to test hypothesis one which stated: There is no significant difference in attitude scores between RMNP area residents, Manitoba members of CPAWS, Manitoba members of the Sierra Club, the Riding Mountain Landowners Association, Trappers in the RMNP region, and Manitoba outfitters in the RMNP region. Table 22 indicates that there was a highly significant difference found ($P=<.001$). The null hypothesis was therefore rejected. Duncan's procedure was used to determine which groups were significantly different. Table 23 indicates that members of CPAWS and the Sierra Club were significantly different than the four other groups in that their scores indicated the most positive attitude toward wolves (2.4 and 2.3 respectively). Area residents (3.1) were significantly different from all other groups. Livestock producers (3.5) had scores which were between area residents and trappers and outfitters

TABLE 22

Analysis of Variance: Attitude Score by Area Residents and 5 Interest Groups

Source	*DF*	*Sum of Squares*	*Mean Squares*	*F Ratio*	*F Prob*
Between Groups	*5*	*101.84*	*20.37*	*30.72*	*<.0001*
Within Groups	*556*	*368.59*	*.66*		

TABLE 23

Duncan Test: Attitude Score by Area Residents and 5 Interest Groups

Mean	*Group*	*Subset for alpha=.05*		
		1	*2*	*3*
2.34	*Manitoba Members of the Sierra Club*	*A*	*	*
2.39	*Manitoba Members of CPAWS*	*A*	*	*
3.15	*Area Residents*	*	*B*	*
3.51	*Landowners Association*	*	*B*	*C*
3.54	*Manitoba Trappers*	*	*	*C*
3.64	*Manitoba Outfitters*	*	*	*C*

Note: those groups which have differing letters are significantly different from each other, and from groups which have no letters
Note also: Means scores signify attitude toward the wolf: 1=strongly like, 2=moderately like, 3=like, 4=neutral, 5=dislike, 6=moderately dislike, 7=strongly dislike

and were not statistically different from any of these three groups. Trappers and outfitters were not significantly different from each other, but were the most statistically different from CPAWS and Sierra Club members.

4.1.3 Factors Related to Attitude

An independent T-Test was used to identify factors which may be used to predict attitudes toward the wolf. Hypothesis three of this study stated "There is no significance in attitude score between individuals who hunted in 1995 and individuals who did not hunt in 1995". Table 24 indicates that there was a significant difference (P=<.001) between individuals who hunted in 1995 and those individuals who did not hunt in 1995.

More specifically, people who hunted in 1995 had less positive attitudes toward wolves than people who did not hunt in 1995. This has several implications. Firstly,

26.8% of the outfitters surveyed agreed that wolves are having a significant impact on big game hunting in the RMNP region which may be perceived as a conflict with hunting opportunities. Secondly, 38.4% also agreed that if they saw a wolf they would try to kill it. As noted, while hunting they can legitimately take a wolf with any unused big game tag. Further, 30.7% of the outfitters agreed that the Manitoba government should allow more wolves to be harvested, which suggests they would like more opportunity to hunt wolves. A majority of outfitters (55.0%) also felt that wolves that kill livestock should be killed, suggesting further the desire for increased hunting opportunities.

TABLE 24

T-test: Attitude Score by Individuals Who Hunted in 1995 and Individuals Who Did Not Hunt in 1995

Total attitude	*number of cases*	*mean*	*SD*	*t-value*	*df*	*2 tail significance*
Hunters	*112.0*	*3.2*	*.97*	*3.58*	*550*	*<.001*
Non-hunters	*440*	*2.82*	*.89*			

4.2 Knowledge of Wolves

Part of our understanding of wolves comes from our cultural beliefs which have been developed over centuries. It is believed by some (Baker, 1993; Munson, 1994) that peoples' misconceptions about ecological principles can be based on prior knowledge. It is believed by others (Bath, 1987a, 1987b; Kellert, 1996) that prior knowledge and experience can influence peoples' attitudes.

4.2.1 Individual Question Scores

Although there is currently a great deal of literature available to the public about wolves, it appears from the results of this study that the wolf is quite misunderstood in the RMNP region of Manitoba.

Table 25 asks "How much do you think the average adult Riding Mountain National Park timber wolf weighs?" A majority of all groups indicated the correct answer, 60-119 lbs (28-54 kg). Ream and Mattson (1982) identified that the adult male timber wolf weighs between 80 to 100 lbs. Some of the respondents indicated that they believed that adult timber wolves weigh 120-180 lbs, indicating that they perceive the animal to be much larger than it actually is. In addition, some area residents and members of the Sierra Club and CPAWS indicated that they thought wolves weighed over 180 lbs. Approximately 38.0% of each group indicated an incorrect answer or "I'm not sure".

The over estimation of size may be related to a fear of being attacked by a wolf, and subsequently lead to more negative attitudes toward the animal. Table 26 shows that as the predictions of weight increased, so did the fear people had that they may be attacked. In addition, there was a fairly high percentage (28.9%) of people who would be afraid to hike in the park that were not sure how much a wolf weighs and only 11.9% (46/388) were accurate on their estimations. On the other hand, people who were not afraid of being attacked were more accurate on their size estimations (309/388 or 79.6% were correct).

TABLE 25

How much do you think the average adult Riding Mountain National Park timber wolf weighs?

	0-59lbs	**60-119lbs*	*120-180lbs*	*OVER 180 lbs.*	*I'M NOT SURE*
Area Residents	*3.9*	*63.2*	*16.8*	*1.8*	*14.4*
Manitoba Trappers	*0.0*	*62.1*	*17.2*	*0.0*	*20.7*
Manitoba Outfitters	*3.7*	*59.3*	*33.3*	*0.0*	*3.7*
MB. members Sierra Club	*7.8*	*52.9*	*19.6*	*2.0*	*17.6*
MB. members CPAWS	*5.4*	*61.1*	*17.3*	*0.5*	*15.7*
Landowners Association	*0.0*	*75.0*	*12.5*	*0.0*	*12.5*

**Indicates the correct answer.*

TABLE 26

Crosstabs: Weight of RMNP wolves and fear of hiking in RMNP.

	How much do you think the average RMNP wolf weighs?				
	0-59lbs	*60-119lbs*	*120-180lbs*	*over 180lbs*	*I'm Not Sure*
I would be afraid to hike in RMNP knowing that wolves are present in the park.					
%agree	*10.7*	*11.9*	*19.5*	*12.5*	*28.9*
%neutral	*7.1*	*8.5*	*10.6*	*0.0*	*13.3*
%disagree	*82.1*	*79.6*	*69.9*	*87.5*	*57.8*

TABLE 27

How many wolves exist in Riding Mountain National Park?

	1-30	**30-60*	*60-90*	*90-120*	*OVER 120*
Area Residents	*24.0*	*31.3*	*18.9*	*6.2*	*16.6*
Manitoba Trappers	*14.3*	*23.8*	*28.6*	*14.3*	*19.0*
Manitoba Outfitters	*17.4*	*43.5*	*30.4*	*4.3*	*4.3*
MB. members Sierra Club	*21.4*	*50.0*	*21.4*	*4.8*	*2.4*
MB. members CPAWS	*31.2*	*38.9*	*15.9*	*9.6*	*4.5*
Landowners Association	*14.3*	*42.9*	*0.0*	*14.3*	*28.6*

** Indicates the correct answer. For this question, two answers are counted as correct since the options overlap, and there is no hard data available on how many wolves currently exist in RMNP. The best estimate to date is 32 wolves.*

Table 27 asks "How many wolves exist in Riding Mountain National Park?" Members of the Sierra Club were 50.0% correct in their choice that the number of wolves in RMNP fell between 30-60 wolves. Outfitters were 43.5% correct, livestock producers were correct 42.9% of the time, CPAWS members were correct 38.9% of the time, area residents were correct 31.3% of the time, and trappers were correct 23.8% of the time. An

TABLE 28

Crosstabs: Number of wolves in RMNP and annual harvests

	How many wolves exist in RMNP?				
	1-30	*30-60*	*60-90*	*90-120*	*over 120*
The provincial government should allow more wolves to be harvested					
%agree	*16.0*	*10.3*	*17.5*	*13.2*	*45.6*
% neutral	*19.1*	*23.8*	*26.8*	*28.9*	*27.9*
%disagree	*64.9*	*65.9*	*55.7*	*57.9*	*26.5*

average of 23.0 of each group (except livestock producers) felt that there was 60-90 wolves in RMNP. An average of 8.9% of each group felt that there was 90-120 wolves in RMNP. An average of 12.6% of each group felt that there was over 120 wolves in RMNP. A total of 44.5% of people surveyed overestimated the number of wolves in RMNP.

Overestimations on the number of wolves present in the region explains in part why outfitters and trappers both indicated that they thought the Manitoba government should allow more wolves to be harvested. Trappers, outfitters and livestock producers also all agreed that wolves are having a significant impact on big game hunting opportunities in the region, so an increase in the number of wolves harvested may be perceived as a way to increase big game hunting opportunities. Table 28 indicates that as the predictions of the number of wolves present in the park increases, the degree of agreement that harvest numbers should be increased also increases. Alternatively, as the number of wolves estimated to be in the park decreases, the degree of agreement that more wolves should be harvested also decreases.

Table 29 asks "Do you think wolf numbers in Riding Mountain National Park are: increasing, decreasing, or remaining about the same." Members of the Sierra Club (60.0%) and members of CPAWS (50.3%) were correct that the number of wolves in RMNP is decreasing. All other groups were less than 50% correct. Over 60.0% of

TABLE 29

Do you think wolf numbers in Riding Mountain National Park are:

	Increasing	**Decreasing*	*Remaining about the same*
Area Residents	*23.8*	*29.0*	*47.2*
Manitoba Trappers	*26.9*	*30.8*	*42.3*
Manitoba Outfitters	*17.4*	*21.7*	*60.9*
MB. members Sierra Club	*5.0*	*60.0*	*35.0*
MB. members CPAWS	*6.9*	*50.3*	*42.8*
Landowners Association	*28.6*	*28.6*	*42.9*

**Indicates the correct answer.*

outfitters and 47.2% of the area residents believed wolf numbers were remaining the same. Livestock producers (42.9%) and trappers (42.3%) also believed wolf numbers were remaining about the same. A lower proportion of livestock producers (28.6%), trappers (26.9%), area residents (23.8%) and outfitters (17.4%) believed that wolf numbers in RMNP were increasing.

Table 30 indicates that for the options given for how many wolves exist in RMNP, the majority of respondents felt that numbers were remaining about the same. The belief that wolf numbers is remaining about the same is significant because the same groups (outfitters, livestock producers and trappers) over estimated the number of wolves in the park. Table 31 also indicates that as number of wolves estimated increased, so did the percentage of respondent who believed the population was increasing.

Table 31 asks "How successful do you believe a pack of wolves in Riding Mountain National Park given 100 chases, is at catching and killing a moose, one of their prey species?" Although success rate can vary with snow depth and other conditions, the average success rate reported by RMNP biologists is about 13.0%. The success rate reported for wolves on Isle Royale was 8.0% (Mech, 1966). The success rate in RMNP

TABLE 30

Crosstabs: Number of wolves in RMNP and population status.

		How many wolves exist in RMNP?				
		1-30	*30-60*	*60-90*	*90-120*	*over 120*
Do you think wolf numbers in RMNP are:	*Increasing*	*7.9*	*13.9*	*16.5*	*10.5*	*40.3*
	Decreasing	*45.2*	*48.3*	*35.1*	*23.7*	*19.4*
	Remaining about the same	*46.8*	*37.8*	*48.5*	*65.8*	*40.3*

TABLE 31

How successful do you believe a pack of wolves in Riding Mountain National Park given 100 chases, is at catching and killing a moose, one of their prey species?

	1-10%	**11-50%*	*51-80%*	*81-100%*	*I'M NOT SURE*
Area Residents	*22.7*	*26.9*	*15.8*	*10.4*	*24.4*
Manitoba Trappers	*24.1*	*31.0*	*13.8*	*13.8*	*17.2*
Manitoba Outfitters	*11.5*	*42.3*	*11.5*	*19.2*	*15.4*
MB. members Sierra Club	*47.1*	*23.5*	*7.8*	*2.0*	*19.6*
MB. members CPAWS	*41.2*	*24.1*	*7.0*	*3.2*	*24.6*
Landowners Association	*25.0*	*12.5*	*12.5*	*50.0*	*0.0*

** Indicates the correct answer.*

could be slightly higher due to the high quantity of ungulates currently in the park. An average of 26.7% of each group indicated the correct answer. On the other hand, an average of 27.8% of all groups over estimated wolf hunting success rate. Of these, outfitters, trappers and livestock producers consistently over estimated the success rate which could explain why they thought wolves were having a significant impact on big game hunting opportunities. An average of 28.6% of each group underestimated wolf

hunting success rate. An average of 16.9% of each group was not sure what wolf hunting success rate was.

Table 32 asks "What percentage of cattle that exist in wolf range in the Riding Mountain National Park region are killed by wolves in a single year?" 70.0% of the Sierra Club members, 62.5% of the livestock producers, 53.8% of the outfitters, 52.2% of CPAWS members, 48.3% of the trappers and 39.9% of the area residents answered the question correctly. Some livestock producers (25.0%) and outfitters (23.1%) believed that there is between 1-30% of cattle ranging in the RMNP killed by wolves each year. The perception of a higher incidence of wolf predation on livestock (upwards to the 30% range) may explain why livestock producers agreed there should be an increase in wolf harvests. Predator control measures are likely perceived as a method of reducing wolf predation on livestock.

Many people were not sure how many cattle were lost to wolf predation each year. For example, 41.4% of the trappers, 36.3% of CPAWS members, 22.0% of Sierra Club members and 19% of the outfitters were not sure. The perception that there is a high incidence of wolf predation would likely lead to more negative attitudes toward wolves because of the direct financial loss incurred by livestock producers. The large number of people who were not sure of, or over estimated the incidence of wolf predation on livestock indicates a need for education on this topic.

Table 33 asks "What would be your estimate of documented cases of (free ranging) wolf attacks on humans occurring in North America since 1800?" An average of 32.3% for each group indicated the correct answer (no documented cases). There was a fairly high average (28.3%) number of people from each group who indicated they thought 1-10 cases had been documented. Almost one-third (29.8%) of people surveyed indicated they were not sure if wolves attacked people or not. The highest percentages of people who thought there had been 1-10 cases of wolves attacking people were found for the area residents (22.1%), trappers (21.4%) and outfitters (23.1%).

Individuals who believed that wolves may attack people tended to have a more negative attitude toward the animal based on a perceived threat of attack. Table 34

TABLE 32

What percentage of cattle that exist in wolf range in the Riding Mountain National Park region are killed by wolves in a single year?

	None	**Greater than 0 But less than 1%*	*1-30%*	*31-60%*	*OVER 60%*	*I'm Not Sure*
Area Residents	*3.9*	*39.9*	*12.9*	*0.9*	*1.2*	*41.1*
Manitoba Trappers	*0.0*	*48.3*	*6.9*	*3.4*	*0.0*	*41.4*
Manitoba Outfitters	*3.8*	*53.8*	*23.1*	*0.0*	*0.0*	*19.2*
MB. members Sierra Club	*4.0*	*70.0*	*4.0*	*0.0*	*0.0*	*22.0*
MB. members CPAWS	*4.9*	*52.2*	*6.6*	*0.0*	*0.0*	*36.3*
Landowners Association	*12.5*	*62.5*	*25.0*	*0.0*	*0.0*	*0.0*

* *Indicates the correct answer.*

TABLE 33

What would be your estimate of documented cases of (free ranging) wolf attacks on humans occurring in North America since 1800?

	**None*	*1-10*	*11-20*	*21-50*	*51-100*	*Over 100*	*I'm Not Sure*
Area Residents	*22.3*	*27.7*	*2.7*	*3.0*	*1.2*	*1.8*	*41.4*
Manitoba Trappers	*35.7*	*21.4*	*7.1*	*0.0*	*0.0*	*0.0*	*35.7*
Manitoba Outfitters	*23.1*	*38.5*	*7.7*	*3.8*	*0.0*	*0.0*	*26.9*
MB. members Sierra Club	*35.3*	*35.3*	*9.8*	*2.0*	*0.0*	*0.0*	*17.6*
MB. members CPAWS	*39.8*	*34.4*	*3.2*	*1.6*	*0.5*	*0.5*	*19.9*
Landowners Association	*37.5*	*12.5*	*12.5*	*0.0*	*0.0*	*0.0*	*37.5*

* *Indicates the correct answer.*

indicates that individuals who had more positive attitudes toward wolves tended to have the lowest estimates of the number of documented cases of wolves attacking people. People with more negative attitudes (3-3.99) tended to have higher estimates of the number of people who have been attacked by wolves.

*TABLE 34**

Crosstabs: Estimates of documented wolf attacks on humans by attitude score

What would be your estimate of documented (free ranging) wolf attacks on humans occurring in North America since 1800?

	None	*1-10*	*11-20*	*21-50*	*51-100*	*over 100*	*I'm Not sure*
Attitude Score							
1-1.99 Strongly like	*22.9%*	*18.3*	*4.3*	*7.1*	-	-	*4.7*
2-2.99 Moderately like	*52.4*	*49.1*	*60.9*	*50.0*	*50.0*	*42.8*	*29.6*
3-3.99 Like	*19.3*	*25.1*	*30.4*	*42.9*	*50.0*	*14.3*	*38:5*
4-4.99 Neutral	*4.8*	*5.1*	*4.3*	-	-	*42.8*	*23.7*
5-5.99 Dislike	*.6*	*2.3*	-	-	-	-	*2.9*
6-6.99 Moderately dislike	-	-	-	-	-	-	*.5*
7-7.99 Strongly dislike	-	-	-	-	-	-	-

**Note: 166 respondents believed there was no documented cases, 175 believed there was 1-10 cases, 23 respondents believed there was 11-20 cases, 14 respondents believed there was 21-50, 4 respondents believed there was 51-100 cases, 7 respondents believed there was over 100 cases and 169 respondents were not sure how many cases there has been.*

TABLE 35

What is the average pack size of wolves in Riding Mountain National Park?

	1-4	**5-15*	*16-30*	*Over 30*	*I'm Not Sure*
Area Residents	*24.6*	*34.5*	*1.5*	*0.6*	*38.7*
Manitoba Trappers	*20.7*	*51.7*	*0.0*	*0.0*	*27.6*
Manitoba Outfitters	*29.6*	*48.1*	*0.0*	*0.0*	*22.2*
MB. members Sierra Club	*20.4*	*51.0*	*0.0*	*0.0*	*28.6*
MB. members CPAWS	*22.5*	*45.1*	*0.5*	*0.0*	*31.9*
Landowners Association	*25.0*	*50.0*	*0.0*	*0.0*	*25.0*

**Indicates the correct answer.*

TABLE 36

Do wolf packs defend a relatively fixed area or territory against other wolf packs?

	Yes	**No*	*I'm Not Sure*
Area Residents	*53.6*	*5.7*	*40.7*
Manitoba Trappers	*50.0*	*7.1*	*42.9*
Manitoba Outfitters	*69.2*	*3.8*	*26.9*
MB. members Sierra Club	*68.0*	*4.0*	*28.0*
MB. members CPAWS	*62.6*	*7.1*	*30.2*
Landowners Association	*50.0*	*12.5*	*37.5*

** Indicates the correct answer.*

Note: while wolves do defend a relatively fixed area against other packs in different geographic areas, they do not defend fixed territories in RMNP.

Table 35 asks "What is the average pack size of wolves in RMNP? A majority of trappers (51.7%), Sierra Club members (51.0%) and livestock producers (50.0%) indicated the correct answer, 5-15 wolves. Outfitters (48.1%), CPAWS members (45.1%) and area residents (34.5%) were correct less than 50% of the time. An average of 23.8% of each group underestimated the average pack size to be 1-4 wolves. Only the area residents (2.1%) overestimated the average pack size to be over 15 wolves. An average of (29.0%) of each group indicated they were not sure what the average pack size was in RMNP. Over estimations of the number of wolves in a pack has a couple of implications.

TABLE 37

Would you agree that only two members of a wolf pack breed in any one year?

	**Yes*	*No*	*I'm Not Sure*
Area Residents	*37.7*	*17.2*	*45.1*
Manitoba Trappers	*62.1*	*20.7*	*17.2*
Manitoba Outfitters	*65.4*	*23.1*	*11.5*
MB. members Sierra Club	*53.1*	*18.4*	*28.6*
MB. members CPAWS	*48.9*	*15.9*	*35.2*
Landowners Association	*37.5*	*12.5*	*50.0*

** Indicates the correct answer.*

TABLE 38

Do wolves survive primarily on beaver throughout the summer?

	**Yes*	*No*	*I'm Not Sure*
Area Residents	*6.2*	*46.9*	*46.9*
Manitoba Trappers	*13.8*	*79.3*	*6.9*
Manitoba Outfitters	*23.1*	*61.5*	*15.4*
MB. members Sierra Club	*12.0*	*44.0*	*44.0*
MB. members CPAWS	*13.3*	*46.7*	*40.0*
Landowners Association	*12.5*	*62.5*	*25.0*

** Indicates the correct answer.*

Firstly, a large pack may be perceived as a greater threat to both big game and to livestock. Secondly, larger packs would also be more threatening to individuals who feared they may be attacked by wolves while hiking in the park.

Table 36 asks "Do wolf packs defend a relatively fixed area or territory against other wolf packs?" While in many areas wolves do defend relatively fixed areas, there is considerable overlap in wolf territories in RMNP (Goulet, per. comm. 1996). A majority of people in all groups indicated the incorrect answer (yes). An average of 34.4% of each group indicated that they were not sure and an average of 6.7% of each group chose the correct answer.

Table 37 asks "Would you agree that only two members of a wolf pack breed in any one year?" A majority of outfitters (65.4%), trappers (62.1%) and members of the Sierra Club (53.1%) chose the correct answer. Less than 50% of CPAWS members (48.9%), area residents (37.7%) and livestock producers (37.5%) chose the correct answer. An average of 31.3% of each group indicated they were not sure. One question on the survey asked respondents to indicate any other concerns about wolves in RMNP. Many reported a concern that the population would become too large too quickly, which indicates they may not be aware that only two members of a pack breed in any one year.

Table 38 asks "Do wolves survive primarily on beaver throughout the summer?" All groups had very low percentages correct for this question. Rather, 79.3% of the

trappers, 62.5% of the livestock producers, 61.5% outfitters, 46.9% of the area residents, 46.7% of CPAWS members, and 44.0% of the Sierra Club members chose the incorrect answer (no). In addition, area residents (46.9%), and members of the Sierra Club (44.0%) and CPAWS (40.0%) were not sure what the correct answer was.

Table 39 asks "Do wolves usually sever the hamstring muscles of their prey to bring them down (eg. moose, deer, elk)?" In many areas wolves do not sever the hamstring muscles of their prey to bring them down, however, there has been evidence of this occurring in RMNP (Goulet, per. comm.1995). A majority of trappers (75.9%), outfitters (65.4%) and area residents (55.4%) chose the correct answer (yes). A majority of CPAWS members (46.9%), Sierra Club members (44.0%) and livestock producers were not sure if wolves sever the hamstring muscle of their prey to bring them down.

Table 40 asks "In most areas where wolves and coyotes can be found, would they usually occupy the same territory?" While wolves and coyotes generally do not occupy the same territory, they do in RMNP (Carbyn, 1980). A majority of livestock producers (75.0%), trappers (61.2%) and outfitters (57.7%) chose the correct answer (yes). A majority of CPAWS members (38.1%) and area residents (37.4%) were not sure if wolves and coyotes occupied the same territories. A majority of Sierra Club members (50.0%) disagreed with the statement.

Table 41 asks "Are adult wolves preyed on by other wild animals?" The answer to this question is no. While there may occasionally be interspecific competition which results in wolf mortality, wolves do not have any natural predators. A large majority of all groups answered this question correctly. An average of 19% of each group (except livestock producers) were not sure .

TABLE 39

Do wolves usually sever hamstring muscles of their prey to bring them down (eg. moose, deer, elk)?

	*Yes	No	I'm Not Sure
Area Residents	*55.4*	*7.1*	*37.5*
Manitoba Trappers	*75.9*	*3.4*	*20.7*
Manitoba Outfitters	*65.4*	*19.2*	*15.4*
MB. members Sierra Club	*42.0*	*14.0*	*44.0*
MB. members CPAWS	*40.2*	*12.8*	*46.9*
Landowners Association	*37.5*	*25.0*	*37.5*

** Indicates the correct answer.*

TABLE 40

In most areas where wolves and coyotes can be found, would they usually occupy the same territory?

	*Yes	No	I'm Not Sure
Area Residents	*34.1*	*28.5*	*37.4*
Manitoba Trappers	*62.1*	*24.1*	*13.8*
Manitoba Outfitters	*57.7*	*30.8*	*11.5*
MB. members Sierra Club	*26.0*	*50.0*	*24.0*
MB. members CPAWS	*25.4*	*36.5*	*38.1*
Landowners Association	*75.0*	*25.0*	*0.0*

• Indicates the correct answer.

Note: While wolves and coyotes would not occupy the same area in many geographic locations, they do have territories which overlap in RMNP.

Table 42 asks "Did wolves historically occupy the Riding Mountain National Park region? The answer to this question is yes. Wolves occupied RMNP from 1880 to about 1895 at which time they were extirpated from the park until 1930 (Carbyn, 1980). Wolves have been present in the park since that time. A very high percentage of all groups identified the correct answer. There were differences in the number of CPAWS members, Sierra Club members and area residents who did not think that wolves occupied the RMNP region.

TABLE 41

Are adult wolves preyed on by other wild animals?

	Yes	**No*	*I'm Not Sure*
Area Residents	*9.9*	*62.0*	*28.1*
Manitoba Trappers	*6.9*	*79.3*	*13.8*
Manitoba Outfitters	*0.0*	*88.0*	*12.0*
MB. members Sierra Club	*16.0*	*68.0*	*16.0*
MB. members CPAWS	*9.5*	*65.4*	*25.1*
Landowners Association	*0.0*	*100*	*0.0*

* *Indicates the correct answer.*

TABLE 42

Did wolves historically occupy the Riding Mountain National Park region?

	**Yes*	*No*
Area Residents	*75.3*	*24.7*
Manitoba Trappers	*100*	*0.0*
Manitoba Outfitters	*88.5*	*11.5*
MB. members Seirra Club	*70.0*	*30.0*
MB. members CPAWS	*51.1*	*48.9*
Landowners Association	*100*	*0.0*

• *Indicates the correct answer.*

Table 43 asks "Have you ever seen a wolf in the wild?" A majority of all groups have seen a wolf in the wild. Of groups surveyed, the largest number of CPAWS (48.9%) and Seirra Club members (30%) have not seen a wolf in the wild.

Table 44 asks "Is there currently compensation available for ranchers in the RMNP region when a wolf kills their livestock." A large majority of all groups did not know the correct response and disagreed with the statement (100.0% of livestock producers, 96.4% of the area residents, 92.9% of the trappers, 88.5% of the outfitters, 83.9% of CPAWS members, and 80.0% of the Sierra Club members). The perception that

TABLE 43

Have you ever seen a wolf in the wild?

	Yes	*No*
Area Residents	*75.3*	*24.7*
Manitoba Trappers	*100.0*	*0.0*
Manitoba Outfitters	*88.5*	*11.5*
MB. members Sierra Club	*70.0*	*30.0*
MB. members CPAWS	*51.1*	*48.9*
Landowners Association	*100.0*	*0.0*

TABLE 44

Is there currently compensation available for ranchers in the RMNP region when a wolf kills their livestock.

	**Yes*	*No*
Area Residents	*3.60*	*96.40*
Manitoba Trappers	*7.10*	*92.90*
Manitoba Outfitters	*11.50*	*88.50*
MB. members Sierra Club	*20.00*	*80.00*
MB. members CPAWS	*16.10*	*83.90*
Landowners Association	*0.00*	*100.0*

** Indicates the correct answer.*

there is no compensation available for the financial losses associated with wolf predation on livestock would justifiably result in a great deal of frustration for people who suffer those losses. That frustration, in turn, would likely lead to more negative attitudes toward wolves for people who suffer livestock losses than for individuals who do not raise livestock.

Table 45 asks "Where have you acquired your knowledge about the wolf?" Trappers (68.2%), livestock producers (57.1%) and outfitters (42.9%) all acquired their knowledge about the wolf from personal experience. Members of the Sierra Club (35.6%) acquired their knowledge about the wolf from magazines. Area residents (31.3%) acquired their knowledge about the wolf from T.V. and members of CPAWS (25.5%)

TABLE 45

Where have you acquired your knowledge about the wolf?

	A	B	C	D	E	F	G	H	I	J	K
Area Residents	*3.1*	*2.0*	*17.2*	*14.5*	*2.0*	*4.7*	*5.5*	*7.4*	*0.0*	*31.3*	*12.5*
Manitoba Trappers	*0.0*	*0.0*	*4.5*	*4.5*	*0.0*	*0.0*	*0.0*	*0.0*	*4.5*	*18.2*	*68.2*
Manitoba Outfitters	*4.8*	*0.0*	*14.3*	*9.5*	*0.0*	*4.8*	*14.3*	*4.8*	*0.0*	*4.8*	*42.9*
MB. members Sierra Club	*0.0*	*2.2*	*35.6*	*20.0*	*0.0*	*11.1*	*4.4*	*11.1*	*2.2*	*11.1*	*2.2*
MB. members CPAWS	*1.2*	*1.2*	*23.6*	*25.5*	*1.8*	*7.9*	*3.0*	*6.1*	*4.2*	*21.8*	*3.6*
Landowners Association	*0.0*	*14.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*14.3*	*0.0*	*14.3*	*57.1*

A) Newspapers B) Brochures C) Magazine Articles D) Books E) School F) Other G) Friends H) Films I) Public Meetings J) T.V. K) Personal Experience

TABLE 46

How knowledgeable do you feel you are about wolves?

	A	B	C	D	E
Area Residents	*5.9*	*77.1*	*12.6*	*3.8*	*0.6*
Manitoba Trappers	*6.9*	*24.1*	*58.6*	*10.3*	*0.0*
Manitoba Outfitters	*8.0*	*32.0*	*48.0*	*12.0*	*0.0*
MB. members Sierra Club	*2.0*	*64.7*	*27.5*	*5.9*	*0.0*
MB. members CPAWS	*1.6*	*73.9*	*20.7*	*3.7*	*0.0*
Landowners Association	*12.5*	*62.5*	*25.0*	*0.0*	*0.0*

A) Know Nothing About Wolves B) Have a Little Knowledge C) Quite Knowledgeable D) Very Knowledgeable E) Expert

acquired their knowledge about the wolf from books.

Table 46 asks "How knowledgeable do you feel you are about wolves?" A majority of area residents (77.1%), members of CPAWS (73.9%), members of the Sierra Club (64.7%) and livestock producers (62.5%) felt that they had a "little knowledge"

about wolves. A majority of trappers (58.6%) and outfitters (48.0%) felt they were "quite knowledgeable" of wolves. Very few people felt that they were "very knowledgeable" or had "expert" knowledge about wolves. All groups surveyed had an average of less than 50.0% correct in their knowledge scores which indicates that they do have little knowledge about wolves. Few individuals within each group were quite knowledgeable or very knowledgeable about wolves.

4.2.2 Knowledge Scores

As noted, knowledge scores were computed using 15 knowledge items on the survey. The knowledge score was computed as follows:

$$\sum K1+K2+K3+K4+...+K14+K15 = \text{Knowledge Score}$$

Hypothesis two stated "there is no significant difference in knowledge scores between RMNP area residents, Manitoba members of Canadian Parks and wilderness society, Manitoba members of the Sierra Club, the Riding Mountain Landowners Association, trappers in the RMNP region, and Manitoba outfitters in the RMNP region." Table 47 indicates that there is a significant difference ($P=<.001$) in the knowledge scores between groups. As such, the null hypothesis was rejected.

A Duncan test (Table 48) shows that area residents are significantly different from all other groups, but most different from the outfitters (ie their level of knowledge was significantly lower than the outfitters). As indicated in Table 48, livestock producers, trappers and outfitters all had direct personal experience as their primary source of information about wolves. Area resident, on the other hand, indicated that they received most of their knowledge about wolves from watching television.

Members of CPAWS, members of the Sierra Club, livestock producers and trappers are not significantly different from each other. Livestock producers obtained most of their knowledge about wolves from personal experience. Although the livestock

Table 47

Analysis of Variance: Knowledge Score by Area Residents and 5 Interest Groups

Source	*DF*	*Sum of Squares*	*Mean Squares*	*F Ratio*	*F Prob*
Between Groups	*5*	*203.43*	*40.69*	*6.29*	*<.0001*
Within Groups	*555*	*3591.37*	*6.47*		

Table 48

Duncan Test: Knowledge Score by Area Residents and 5 Interest Groups

Mean	*Group*	*Subset for alpha=.05*	
		1	*2*
5.05	*Area Residents*	*A*	*
5.98	*Manitoba Members of CPAWS*	*A*	*B*
6.39	*Manitoba Members of the Sierra Club*	*A*	*B*
6.33	*Landowners Association*	*A*	*
6.50	*Manitoba Trappers*	*A*	*B*
6.95	*Manitoba Outfitters*	*	*B*

Note: those groups which have differing letters are significantly different from each other, and from groups which have no letters

Note also: Knowledge scores can accumulate from a score of zero (which indicates no knowledge) to a perfect score of 15.

producers have a high mean score, the sample size used was significantly smaller than the area resident which would result in a high mean standard error (SE)*. As a result, the differences between area residents and livestock producers are not significant.

Most members of environmental groups acquired their knowledge of the wolf through reading written materials such as books and magazines. Members of the Sierra Club obtained their information primarily from magazines. Their higher knowledge scores indicate that magazines are good sources of information. Members of CPAWS

*Note: SE provides a measure of how well a sample statistic represents the population (Gravetter and Wallnau, 1992). Standard error is determined by two factors: the variability of r scores, and the sample size used. The bigger the sample, the better the estimate (Gravetter and Wallnau, 1992).

obtained most of their information from books. Their average knowledge scores were less, which indicates that books may provide less accurate information than does personal experience or magazines.

The implication of these results are that educational efforts to date may provide people with mixed information about wolves that may, or may not, be accurate. In particular, the reliance on television as a form of information about wolves appears to lead to lower overall knowledge scores. This is likely associated with the sensationalism utilized by most programs to increase viewer numbers. This type of information tends to perpetuate the same myths about wolves which have been present in our culture for decades.

4.2.3 Factors Related to Knowledge

Objective four of this study was to identify factors which may be related to knowledge scores. Hypothesis four states "there is no significant difference between knowledge score by education level. ANOVA was used to determine if there was any significant differences between groups. Table 49 indicates there was a significant difference (P=<.001) in knowledge scores at different education levels so the null hypothesis was rejected. A Duncan test was used in order to identify at which education levels knowledge scores became significantly different.

Table 49

Analysis of Variance: Knowledge Score by Education Level

Source	*DF*	*Sum of Squares*	*Mean Squares*	*F Ratio*	*F Prob*
Between Groups	*4*	*132.83*	*33.21*	*5.18*	*.0004*
Within Groups	*544*	*3485.72*	*6.41*		

Table 50 indicates that individuals who had an elementary education level were significantly different from all other groups with a mean score of 4.37. The lower knowledge score is likely related to grade school curriculums. Most curriculums give priority to math, English and basic science courses.

The greatest degree of difference was between individuals with a high school education (5.38) and individuals with a PhD (6.43). Individuals with undergraduate and graduate university degree did not have significantly different scores. This may relate to

Table 50

Duncan Test: Knowledge Score by Education Level

Mean	*Group*	*Subset for alpha=.05*	
		1	*2*
4.37	*Elementary School*	*	*
5.38	*High School*	*A*	*
5.79	*College/University*	*A*	*B*
5.93	*Graduate Program*	*A*	*B*
6.43	*PhD.*	*	*B*

Note: those groups which have differing letters are significantly different from each other, and from groups which have no letters

Note also: Knowledge scores can accumulate from a score of zero (which indicates no knowledge) to a perfect score of 15.

the greater amount of choice and specialization that students have as they progress through high school and university curriculums. Although the demographic information did not inquire about areas of specialization, individuals who had a PhD may have specialized in a field related to ecological principles.

Hypothesis five stated that "there is no significant relationship between knowledge score and age". Individuals were grouped, by age, into eight groups which ranged from 15 years old to over 85. An ANOVA (Table 51) shows that there was a significant difference in knowledge scores across age (P=<.001) and the null hypothesis was rejected. A Duncan test shows where the significant differences between groups exist.

Table 52 shows that individuals 15-25, 56-65, 66-75,76-85, and over 85 are not significantly different from each other but are different from the other groups. More specifically, people aged 46-55 had the highest knowledge scores (6.30) and were most

Table 51

Analysis of Variance: Knowledge Score by Age

Source	*DF*	*Sum of Squares*	*Mean Squares*	*F Ratio*	*F Prob*
Between Groups	*7*	*200.47*	*28.64*	*4.50*	*.0001*
Within Groups	*538*	*3420.08*	*6.37*		

Table 52

Duncan Test: Knowledge Score by Age

Mean	*Age Group (yrs)*	*Subset for alpha=.05*				
		1	*2*	*3*	*4*	*5*
3.50	*over 85*	*	*	*	*	*
4.44	*76-85*	*	*	*	*	*
4.80	*66-76*	*	*	*	*	*
5.40	*56-65*	*	*	*	*	*
6.30	*46-55*	*A*	*B*	*C*	*	*E*
5.96	*36-45*	*A*	*B*	*C*	*	*
5.59	*26-35*	*	*B*	*	*	*
5.39	*15-25*	*	*	*	*	*

Note: those groups which have differing letters are significantly different from each other, and from groups which have no letters

Note also: Knowledge scores can accumulate from a score of zero (which indicates no knowledge) to a perfect score of 15.

Table 53

Analysis of Variance: Knowledge Score by Gender

Source	*DF*	*Sum of Squares*	*Mean Squares*	*F Ratio*	*F Prob*
Between Groups	*1*	*89.50*	*89.50*	*13.69*	*.0002*
Within Groups	*555*	*3628.19*	*6.54*		

significantly different from the knowledge scores of individuals 56 and older which indicates that this is the approximate age at which knowledge scores start to decline. Individuals aged 36-45 had knowledge score of 5.95 which was significantly different

from individuals aged 66 and older. Individuals aged 26-35 had a knowledge score of 5.59 which were most significantly different from individuals aged 76-85. The differences in knowledge scores across ages relates back to education levels. Individuals who are 56 to over 85 would have been educated when environmental issues were not as prominent as they are now. In addition many of the people who are within that age group would have been alive during the period when wolves were extirpated from the RMNP region due to the expansion of agricultural practices and the bounties provided by the government to kill wolves. Individuals aged 15 to 25 were not significantly different from these groups. This may be because there was a relatively small number of individuals within this age group who had not yet had time to accumulate knowledge about wolves.

Hypothesis six stated that "there is no significant difference between knowledge score and gender." Table 53 shows that results of an ANOVA which show that there are significant differences (P=<.001) in knowledge scores between men and women. The null hypothesis was rejected. A comparison of knowledge score mean indicates that the knowledge score of women (5.02) were statistically significantly lower than mens' knowledge scores (5.86). Although statistically different, the differences between mens' and womens' scores are not substantively different. Differences may be related to a past tendency for more men to have higher education levels and more personal experiences with wolves while hunting or trapping. This is, of course, changing and surveys did indicate that individual women with higher educations (who were also younger) tended to have higher individual knowledge scores.

4.3 Willingness to have Wolves in the RMNP Region

Social psychological literature has many documented instances where peoples' attitudes do not predict their subsequent behaviours (Aronson, 1992). As an extension of this, peoples' attitudes toward wolves may not be an adequate predictor of their willingness to have wolves occupying the area in which they live. Indeed, much of the

above results and discussion indicate that although a majority of all groups indicated that they held positive attitudes toward wolves, subsequent questions indicated that they also held negative attitudes toward wolves and would kill a wolf if given the opportunity.

Decker and Purdy (1988) describe a concept referred to as Wildlife Acceptance Capacity (WAC) which reflects the maximum wildlife population that people are willing to accept. Factors which may limit WAC are: peoples' acceptance of damage and nuisance associated with a wildlife species; perceived competition of the species for another of interest for people; the role of the species in disease transmission to humans; and the values placed on the species (Decker and Purdy, 1988).

4.3.1 Individual Question Scores

Table 54 asks "What is your primary reason for being against having wolves in Riding Mountain National Park?". All members of CPAWS and area residents (94.4%) who were against having wolves in RMNP indicated that it was because wolves may attack people. All trappers and 57.0% of the outfitters indicated that their primary reason for being against having wolves in RMNP was a reduction of big game animals. Livestock producers (100.0%) who were not in favor of having wolves in RMNP indicated that it was because livestock losses are unacceptably high. Members of the Sierra Club (100.0%) who were not in favor of having wolves in RMNP indicated that it was because wolves killed more animals than they needed to survive.

Three questions were included on the survey to determine if people who oppose having wolves in RMNP would change their opinions if certain compromises were offered. For example, Table 55 inquires "If you are not in favor of having wolves in Riding Mountain National Park would your opinion change if a program of financial compensation for livestock losses attributed to wolves was implemented?" All of the livestock producers indicated that their opinion would change if financial compensation was provided for livestock losses. A majority of trappers (66.7%) and outfitters (62.5%) indicated that their opinion would not change. Area residents (39.0%) indicated that their opinion would not change, but to a lesser degree than trappers and outfitters. Half of the

TABLE 54

What is your primary reason for being against having wolves in Riding Mountain National Park?

	A	B	C	D	E	F	G	H	I	J
Area Residents	*33.0*	*55.6*	*94.4*	*8.3*	*50.0*	*19.4*	*44.4*	*19.7*	*47.2*	*38.9*
Manitoba Trappers	*0.0*	*120*	*20.0*	*0.0*	*40.0*	*0.0*	*0.0*	*0.0*	*20.0*	*0.0*
Manitoba Outfitters	*14.3*	*57.0*	*14.3*	*0.0*	*14.3*	*0.0*	*14.3*	*0.0*	*42.9*	*14.3*
MB. members Sierra Club	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*100*	*0.0*	*0.0*	*0.0*	*0.0*
MB. members CPAWS	*0.0*	*0.0*	*200*	*100*	*200*	*0.0*	*100*	*0.0*	*100*	*0.0*
Landowners Association	*100*	*0.0*	*0.0*	*0.0*	*0.0*	*100*	*0.0*	*0.0*	*0.0*	*0.00*

A) Livestock losses are unacceptably high B) An Unacceptable decline in big game animals C) Wolves may attack people D) Wolves serve no ecological purpose E) Wolves kill more animals than they need to for survival F) Because I don't like wolves G) Wolves may scare off tourists H) Wolves are pests I) There are no benefits to having wolves in the park J) Other

Note: Of the individuals surveyed, 51 were not in favor of having wolves in RMNP. That figure breaks down as follows: 36 area residents, 5 trappers, 7 outfitters, 1 Sierra club member, 1 CPAWS member, and one livestock producer. The respondents could have more than one response to the question which is why their scores cumulatively exceed 100%. In addition, although those not in favor of having wolves in RMNP responded in a certain way, there was also a few individual in favor of having wolves in RMNP, but that shared some of the same concerns as those not in favor. For example, 1 member of CPAWS was opposed to wolves in RMNP but 2 members feared that wolves may attack people.

Sierra Club members indicated that their opinion would change with implementation of a compensation fund and all of the members of CPAWS indicated they had no opinion on the issue.

Table 56 asked "If you are not in favor of having wolves in Riding Mountain National Park would your opinion change if it were possible to hold livestock losses at less than 1%? In keeping with other studies, all of the livestock producers stated that their opposition to having wolves in RMNP would not change if livestock losses were held

TABLE 55

If you are not in favor of having wolves in Riding Mountain National Park would your opinion change if a program of financial compensation for livestock losses attributed to wolves was implemented?

	Yes	*No*	*No Opinion*
Area Residents	*16.9*	*39.0*	*44.2*
Manitoba Trappers	*11.1*	*66.7*	*22.2*
Manitoba Outfitters	*12.5*	*62.5*	*25.0*
MB. members Sierra Club	*50.0*	*50.0*	*0.0*
MB. members CPAWS	*0.0*	*0.0*	*100*
Landowners Association	*100*	*0.0*	*0.0*

TABLE 56

If you are not in favor of having wolves in Riding Mountain National Park would your opinion change if it were possible to hold livestock losses at less than 1%?

	Yes	*No*	*No Opinion*
Area Residents	*16.0*	*32.0*	*52.0*
Manitoba Trappers	*0.0*	*66.7*	*33.3*
Manitoba Outfitters	*0.0*	*57.1*	*42.9*
MB. members Sierra Club	*0.0*	*100*	*0.0*
MB. members CPAWS	*0.0*	*25.0*	*75.0*
Landowners Association	*0.0*	*100*	*0.0*

TABLE 57

If you are not in favor of having wolves in Riding Mountain National Park, would your opinion change if only the wolves that killed livestock were killed?

	Yes	*No*	*No Opinion*
Area Residents	*26.9*	*35.9*	*37.2*
Manitoba Trappers	*33.3*	*55.6*	*11.1*
Manitoba Outfitters	*0.0*	*85.7*	*14.3*
MB. members Sierra Club	*0.0*	*100*	*0.0*
MB. members CPAWS	*25.0*	*0.0*	*75.0*
Landowners Association	*0.0*	*100*	*0.0*

TABLE 58
What is your primary reason for being in favor of having wolves in Riding Mountain National Park?

	A	B	C	D	E	F	G	H	I	J
Area Residents	*44.0*	*28.2*	*73.0*	*9.7*	*8.9*	*10.8*	*9.7*	*4.6*	*3.1*	*3.4*
Manitoba Trappers	*68.4*	*36.8*	*73.7*	*10.5*	*10.5*	*21.1*	*15.8*	*47.4*	*26.3*	*5.3*
Manitoba Outfitters	*29.1*	*29.4*	*70.6*	*17.7*	*5.9*	*11.8*	*11.8*	*17.7*	*11.8*	*0.0*
MB. members Sierra Club	*29.2*	*18.8*	*85.4*	*4.2*	*6.3*	*8.3*	*4.2*	*0.0*	*0.0*	*2.1*
MB. members CPAWS	*36.3*	*18.4*	*83.8*	*5.0*	*5.6*	*5.6*	*4.5*	*1.7*	*1.1*	*1.7*
Landowners Association	*42.9*	*14.3*	*71.4*	*0.0*	*0.0*	*28.6*	*0.0*	*28.6*	*0.0*	*0.0*

A) Because they have the right to exist B) So future generations can enjoy them C) Because they are important members of the ecological community D) To photograph them E) Because of their value to science and research F) Because I'm very fond of wolves G) Because they may attract tourists H) To be able to harvest their pelts I) So that some people will be able to hunt them J) Other

Note: Of the individuals surveyed, 529 individuals were in favor of having wolves in RMNP. That figure breaks down as follows: 259 area residents, 19 trappers, 17 outfitters, 48 Sierra club members, 179 CPAWS members, and 7 livestock producers. The respondents could have more than one response to the question which is why their scores cumulatively exceed 100%.

below 1%. A majority of outfitters (66.7%) and Sierra Club members also indicated their opinion would not change if livestock losses were kept below 1%. CPAWS members (75%) indicated that they had no opinion about the issue.

Table 57 asked "If you are not in favor of having wolves in Riding Mountain National Park, would your opinion change if only the wolves that killed livestock were killed?" All of the livestock producers and members of the Sierra Club indicated that killing the wolves who kill livestock would not change their opposition to having wolves in RMNP. A majority of outfitters (85.7%) and trappers (57.1%) also indicated that their opinion would not change. Area residents (35.9%) and CPAWS members (25.0%)

indicated their opinions would not change, but to a much lesser degree than the first four groups.

Table 58 asks "What is your primary reason for being in favor of having wolves in Riding Mountain National Park?" A large majority of members of the Sierra Club (85.4%) and CPAWS (83.8%) were in favor of having wolves in RMNP because they believed they were important members of the ecological community. This was also the most frequent reason given by trappers (73.7%), area residents (73.0%), livestock producers (71.4%) and outfitters (70.6%). Nearly 70.0% of the trappers, 44.0% of area residents, 42.9% of livestock producers, 36.3% of CPAWS members, 29.2% of Sierra Club members and 29.1% of outfitters also indicated that they were in favor of having wolves in the RMNP region because they had the right to exist. Trappers (47.4%) and livestock producers (28.6%) also indicated they were in favor of having wolves in the RMNP region in order to be able to harvest their pelts.

4.3.2 Willingness Scores

In order to determine any relationships between attitude or knowledge scores and willingness to have wolves in RMNP, Pearson Correlations were performed. Hypothesis seven stated " There is no significant relationship between attitude scores and willingness to have wolves in the RMNP region." The results in Table 59 indicates an r value of .66 and P=<.001 suggesting that there was in fact a significant relationship between attitude scores and peoples' willingness to have wolves in RMNP. As peoples' attitudes became more positive, their willingness to have wolves in RMNP region increased. As attitudes became more negative, willingness to have wolves in the region declined. Since P <.05 the null hypothesis was rejected. An r^2 value of .44 explains approximately 44% of the total variance.

Hypothesis eight stated "There is no significant relationship between knowledge scores and willingness to have wolves in the RMNP region." Table 60 indicates there is a significant relationship between knowledge scores and peoples' willingness to have wolves in the RMNP region (P=<.001) so the null hypothesis was rejected. An r value of

Table 59

Pearson Correlation: Attitude Score Related to Willingness to Have Wolves in the RMNP Region

		Knowledge	*Are you in favor of having wolves in RMNP?*
Pearson's Correlation	*Knowledge*	*1.0*	*.66*
	Are you in favor?	*.66*	*1.0*
Sig. (2-Tailed)	*Knowledge*		*.000*
	Are you in favor?	*.000*	
N	*Knowledge*	*562*	*562*
	Are you in favor?	*562*	*638*

Table 60

Pearson Correlation: Knowledge Score Related to Willingness to Have Wolves in the RMNP Region

		Knowledge	*Are you in favor of having wolves in RMNP?*
Pearson's Correlation	*Knowledge*	*1.0*	*-.25*
	Are you in favor?	*-.25*	*1.0*
Sig. (2-Tailed)	*Knowledge*		*.000*
	Are you in favor?	*.000*	
N	*Knowledge*	*561*	*560*
	Are you in favor?	*560*	*638*

−.25 indicates that there is a statistically significant relationship between knowledge score and willingness to have wolves in the RMNP region. The results show that as knowledge about the wolf increased, so did willingness to have wolves in the RMNP region. Lower knowledge scores were associated with lower willingness to have wolves in the RMNP region. The r^2 value of .06 explains approximately 6% of the total variance. While this is a statistically significant relationship, in general there was relatively small differences in knowledge scores across samples. Overall, all scores were less than 50%.

Multiple regression was used to identify factors which may be used to predict willingness to have wolves in the RMNP region (see Table 61). The regression equation is

$$Y= 1.64+ 1.12(\text{Attitude Score})$$

Table 61 shows that the above variable represents 42% of the variability (r^2=.42). Five other variables were included in the regression which were not statistically significant at P=.05. These variables included: knowledge score (.2014); hunter vs non-hunter (.0653); age (.7229) ; education (.5222); and gender (.9050).

As noted, respondents with more positive attitudes toward wolves were more willing to have wolves in the RMNP region, which is not surprising. This information is useful to those agencies who manage wolves in the RMNP region as information gathered on attitudes can be used to predict peoples' willingness to have wolves present in the region.

Because attitudes are indicated to be a good predictors of willingness to have wolves in the RMNP region, a multiple regression was done to see which variables (knowledge score, age, gender, education and hunter vs non-hunter) contributed to attitudes. The regression equation is shown below:

$$Y=4.39-.26(\text{education level}) -.13(\text{knowledge score}) + .23(\text{gender})-.20(\text{hunter vs non-hunter})$$

Table 62 shows that four of the five variables were good predictors of attitude at P=.05. These variables included: education level (<.0001); knowledge score (<.0001); gender (.0031); and hunter vs non-hunter (.0120). The only variable which was not included in the equation was age (.3884).

Collectively, all variables in the equation explain a total of 31% of the variance. Education level entered the equation first and explained 17% of the total variance. As education level increased, attitudes toward wolves also increased. Knowledge score was the second variable to enter the equation and explained an additional 11% of the total variance. As knowledge scores became higher, attitudes toward wolves became more positive.

TABLE 61

Multiple Regression: Predictions of Willingness to Have Wolves in the RMNP Region

Step	*Variable*	*Sig.*	*Multiple r*	r^2
1	*Attitude Score*	*<.001*	*.66*	*.43*

TABLE 61 SUMMARY

1. Respondents with a more positive attitude were more willing to have wolves in the RMNP region than were respondents with less positive attitudes toward wolves.

TABLE 62:

Multiple Regression: Predictions of Factors Which Influence Attitudes

Step	*Variable*	*Sig.*	*Multiple r*	r^2
1	*Education Level*	*<.001*	*.41*	*.17*
2	*Knowledge Score*	*<.001*	*.53*	*.28*
3	*Gender*	*<.001*	*.54*	*.30*
4	*Hunter vs Non-Hunter*	*.01*	*.55*	*.31*

TABLE 62 SUMMARY

1 *Respondents with higher education levels tended to have more positive attitudes toward wolves than did respondents with lower education levels.*

2 *Respondents who had higher knowledge scores had more positive attitudes toward wolves than did respondents with lower knowledge scores.*

3 *Mens' attitude scores tended to be higher than womens' attitude scores.*

4 *Hunters tended to have less positive attitudes toward wolves than did non-hunters who tended to have more positive attitudes toward wolves.*

The third variable to enter the equation was gender which explained an additional 2% of the total variance. Women had more positive attitudes toward wolves than men did. More specifically, over 70% of the women surveyed either strongly liked or moderately liked wolves whereas only 52% of the men surveyed strongly liked or moderately liked wolves.

Whether a person hunted or did not hunt in 1995 was the fourth variable to enter the equation and explained 1% of the total variance. People who hunted in 1995 tended to have less positive attitudes toward wolves than did people who did not hunt in 1995.

Chapter Summary

Although a majority of survey respondents indicated that they had positive attitudes toward wolves, subsequent question responses indicated that they also had negative attitudes toward wolves which were associated with misconceptions they held about wolf ecology and behaviour. The knowledge scores of all groups was below 50.0% correct which indicates people have little knowledge about wolves in the RMNP region. In addition, peoples' willingness to have wolves in the RMNP region was also directly linked the their knowledge of wolf ecology and behavior. More specifically, as knowledge scores decreased, so did the willingness to have wolves in the RMNP region.

A predictive relationship was found to exist between attitudes toward wolves and willingness to have wolves in the RMNP region. A further analysis showed that attitudes can be predicted based on peoples' knowledge about wolves, whether a person hunts or does not hunt, education level, and gender.

Chapter 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The primary purpose of this practicum was to identify, document and analyse the attitudes and knowledge of RMNP area residents, Manitoba members of Canadian Parks and Wilderness Society (CPAWS), Manitoba members of the Sierra Club, the Riding Mountain Landowners Association (who represent livestock producers), Trappers in the RMNP region, and Manitoba Outfitters in the RMNP region. Information obtained from the study will hopefully be used to develop a wolf management strategy and educational programs in the RMNP region. The specific objectives were to: 1) to measure and document attitudes toward wolves in the RMNP region; 2) to measure and document knowledge about the wolf; 3) to identify any differences which may exist between groups; 4) to identify factors which may be related to knowledge scores; 5) to identify factors which may be related to willingness to have the population of wolves in the RMNP region; and 6) to provide recommendations for wolf management and educational programs in the RMNP region.

The use of three research tools (literature reviews, mail survey and various statistical procedures) resulted in accomplishment of the general purpose and specific objectives of this study. The literature review done on historical attitudes toward wolves, values of wildlife and human dimensions research indicated that attitudes toward wolves are becoming much more positive and can be related to peoples' willingness to live near wolves. It was also discovered that knowledge about wolves can play an important role in both attitudes toward wolves and willingness to have wolves in the region.

5.2 Public Attitudes Toward the RMNP Wolf Population

5.2.1 Attitude Theory

Some of the most recent human dimensions research focuses on public attitudes toward predators, notably public attitudes toward wolf reintroduction into various areas in North America. The literature shows that there is a strong predictive relationship between public attitudes toward wolves and peoples' willingness to have wolves reintroduced into an area. The research presented here provides information about how peoples attitudes towards wolves may differ when there is an existing population rather than one which is proposed for reintroduction.

The study results presented here have shown differences in the attitudes between two of the six different interest groups shown here and those surveyed in wolf reintroduction sites. Although they shared similar management concerns, hunters and livestock producers in reintroduction areas had largely negative attitudes toward wolves, whereas hunters and livestock producers in the RMNP region reported having largely positive attitudes toward the animal.

One of the most notable differences between values described in wolf reintroduction areas versus an area where they already exist is the large majority of all groups who indicated that they believed that wolves were an important part of a ecosystem. This may have been contributing to the broader range of attitudes in this study. Attitudes in reintroduction sites tend to be more polarized ('love em' or 'hate em') than they were in this area which has had wolves occupying it historically. Kellert's study (1985), for example, showed that there was a range of values from very negative to very positive.

The differences between attitudes in reintroduction areas and areas with existing populations of wolves could aid in reintroduction efforts. Providing information to residents in reintroduction areas about how living with wolves has, or has not, affected the livelihoods of people in area were wolves currently range could provide people with some assurance that there is not always high incidences of wolf predation on livestock.

Within the RMNP region, information gathered on attitudes has the potential of providing wildlife managers with information pertaining to the concerns that local residents have about wolves in the region and their management (see Appendix D) and it may also provide information that can strengthen the relationships between land managers and local residents.

5.2.2 Techniques Used

The methods which were used in this study to measure attitudes toward wolves have been used in a number of other attitudinal studies (Bath 1987a, 1987b; Kellert, 1985). The techniques used for acquiring information on public attitudes appear to be well suited to studies such as this one. As noted, there are advantages and disadvantages to using a mail survey. The use of a mail survey allows a large number of people to be contacted over a short period of time. On the other hand, there may be biases inherent in peoples' responses.

5.2.3 Results in this Case

The results of this study indicated that all six groups surveyed had positive attitudes toward wolves. This information does not support research from the United States which found that livestock producers and hunters (here represented by outfitters) tend to have the most negative attitudes toward wolves (Kellert, 1985; Bath 1987b). One explanation for the difference in results may be the small sample size of livestock producers used in this study. A larger sample may have produced different results. On the other hand, this study does support the literature which suggests that environmental group members tend to have the most positive attitudes toward wolves.

All of the groups surveyed were in strong agreement that wolves are important members of the ecological community. This may be a factor contributing to the positive attitudes expressed by participants. Recognition of the role wolves play in an ecosystem is referred to by Kellert (1996) as an ecologistic value. All of the groups also felt that the

wolves had the right to exist, suggesting they also held moralistic values. The third most popular reason given by area residents, outfitters, Sierra Club members and CPAWS members for being in favor of having wolves in RMNP was so future generations could enjoy them. This suggests that these groups also have naturalist values. They likely enjoy the direct experience and exploration of nature. Trappers and livestock producers both indicated that they were in favor of having wolves in the region so they could harvest their pelts. Although three values were the most frequently expressed, people also indicated (through answer selection) they held scientific, aesthetic, humanistic, and dominionistic values (for more information on these please refer back to section 2.3).

The primary reasons given by those people not in favor of having wolves in RMNP represented negativistic values. Specifically, all of the choices given in the questionaire represented a fear or aversion to wolves which probably arose from misconceptions about wolf ecology and/or behavior. For most groups, the most popular choices were a fear of attack on people, or that wolves may reduce big game hunting opportunities. Peoples' fear of wolves was quite evident in some of the written comments included in Appendix D. Livestock producers were more concerned that livestock losses would be unacceptably high.

When given three choices of compromises (see Tables 50-52) which could increase the willingness of those not in favor of having wolves in the RMNP region, all options were consistently rejected. This indicates that those individuals not in favor of having wolves in the RMNP region are likely to reject any of the options that may be presented to them.

Several of the groups felt that wolves that kill livestock should be trapped and relocated rather than killed. Livestock producers, outfitters and trappers on the other hand all felt that wolves that kill livestock should be killed. The preference to kill a wolf rather than relocate it may be associated with utilitarian values held by these three particular groups. This may also be related to the direct impact that cattle predation can have on the livestock producers livelihoods. Relocation of wolves could just be moving the problem to another area. In all likelihood, relocation would have to be to a different area of

Manitoba since RMNP is not large enough to permit such an activity.

The only group that felt the Government of Manitoba should increase wolf harvests was the trappers. This is likely because they earn their livelihoods through harvesting the pelts. Trappers also felt that the wolf population in RMNP was increasing so an increased harvest would be reasonable. Trapper estimates of the number of wolves currently present in the park were high, indicating further that they are not aware of recent population declines. The primary reason that trappers were opposed to having wolves in RMNP was their perception that wolves reduced big game hunting opportunities.

Mech (1970) found that based on biomass consumed per wolf, wolves could influence prey populations if the predator/prey ratio was 1:11,000 kg per wolf. This biomass amount is equivalent to approximately 30 moose/wolf or 37 elk/wolf based on data from RMNP (Goulet, pers. com. 1997). The current populations of moose and elk in RMNP are approximately 4200 and 5000 respectively which more than satisfies the 32 wolves food requirements. As such, wolves are probably not providing a regulatory function to those populations of ungulates in the park.

The primary implication of the conclusions drawn are that attitudes are much more complex than they first appear. Although individuals report having positive attitudes toward wolves, these attitudes are often associated with some negative attitudes. In order to better understand attitudes, it is critical to investigate the underlying knowledge respondents have about wolves.

5.3 Public Knowledge of Wolves in the RMNP Region

5.3.1 Knowledge

The information provided by this research contributes to the existing body of evidence that as knowledge about wolves increases, attitudes toward wolves tend to become more positive. Overall, most individuals acquired their knowledge about wolves from personal experience, magazines, T.V., and books. Trappers, livestock producers and

outfitters primarily indicated that their knowledge was a direct result of their personal experience with wolves. These three groups obtained the highest knowledge scores of all the groups surveyed. Sierra Club members and members of the CPAWS tended to acquire their information about wolves from written materials such as magazines and books. Area residents received most of their information from watching T.V. programs about wolves.

5.3.2 Techniques Used

The methods which were used in this study to measure public knowledge about wolves have been used in a number of other studies (Bath 1987a, 1987b; Kellert, 1989). The techniques used for acquiring information on public knowledge about wolves appears to be well suited to studies such as this one. The additional technique of using crosstabs to strengthen associations between variables aided in confirming associations which were thought to exist.

5.3.3 Results in this Case

As noted, cattle predation on livestock has been minimal in the RMNP region. Table 29 showed that fairly high percentages of all groups were aware that livestock losses were greater than 0 but less than 1%. Many of the groups, however, also had high percentages of people who did not know what the incidence of wolf predation on livestock was for the RMNP region.

Although almost all people surveyed were not aware there is currently a compensation fund for livestock producers, all groups agreed that livestock producers should receive some compensation for livestock predation. Though all groups (except livestock producers) agreed they would be willing to contribute monies to a compensation fund, CPAWS members were the most willing to contribute. The above average willingness of the members of the CPAWS to contribute to a compensation fund may be attributed to two things: first, they held the most positive attitude toward wolves which corresponds to a greater desire to have wolves present in the RMNP region; and

second, a majority of the respondents were from urban areas and therefore may lack direct negative interaction with wolves such as livestock predation losses.

All of the groups indicated that they felt the Government of Manitoba should provide compensation for livestock predation by wolves. The unwillingness of livestock producers to contribute to a compensation fund may indicate a less positive attitude toward having wolves in the park than shown by individuals who would contribute to a compensation program.

It is also interesting to note that a very high percentage of all groups were not aware that wolves supplement their diet with beaver in the summer. The number of beaver in RMNP in 1996 was estimated between 15,000 and 20,000 (Dubois, pers. com. 1997). Having a large population of beaver has resulted in a great deal of crop damage for landowners in outlying areas. Having the knowledge that beaver are one of the wolves food sources may be a good way of fostering tolerance of those who opposed having wolves in RMNP.

5.4 Willingness to Have Wolves in the RMNP Region

5.4.1 Wildlife Acceptance Capacity (WAC)

As noted, Wildlife Acceptance Capacity (WAC) reflects the maximum wildlife population that people are willing to accept (Decker and Purdy, 1988). Decker and Purdy (1988) reported that factors which may limit WAC are: peoples' acceptance of damage and nuisance associated with a wildlife species; perceived competition of the species for another of interest for people; the role of the species in disease transmission to humans; and the values placed on the species. Two factors which may limit WAC in the RMNP region are peoples' acceptance of damage and nuisance wolves cause to livestock and perceived competition of wolves for big game species.

5.4.2 Techniques Used

The methods used in this study used similar research (Bath 1987a, 1987b) as a

framework. The statistical analysis used have been quite effective in other studies similar to this study. As such, no variations were used.

5.4.3 Results in this Case

Current human dimensions literature has reported relationships between attitudes and willingness to reintroduce wolves into a region and knowledge and willingness to reintroduce wolves into a region. This study has shown that those relationships also exist in areas where there is a currently an existing population of wolves. The further predictive relationship found in this study between attitudes and other variable such as knowledge, whether a person hunts or not, education level, gender and affiliation also relate to peoples' willingness to accept wolves in the RMNP region. As the attitudes of respondents became more positive, their willingness to have wolves in the region increased.

5.5 Recommendations for Management and Education:

5.5.1 Recommendations for Management

Land management practices have become increasingly concerned with influencing human behavior rather than managing wildlife populations. As such, implementation of new wildlife management policies or plans necessitates informing and educating the public about wildlife management issues. Given that the survey showed very little public knowledge about wolf management in the RMNP region, inclusion of local people in the management decision making process would be a good way to begin building bridges with the community. Having information on public attitudes toward wolf management would enable wildlife managers to incorporate the attitudes, values, knowledge, and expectations of stakeholders into land use decisions (Knuth and Nielsen, 1991).

5.5.1 (1) **Livestock predation:** Both livestock producers and the provincial government need to place more emphasis on preventative techniques for wolf-livestock management. For example: sending healthy, non-pregnant animals to pasture; checking cattle regularly;

rounding up cattle early in the fall; and removing carcasses to prevent scavenging (Bjorge and Gunson, 985).

The adoption of more preventative husbandry practices would financially benefit both livestock producers and the Manitoba government. Livestock producers who currently do not receive compensation for livestock losses could reduce financial losses associated with wolf predation. The Manitoba government would save money which is currently spent on predator control measures in the RMNP region.

5.5.1(2) **Management Strategies:** The use of non lethal management strategies was supported by a majority of survey participants and this is recommended to managers. In cases where relocation is not a viable option, and damages to livestock continue, current predator control methods may still have to be used. The adoption of the management strategies which were supported by local people could make enforcement of those strategies easier to achieve for both the Provincial and the Federal governments who manage wolves in the RMNP region.

5.5.1(3) **Compensation Program:** Implementation of a compensation program for livestock producers could aid in fostering tolerance of wolves by those groups (livestock producers outfitters and trappers) who favoured lethal control of wolves. Survey respondents indicated that they felt that the Provincial government should be responsible for compensation costs. Written comments on many surveys also indicated that some people felt that the Federal government should also be responsible for compensation costs.

The compensation program would require having a trained biologist identify if the kill was done by wolves. Once established that it was wolves, payment of a certain percentage of the total retail value of the livestock killed could be made. As noted, in Alberta, the province pays 70% of the total retail value which may serve as a good starting point.

Having a compensation program in the RMNP region would benefit the livestock producer and the Provincial and Federal governments. Livestock producers who are compensated for their loss would have the financial loss lessened, but they may also have

more tolerance when they see a wolf near their livestock and be slower to exercise their right to shoot the wolf. The Provincial government would benefit by reducing their costs on predator control costs. On the other hand, they would incur the cost of a portion of the compensation. The Federal government would benefit if tolerance was raised, and less wolves were killed. This would aid them in trying to maintain a population of wolves in RMNP so future generations could enjoy them.

5.5.1(4) **Wolf Harvest:** The current hunting and trapping regulations set out by the Department of Natural Resources permit lengthy wolf harvests in the RMNP region. Survey respondents indicated that they felt that there should not be an increase in the number of wolves harvested in the RMNP region. Written comments suggested that many respondents felt that wolf harvests should be reduced, or eliminated from the area surrounding the park. Many of the respondents were unsure or incorrect in their estimates of both the number of wolves in the RMNP region, and the status of the wolf population (ie., if it was increasing, decreasing or staying about the same).

A reduction in the number of wolves in the RMNP would benefit the local economy. Although largely untapped in the RMNP region to date, tourism which is focussed on wolves could be quite lucrative. As noted, the revenue generated from reintroducing wolves into the Yellowstone region was ten times the costs incurred by county having them there.

5.5.1(5) **Interagency Management:** In order to properly plan for both compensation and educational programs, interagency management is required between the Federal government, Provincial government and local landowners to ensure there is consistency in these programs. All groups would benefit from this because monitoring costs for compensation programs would be reduced if all participated in the development of those programs. The benefits for educational programs are also shared by all the aforementioned agencies. Working together, information can be shared between groups which would reduce the costs of each acquiring the same information about local knowledge separately. In addition, the number of presentations to various interest groups could be reduced, lessening costs even further.

5.5.2 Recommendations for Education:

As noted in section 4.2, the knowledge scores of the participants of this study were all below 50% correct. This indicates that the attitudes held by all of the respondents may be based on a lack of knowledge about wolf ecology and behavior. To date, most educational messages have been constructed based on false assumptions about peoples' attitudes (Fishbein and Manfredo, 1992). Attempts to use peer pressure to change attitudes will not be very successful if behaviors are primarily under attitudinal control (Fishbein and Manfredo, 1992). In order to be effective, messages must address what knowledge about wolves people are lacking.

Given the above information, the following outline is a framework for educational recommendations.

5.5.2 (1) As outlined by Fishbein and Manfredo (1992), consideration should be given to the following when wildlife managers are developing an educational program:

i) determine the level of knowledge which underlie the attitude;

This study has uncovered that there are a great deal of misconceptions about wolf ecology and behavior. Although all respondents were in favor of having wolves in the RMNP region, groups with more knowledge were more willing to have wolves present. Groups with less accurate knowledge about wolves were less willing to have wolves present. People who achieved the highest knowledge score reported that their primary source of information was personal experience.

ii) selection of targets for educational efforts;

Targets for educational efforts should include misconceptions about wolf ecology which could lead to an unwillingness to have wolves in the RMNP region. As noted, current educational information is generally not based on what information the public lacks, rather, information presented tends to be what the presenter deems important (Knuth and Nielsen, 1991). As a result, if a presenter likes wolves, information given will be positive. If the presenter does not like wolves, the information presented will be negative. In order to stimulate more positive attitudes, the use of appeals which are based on a variety of aesthetic,

utilitarian, or spiritual reasons have proven to be effective (Knuth and Nielsen, 1991). Bright and Manfredo (1996) found that focusing on the symbolism of wolves, the ecological role they play, and the potential wolves presence has to contribute to future generations produced more deeply rooted positive attitudes.

The appeals noted above could aid in improving attitudes about livestock predation, compensation, wolf ecology and the feasibility that wolves may attack people. Currently, a large number of respondents believed that there is a high incidence of wolf predation on livestock, there is currently no compensation available to livestock producers who loose cattle to predation, that wolves may attack people, and numerous behavioral misconceptions.

iii) changing the implication of the attitudes discovered; and

The implication of a negative attitude based on the belief that there is a high incidence of wolf predation on livestock is that there will be an increase in the amount of predator control measures used by the Department of Natural Resources or local landowners. To change this, new alternatives (such as compensation for livestock predation by wolves) must be presented to livestock producers in order to foster tolerance and reduce the incidence of lethal predator control measures.

iv) correspondence between attitude and intention. Behavior does not correspond to attitudes in many cases. For example, all respondents indicated that they had positive attitudes toward wolves but 33.3% of the people surveyed agreed that if they saw a wolf they would try to kill it (see table 19). This suggests that having a positive attitude does not imply a conservation ethic. Rather, there are a number of reasons people can be in favor of having wolves in the RMNP region, one of which is to be able to harvest their pelts.

5.5.2(2) An educational program that is participatory in nature. Self perception theory predicts that actual interaction with an object provides more reflective information about the object than does indirect, non- behavioral experience such as listening to a description of the object (Vincent and Fazio, 1992). Some examples would include utilizing field

trips to kill sites, tracking excursions, or howling outings would provide people with a more direct experience with wolves.

5.5.2(3) Have wildlife managers use approaches to modify behaviors rather than attitudes when dealing with the general public or specific interest groups. Use techniques which would make people consciously deliberate their actions rather than engaging in undesirable spontaneous behavior (Vincent and Fazio, 1992). (Providing consistent positive reinforcement when a desirable behavior occurs may be one way to achieve this.)

5.5.2(4) Enhance the accessibility of the desired attitude through repeated expression. One way to encourage desirable attitudes and behaviors toward wolves is to provide people with the avenues to share their findings in a group setting which will further reinforce their behaviors and corresponding attitude.

5.5.2(5) Specific educational programs developed through interagency cooperation should include: i)The current lack of knowledge of the incidence of damage to livestock, and the lack of a comprehensive compensation program could be a limiting factor in increasing positive regional attitudes toward wolves. Program(s) for livestock producers which inform them about the incidence of livestock predation on wolves in the region, what preventative measures they can take, and what compensation is available if they suffer losses; ii) program(s) for the general public which discuss wolf ecology and behavior; and iii) program(s) for outfitters, trappers and livestock producers which keeps them informed about the number of wolves which are present in the region and the status of the population (ie. if the population is increasing, decreasing, or remaining the same).

5.6 Further Research

The following are recommendations for further research:

5.6.1 The results of this study have indicated that the three groups which can have the greatest negative effect on the wolf population in the RMNP region are outfitters (hunters), trappers and livestock producers. Given the relatively small sample sizes of hunters, trappers and livestock producers in the RMNP region used in this study, a wolf attitudinal survey which includes more focus on values should be conducted on a larger

sample of these three groups. Inclusion of a section on values in the survey design would provide information on the underlying attitudes of these three groups. The information gathered could be presented to regional wildlife managers and incorporated into management plans.

5.6.2 A literature review on preventative husbandry practices and their effectiveness in various regions could aid in reducing the incidence of wolf predation on livestock in the region. Although the incidence of livestock predation in by wolves the RMNP region is quite small, methods of reducing livestock predation by wolves could foster more positive attitudes toward the animal. Both livestock producers and the Provincial government would receive financial benefits from this information. Hopefully, the livestock producers would loose less cattle to wolves, and the government would reduce it's current spending on predator control measures.

5.6.3 Information presented in this study pertaining to current educational techniques suggests that there are several approaches to educating the public about wolves which have various degrees of effectiveness. A literature review should be done on environmental educational techniques which have been effective in increasing positive attitudes toward wolves and decreasing negative attitudes toward wolves. The valuable information on which educational techniques are effective and which are less effective in various situations.

5.6.4 A cost/benefit analysis should be done to determine the actual and estimated costs and benefits associated with having wolves in the RMNP region. Projections of compensation costs could be estimated based on literature pertaining to compensation costs reported in other areas of North America. Current predator control costs could be provided by the Manitoba Department of Natural Resources. The benefits of having wolves in RMNP could be estimated through the use of a mail survey sent to ecotourism operators in the area, and park visitors which asks specifically about peoples' willingness to pay to have the opportunity to partake in wolf related activities such as tracking or howling outings.

The results should be made available to the Provincial government as many of

both the costs and the benefits of having wolves in the RMNP region are incurred or obtained by them. In addition, the information should also be available to the ecotourism operators in the RMNP region since this could provide added revenue to them as well.

Closing Comments:

Some interesting similarities and differences were found between attitudes of people living in close proximity to wolves, and people who are faced with the prospect of wolf reintroduction. Comparisons between these two groups could develop into a way of easing the transition of people who fear the worst when wolf reintroduction is proposed for the area in which they live. Perhaps livestock producers who currently live near wolves with little or no conflict could become involved in educational efforts in reintroduction areas.

Information gathered on attitudes toward and knowledge of wolves also has the potential to reduce the number of areas where wolves are extirpated. Incorporation of the fears of the community into management plans could effectively address community concerns so that the community does not feel that they have to take care of things themselves. Working with government agencies, rather than separately from them, could also empower the local people and result in their involvement in many other community issues.

Literature Cited

Ajzen, I. 1992. Persuasive communication theory in social psychology: a historical perspective. In Manfredo (ed) *Influencing Human Behavior*. Sagmore Publishing Co. Inc., United States.

Aronson, E. 1991. *The Social Animal* sixth edition. W.H. Freeman and Company, United States. 423 pp.

Baker, 1993. *Picturing the Beast*. Manchester University Press, Manchester.

Bath, A. 1987a. Countywide survey of the general public in Wyoming in counties around the park toward wolf reintroduction in Yellowstone National Park. Unpublished Report to the U.S. National Park Service.

_____ 1987b. Attitudes of various interest groups in Wyoming toward wolf reintroduction in Yellowstone National Park. Unpublished thesis, University of Wyoming.

_____ 1989. The public and wolf restoration in Yellowstone National Park. Society and Natural Resources 2:297-306.

_____ 1991. Public attitudes in Wyoming, Montana, and Idaho toward wolf reintroduction in Yellowstone National Park. Transactions of the Fifty-sixth North American Wildlife and Natural Resources Conference: 91-94.

Becker, E. 1971. *The Birth and Death of Meaning*. The Free Press, New York.

Bidlake, L. 1996. Brandon Regional Wildlife Officer for Department of Natural Resources. (per. Comm.).

Bishop, N. 1991. Wolf recovery in Yellowstone national Park. Yellowstone National Park, Wyoming 8pp.

Bishop, R. 1987. Economic values defined. In Decker, D a nd Goff, G. (eds.) *Valuing Wildlife: Economic and Social Perspectives*. Westview Press, United States.

Bjorge, R. And Gunson, J. 1985. Evaluation of wolf control to reduce cattle predation in Alberta. Journal of Range Management 38(6): 483-486.

Boxall, P. and McFarlane, B. 1995. Analysis of descrete, dependant variables in human dimensions research: participation in residential wildlife appriciation. Wildl. Soc. Bull. 23 (2): 283-289.

Bright, A. And Manfredo, M. 1996. A conceptual model of attitudes toward natural resource issues. Human Dimensions of Wildlife 1(1):1-21.

Brown, T. 1988. From the executive council. Human Dimensions in Wildlife News Letter 7(2):1-2.

Carbyn, L. 1983. Ecology and management of wolves in Riding Mountain National Park, Manitoba. Canadian Wildlife Service Final Report, Large Mammal System Studies Report 10: 184 pp.

Clark, T., Paquet, P. and Curlee, P. 1996. General lessons and positive trends in large carnivore conservation. Conser. Bio. 10(4):1055-1058.

Decker, D., Krasny, M., Goff, G., Smith, C. and Gross, D., 1991. Need for a focus on practitioners in conservation of biological resources. In: Decker, D., Krasny, M., Goff, G., Smith, C. and Gross, D. (eds.) *Challenges in the Conservation of Biological Resources.* Westview press, United States.

_____and Purdy, K. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. Wild. Soc. Bull. 16: 53-57.

Dillman, D. 1978. *Mail and Telephone Surveys: the Total Design Method.* John Wiley and Sons, Toronto.

Dorrance, M. 1982. Predation losses of cattle in Alberta. Journal of Range Management 35(6): 690-691.

Dubois, J. 1996, 1997. RMNP Biologist (pers. com.).

Duffield, J., Patterson, D. And Neher, C. 1993. Wolves and people in Yellowstone: a case study in the new resource economics. Report to the Liz Claiborne and Art Ortenberg Foundation. University of Montana.

Festinger, L. 1954. A theory of social comparison processes. Human Relations 7:117-140.

Fishbein, M. And Ajzen I. 1975. *Understanding attitudes and predicting social behavior.* Prentice Hall, NJ.

Fishbein, M. and Manfredo, M. 1992. A theory of behavior change. In Manfredo (ed) *Influencing Human Behavior*. Sagmore Publishing Co. Inc., United States.

Forbes, G. and Theberge, J. 1996. Cross-boundary management of Algonquin Park wolves. Conser. Bio. 10(4):1091-1097

Gleitman, H. 1981. *Psychology*. Norton & Company, United States.

Goulet, G. 1995-1997. Independent Wolf Biologist, pers. com.

Gravetter, F. And Wallnau, L. 1992. *Statistics for the behavioral sciences (third edition).* West Publishing Company, MN.

Haber, G. 1996. Biological conservation and ethical implications of exploiting and controlling wolves. Conser. Bio. 10(4):1068-1081.

Hummel, M. 1990. A conservation strategy for large carnivores in Canada. Prepared for the World Wildlife Fund.

Kellert, S. 1985. Public perceptions of predators, particularly the wolf and coyote. Biological Conservation 31: 167-189.

_____ 1989. The contributions of wildlife to human quality of life. In Decker, D a nd Goff, G. (eds.) *Valuing Wildlife: Economic and Social Perspectives*. Westview Press, United States.

_____ 1990. Public attitudes and beliefs about the wolf and its restoration in Michigan. Unpublished Report for Yale University School of Forestry & Environmental Studies.

_____ 1996. *The Value of Life: Biological Diversity and Human Society*. Island Press, United States.

_____, Black, M., rush, C. and Bath, A. 1996. Human culture and large carnivore conservation in North America. Conser. Bio. 10(4): 977-990.

Knuth, B. And Nielsen, L. 1991. People, patches and politics: considering the human dimension in landscape management. In Decker, D., Kransny, M, Goff, G., Smith, C. and Gross, D. (eds.) *Challenges in the conservation of biological resources*. Westview Press, United States.

Leopold, A 1940. The state of the profession. J. Wildl. Mgmt. 4(3) :343-346.

Lindblom, C. 1974. The science of "muddling through". In Baily, J., Elder, W., and McKinney, T. *Readings in Wildlife Conservation*. The wildlife Society, United States.

Llewellyn, L. 1978. Who speaks for the timber wolf? Transactions of the Forty-Third North American Wildlife and Natural Resource Issues Conference: 442-452.

Lohr, C., Ballard, W. And Bath, A. 1996. Attitudes toward gray wolf reintroduction to New Brunswick. Wildl. Soc. Bull. 24(3): 414-420.

Lopez, B. 1978. *Of Wolves and Men*. Charles Scriber's Sons, New York.

Mace, R. and Waller, J. 1996. Grizzly bear distribution and human conflicts in Jewel Basin hiking area, Swan Mountains, Montana. Wildl. Soc. Bull. 24(3):461-467.

Manfredo, M. 1989. Human dimensions of wildlife management. Wild. Soc. Bull. 17: 447-449.

_____, Bright, A., Pate, J & Tishbein, G. 1994. Colorado residents' attitudes and perceptions toward reintroduction of the gray wolf (Canis lupus) into Colorado. Summary of Project Report No.21, Colorado State University.

_____ and Vaske, J. 1996. Human Dimensions of Wildlife. Human Dimensions of Wildlife 1(1): v-vi.

Mangun, W., Knuth, B, Keller, J. and Goff, G. 1991. Challenges for public-sector and private-sector land managers in the conservation of biological resources. In: Decker, D., Krasny, M., Goff, G., Smith, C. and Gross, D. (eds.) *Challenges in the Conservation of Biological Resources.* Westview press, United States.

Marty, S. 1995. A killing season in the Rockies. Canadian Geographic 115:17.

McCool, S. and Braithwaite, A. 1989. Beliefs and behaviors of back country campers in Montana toward grizzly bears. Wildl. Soc. Bull. 17:514-519.

_____ and Braithwaite, A. 1992. Persuasive messages and safety hazards in dispersed and natural recreational settings. In Manfredo (ed) *Influencing Human Behavior*. Sagmore Publishing Co. Inc., United States.

Mech, D. 1966. The wolves of Isle Royale. Fauna of the National Parks of the U.S. Fauna Series 7. U.S. Department of the Interior.

_____ 1970. The wolf: the ecology and behavior of an endangered species. University of Minnesota Press, Minneapolis.

_____ 1974. Effects of wolf predation. In Baily, J.,Elder, W., and McKinney, T. (eds.) *Readings in Wildlife Conservation*. The Wildlife Society, United States.

Mitchell, B. 1979. *Geography and Resource Analysis.* Longman Group Limited.

Mladenoff, D., Sickley, T., Haight, R. And Wydeven, A. 1995. A regional analysis and prediction of favorable gray wolf habitat in the Northern Great Lakes region. Conser. Bio. 9(2): 279-294.

Morgan, M. and Gramann, J. 1989. Predicting effectiveness of wildlife education programs: a study of students' attitudes and knowledge toward snakes. Wildl. Soc. Bull. 17: 501-509.

Munson, B. 1994. Ecological misconceptions.Journal of Environmental Education 25(4): 30-34.

Noss, R. 1995. Maintaining ecological integrity in representative reserve networks. Prepared for the World Wildlife Fund, Canada.

Nunnally, J. 1970. *Introduction to Psychological Measurement.* McGraw Hill Publishing, New York.

Pate, J., Manfredo, M, Bright, A. And Tishbein, G. 1996. Coloradan's attitudes toward reintroducing the gray wolf into Colorado. Wildl. Soc. Bull. 24(3):421-428.

Peyton, B. and Decker, D. 1987. The role of values and valuing wildlife communication and education. In Decker, D a nd Goff, G. (eds.) *Valuing Wildlife: Economic and Social Perspectives*. Westview Press, United States.

Peterson, R. 1986. Gray wolf. Audubon Wildlife Report, New York.

Phillips, P. And Seldom, J. 1983. *Microeconomics and the Canadian economy (second edition).* T.H. Best Printing Co Ltd., Canada.

Purdy, K. And Decker, D. 1989. Applying wildlife values information in management: the wildlife attitudes and values scale. Wildl. Soc. Bull. 17: 494-500.

Rasker, R. and Hackmann, A. 1996. Economic development and the conservation of large carnivores. Conser. Bio. 10(4):991-1002.

Ream, R. And Mattson, U. 1982. Wolf status in the Northern Rockies. In Harrington, E. And Paquet, P (eds.) *Wolves of the World.* Noyes Publications, New Jersey.

Rolston III, H. 1994. *Conserving Natural Value.* Columbia University Press, New York.

Sheskin, I.M. 1985. *Survey Research for Geographers.* Association of American Geographers. State College, Pennsylvania.

Stardom, R. 1983. Status and management of wolves in Manitoba. In Carbyn (ed.) Wolves in Canada and Alaska. Canadian Wildlife Service Report Number 45.

Statistics Canada, 1991. Census of Manitoba.

Tucker, P and Pletscher, D. 1989. Attitudes of hunters and residents towards wolves in northwestern Montana. Wildl. Soc. Bull. 17: 509-514.

Vincent, M. And Fazio, R. 1992. Attitude accessibility and its consequences for judgement and behavior. In Manfredo (ed) *Influencing Human Behavior.* Sagmore Publishing Co. Inc., United States.

Wilm, H. 1974. A pattern of scientific inquiry for applied research. In Baily, J.,Elder, W., and McKinney, T. *Readings in Wildlife Conservation.* The wildlife Society, United States.

Woodley, S. 1993.*Ecological Integrity and the Management of Ecosystems.* St. Lucie Press, United States.

Young, T. 1994. Natural die-offs of large mammals: implications for conservation. Conser. Bio. 8(2): 410-418.

Appendix A: Introduction Letter

September 9th, 1996

Within a week or so you will be receiving a mail survey as part of a research study. This survey will be mailed to a random selection of people living in the Riding Mountain National Park (RMNP) region. The survey serves to aid in understanding how area residents feel about the wolf population in the RMNP region.

I am writing in advance of sending the survey because many people may appreciate being advised that a research study is in progress, and that they will be contacted by mail. The survey has been reviewed, and approved by the Research Ethics Committee at the Natural Resource Institute.

When the survey arrives, I ask that the person to whom it is addressed be the one to fill out the survey. Where there are two names present on the envelope, I ask that the oldest of the two people be the one to fill out the survey. This is to ensure that the people responding are the adults in the household.

The survey should only take about fifteen minutes to complete.

Your help, and the help of others asked to participate in this effort to determine attitudes toward wolves in the RMNP region is essential to the success of the study.

If you have any questions, please do not hesitate to call me (Carla Ponech) or my advisor Dr. John Sinclair at (204) 474-8373.

Cordially,

Carla Ponech
Project Director

Appendix B: Survey Instrument

The Wolves of Riding Mountain National Park Region

For this study, the term "wolf" refers to the species Canis lupus and does not include the coyote, Canis latrans.

The following questions ask about your feelings towards wolves in the Riding Mountain National Park region. Answers include Strongly Disagree (SDA), Moderately Disagree (MDA), Disagree (DA), Neutral (N), Agree (A), Moderately Agree (MA) and Strongly Agree (SA). Please circle one answer only.

	SDA	MDA	DA	N	A	MA	SA
1. Wolves are an important component of a healthy ecosystem.	1	2	3	4	5	6	7
2. I feel I have a kinship with wolves.	1	2	3	4	5	6	7
3. I live too close to wolves.	1	2	3	4	5	6	7
4. I would like to see a wolf in the wild.	1	2	3	4	5	6	7
5. Because healthy populations of wolves exist in Northern Manitoba, there is no reason to have wolves in the Riding Mountain region.	1	2	3	4	5	6	7
6. Having a greater number of wolves in the Riding Mountain region would cause more damage to livestock than the damage done by the existing wolf population.	1	2	3	4	5	6	7
7. Wolves have a significant impact on the livestock industry around Riding Mountain National Park.	1	2	3	4	5	6	7
8. A wolf that kills livestock should be trapped and relocated.	1	2	3	4	5	6	7
9. A wolf that kills livestock should be killed.	1	2	3	4	5	6	7
10. When livestock is killed by a wolf, the rancher should be paid some sort of compensation.	1	2	3	4	5	6	7

	SDA	MDA	DA	N	A	MA	SA
11. a) I would be willing to contribute money toward a compensation program for ranchers.	1	2	3	4	5	6	7
b) I think that the Manitoba Government should pay compensation to ranchers for livestock losses that are the result of wolf predation.	1	2	3	4	5	6	7
12. Wolves are having a significant negative impact on big game hunting opportunities near Riding Mountain National Park.	1	2	3	4	5	6	7
13. The provincial government should allow more wolves to be harvested.	1	2	3	4	5	6	7
14. If I saw a wolf I would try to kill it.	1	2	3	4	5	6	7
15. I would be afraid to hike in Riding Mountain National Park knowing that wolves are present in the park.	1	2	3	4	5	6	7

	Yes	No	I'm Not Sure
16. Have you ever seen a wolf in the wild?	1	2	3
17. Did wolves historically occupy the Riding Mountain National Park region?	1	2	3
18. Is there currently compensation available for ranchers in the RMNP region when a wolf kills their livestock.	1	2	3

	Yes	No	No Opinion
19. a) Are you in favor of having wolves in Riding Mountain National Park?	1	2	3

(If you answered "yes", please go to question 21. If "no", please continue with 19 (b).)

	Yes	No	No Opinion
b) If you are not in favor of having wolves in Riding Mountain National Park would your opinion change if a program of financial compensation for livestock losses attributed to wolves was implemented?	1	2	3
c) If you are not in favor of having wolves in Riding Mountain National Park would your opinion change if it were possible to hold livestock losses at less than 1%?	1	2	3
d) If you are not in favor of having wolves in Riding Mountain National Park, would your opinion change if only the wolves that killed livestock were killed?	1	2	3

20. What is your primary reason for being against having wolves in Riding Mountain National Park?

A) LIVESTOCK LOSSES ARE UNACCEPTABLY HIGH
B) AN UNACCEPTABLE DECLINE IN BIG GAME ANIMALS
C) WOLVES MAY ATTACK PEOPLE
D) WOLVES SERVE NO ECOLOGICAL PURPOSE
E) WOLVES KILL MORE ANIMALS THAN THEY NEED TO FOR SURVIVAL
F) BECAUSE I DON'T LIKE WOLVES
G) WOLVES MAY SCARE OFF TOURISTS
H) WOLVES ARE PESTS
I) THERE ARE NO BENEFITS TO HAVING WOLVES PRESENT IN THE PARK
J) OTHER_____

_____

Please go to question 22.

21. What is your primary reason for being in favor of having wolves in Riding Mountain National Park?

A) BECAUSE THEY HAVE A RIGHT TO EXIST
B) SO FUTURE GENERATIONS CAN ENJOY THEM
C) BECAUSE THEY ARE IMPORTANT MEMBERS OF THE ECOLOGICAL COMMUNITY
D) TO PHOTOGRAPH THEM
E) BECAUSE OF THEIR VALUE TO SCIENCE AND RESEARCH
F) BECAUSE I'M VERY FOND OF WOLVES
G) BECAUSE THEY MAY ATTRACT TOURISTS
H) TO BE ABLE TO HARVEST THEIR PELTS
I) SO THAT SOME PEOPLE WILL BE ABLE TO HUNT THEM
J) OTHER _____

_____

22. Which answer best describes your attitude towards wolves?

A) STRONGLY LIKE B) LIKE C) NEITHER LIKE NOR DISLIKE
D) DISLIKE E) STRONGLY DISLIKE

23. Do you have other concerns with wolves being present in Riding Mountain National Park?

_____

_____

_____

Please circle the most appropriate response to the following.

1. a)Where have you acquired your knowledge about the wolf? (Please feel free to circle more than one answer.)

A) NEWSPAPERS G) FRIENDS
B) BROCHURES H) FILMS
C) MAGAZINE ARTICLES I) PUBLIC MEETINGS
D) BOOKS J) T.V.
E) SCHOOL K) PERSONAL EXPERIENCE
F) OTHER _____

b) Which source has provided you with the most useful information?

_____

2. How knowledgeable do you feel you are about wolves?

A) KNOW NOTHING ABOUT WOLVES B) HAVE A LITTLE KNOWLEDGE
C) QUITE KNOWLEDGEABLE D) VERY KNOWLEDGEABLE
E) EXPERT

3. How much do you think the average adult Riding Mountain National Park timber wolf weighs?

A) 0-59 LBS.(0-27KG) B) 60-119 LBS. (28-54KG) C) 120-180 LBS. (55-82KG)
D) OVER 180 LBS. (OVER 82KG) E) I'M NOT SURE

4. How many wolves exist in Riding Mountain National Park?

A) 1-30 B) 30-60 C) 60-90
D) 90-120 E) OVER 120

5. Do you think wolf numbers in Riding Mountain National Park are:

A) INCREASING B) DECREASING
C) REMAINING ABOUT THE SAME

6. What would be your estimate of documented cases of (free ranging) wolf attacks on humans occurring in North America since 1800?

A) NONE B) 1-10 C) 11-20 D) 21-50
E) 51-100 F) OVER 100 G) I'M NOT SURE

7. How successful do you believe a pack of wolves in Riding Mountain National Park given 100 chases, is at catching and killing a moose, one of their prey species?

A) 1-10% B) 11-50% C) 51-80% D) 81-100%
E) I'M NOT SURE

8. What percentage of cattle that exist in wolf range in the Riding Mountain National Park region are killed by wolves in a single year?

A) NONE B) GREATER THAN 0 BUT LESS THAN 1%
C) 1-30% D) 31-60%
E) OVER 60% F) I'M NOT SURE

9. What is the average pack size of wolves in Riding Mountain National Park?

A) 1-4 B) 5-15 C) 16-30
D) OVER 30 E) I'M NOT SURE

	Yes	No	I'm Not Sure
10. Do wolf packs defend a relatively fixed area or territory against other wolf packs?	1	2	3
11. Would you agree that only two members of a wolf pack breed in any one year?	1	2	3
12. Do wolves survive primarily on beaver throughout the summer?	1	2	3
13. Do wolves usually sever hamstring muscles of their prey to bring them down (eg. moose, deer, elk)?	1	2	3
14. In most areas where wolves and coyotes can be found, would they usually occupy the same territory?	1	2	3
15. Are adult wolves preyed on by other wild animals?	1	2	3

What is your age?_____

What is your gender? Female___ Male___

Did you hunt in 1995? Yes___ No___

If yes, what species? _____

Please indicate the number of years of formal education that you have.

Elementary	1	2	3	4	5	6	7	8
Secondary	9	10	11	12	13			
College/University		___						
Graduate University		___						
PhD/MD		___						

Appendix C: Follow-up Letter

September 23, 1996

Last week a questionnaire was sent to you regarding your attitudes about, and knowledge of, the wolf population in the Riding Mountain National Park region. Your name was drawn from a random sample of area residents in the RMNP region, or from a list of different interest groups.

If you have already completed the survey and returned it to me please accept my sincere thanks. If you have not, please do so today. Because the survey has only been sent to a small, but representative sample of area residents and interest group members it is extremely important that your survey be included in the study if the results are to be an accurate representation of area residents and each specific interest group.

If by some chance you did not receive the survey, or it has been misplaced, please call me right now at (204) 474-8373 and I will get another one in the mail to you today

Sincerely,

Carla Ponech
Project Director

Appendix D: Respondents Written Comments to the question "do you have other concerns with wolves being present in Riding Mountain National Park?"

Do you have any other concerns with wolves being present in RMNP?

Livestock Producers:

- No, not as long as they don't become overpopulated
- They have bothered cattle next to my livestock and cattle spooked by a timber wolf are very hard to handle.
- Studies done on these animals in the past represent a lot of false information.
- Compensation should come from a federal budget for damage caused by these animals.

Trappers:

- Its just the animals they kill that can be consumed by humans.
- Having trapped wolves for years, problem wolves in ranch land are almost impossible to live trap.
- I have seen them kill elk and moose with my own eyes.
- My personal opinion about wolves is they have the right to live. If you don't bother them, they won't bother you.
- My greatest concern is overprotection and interference by naturalists who seem to forget that human beings have as much right to exist and pursue their favourite activities and livelihoods outside the park as wolves do in or out of the park.

Outfitters:

- Keep the wolf wild - man does not need interfering- hunting has no impact on them neither positive or negative.
- Kill too many yearlings and calves.
- Hunting outside the boundary to keep them inside the park. Most important to keep high population from devastating livestock with no control possible.
- We have too many wolves in all of Manitoba.
- At this time we have more important things to survey "How to create more jobs for our youth".
- If the wolf population gets too high it will interfere with the number of animals (elk, deer, moose) able to be hunted.
- The tourists would see more game in the park if there were less wolves.
- Over population and causing problems with the public.

Canadian Parks and Wilderness Society Members:

- Wolves in the park should be monitored; program assessed from time to time (yr. to yr.).
- I think the number of wolves should be controlled - I have no idea what effect they have on livestock populations but if it is a serious problem, wolves in the park should be eliminated.

Do you have any other concerns with wolves being present in RMNP?

Canadian Parks and Wilderness Society Members (Con't):

- As a National Park, RM should be protecting a natural segment of a natural ecosystem, which includes wolves.
- No need to hunt them at all.
- There has to be enough game to keep them fed all year round.
- A large buffer zone around the park should be established to give better protection to wolves (as well as bears).
- That like bears, they may loose their fear and start coming near homes and the town of Clear Lake.
- Not if their numbers do not become too great.
- Potential fir park wolves to become garbage scavengers near town sites.
- Public should be educated about their habits so they can understand them.
- They are used as scapegoats when livestock near the park is "negatively affected".
- Wolf populations impact beaver and ungulate populations; impacts the whole system.
- Concern they could be needlessly harassed or killed due to lack of public education.
- Only that they be allowed to maintain their existence as well as possible.
- They could be a possible threat to people.
- Concern about vulnerability of an insular population to epidemics (eg. Distemper).
- It is the responsibility of ranchers to protect their livestock - but not by killing wolves. How about fencing for example?
- I would want to know, as we have been notified about bears, if there was a pack of wolves in the cottage area. For the safety of children and pets.
- Yes, that the population not become "gene bound" because of corridor destruction between RMNP and the Duck Mountains.
- I have no concerns because I know that National Park programs are excellent in keeping the public informed re wild animals. All wild animals are dangerous when we don't act appropriately or they are hungry/diseased.
- I admire what I have read about wolves and their sense of family and believe they belong in a natural park which is suppose to protect wild animals.
- Is there a possibility of them attacking people? Has it ever happened?
- The many visitors to the cottage and especially our USA relatives go out of their way to see the bears, elk, deer, buffalo, etc.
- I believe they have a right to be there, however, I don't want anyone to get attacked. Post signs - enter bush at own risk. Leave them alone.
- Farmers always complain but the wolves aren't allowed to own land, only farmers.
- If the introduction of wolves, or more wolves, would upset the ecological balance - negative impact on other wildlife.
- The time has come to put an end to welfare ranching. For ecological, sociological, medical health and ethical reasons. We have far too many ranchers and cattle for anyone's good, and no where near enough protected wilderness. Wolves should be left alone.

Do you have any other concerns with wolves being present in RMNP?

Canadian Parks and Wilderness Society Members (Con't):

- They amplify the picture of a natural park.
- Concern over a small number of wolves in an isolated area - could create inbreeding problems.
- There is a basic, unfounded fear of wolves.
- Hope they don't kill young deer, moose, elk.
- I'd be concerned if the population of wolves got very large, or if packs of them appeared regularly on hunts.
- Genetic inbreeding is a very difficult, complex problem to assess and to do anything about, but homozygosity in wolves should be addressed in RMNP. Poaching or other possible causes of decrease should be addressed.
- They must be managed to maintain a healthy population or balance with that particular habitat.
- It is good to know they are there.
- Fear associated with them could lead to larger-scale negative (and potentially inaccurate) stories/reporting re wolves.
- I am concerned with the decrease in their population within the last few years and strongly advocate the continuation of "the wolf conservation program" in the park.
- There is the ever present danger of wolves attacking adults or children! But, this is compensated for by the value as fur bearers.
- No. I have camped with my children and horses in the Gunn Lake area. The wolves were no problem, we could hear them.
- Wish the population numbers were higher with a healthy, viable population present.
- I am not sure if they are present there and if they have been historically. If they have, then they should be allowed to continue but under reasonable control.
- For the first 30 years of my life there wasn't any wolves in the park and there was many more elk.
- The goal should be "more wolves, fewer people".
- Not so long as their prey animals remain sufficient for their needs so that domestic herds are not attacked. I feel that domesticated animals are too many and too close.
- Some safety concerns for hikers and holiday makers. Would there be educational and informational notices prominent?
- Too many men with guns.
- Their safety.
- No, unless there was so many that other animals disappeared and they , starving, went farther afield.
- Uneducated fears from farmers and tourists that believe in the fairytale vision of wolves as vicious man killers.
- Lack of park livestock compensation program.

Do you have any other concerns with wolves being present in RMNP?

Sierra Club Members:

- The national parks were set up to provide "wild space" to preserve nature. We have very limited space set aside for this purpose. We need to preserve wild spaces for wild things.
- I don't live there so I can't be concerned. I do feel they should be present as they are in the North. We can co-exist.
- How to handle public viewing and how to deal with myths about wolves.
- The rights of photographers, hunters, naturalists, ranchers and cattle owners should be respected vis-a-vis wolves should be balanced. Game animals have rights too. Death by wolves may be more painful than death by hunters. The Wapiti damaged forest experience in RMNP some years ago could have been prevented by judicious hunting.
- Safety for lone hikers.
- No, only concerns for their safety.
- What is the incidence of rabies in wolves and how does it affect their behavior?
- Cattle men will strongly oppose yet are often to blame for they haul dead cattle carcasses into the bush and accustom wolves to such flesh - or leave herd unattended in marginal land areas for many days at a time. Human odors around pastures generally keep wolves away.
- "Like" has little meaning in this context. I don't "like" mosquitos either, but they do belong in the ecosystem.
- Most concerned about absence.

Area Residents:

Boulton:

- No written comments

Clanwilliam:

- They are acceptable within moderation. If there should be a sudden increase in population, control measures may be appropriate.
- Not in favor of wolves being able to increase to, or at, unacceptable rates.

Dauphin and the Town of Dauphin:

- No, I have walked nature trails for over 25 years and seeing their trails in the winter is very exciting.
- Impacts on other wildlife.
- If too many they will cause losses to cattle ranchers as in Northern Alberta where the government had to set out poison bait. They will attack woods men as in an article in Western Sportsman magazine.
- I would suggest to have 25-35 wolves in the park as they are useful on rodents.
- No. If they were attacking campers and hikers I may feel different.

Do you have any other concerns with wolves being present in RMNP?

Dauphin and the Town of Dauphin (Con't):

- They have a right to live on this planet as do all God's creatures. They maintain the balance of nature and we should respect that right.
- No, except I don't feel I know enough about them.
- The gene pool as the population becomes more isolated.
- No, however, due to the environment of a national park there may be times numbers would have to be culled if population expands greatly from the park and are forced outside the park in large numbers.
- Concerned about the number of wolves killed when they step outside the park.
- When they get rabies and come into contact with the public.
- Absolutely none.
- Rarely ever see them.
- While I neither like or dislike them, they are a part of our ecosystem and we need to protect that.
- I am concerned that we, as humans, are constantly pressuring wolves through encroachment, increased park use, etc. making it difficult for them to thrive. I think we need to give them more space.
- Population must be monitored - overpopulation, live trap and relocate.
- I think they do more harm than good.
- No, to our knowledge they are causing no harm to humans.
- Chase animals across highways and cause accidents.
- I guess I do have a small fear of being attacked. I'm not sure how valid my fears are.
- If its going to be a real success then a buffer zone around the park should be set up.
- No, as long as they don't over-populate.
- May attack innocent people or other animals.
- No, as long as their population is controlled.
- No, as long as they are managed properly.
- They destroy rabbits, birds nesting and their babies, elk, moose, deer, and their babies also ducks and geese eggs etc.
- I am not against wolves in the park, but don't bring any in.
- Not safe for humans.
- Small number of wolves in the park will cause little harm. Large numbers will cause an overflow to surrounding cattle country causing more problems. It will also cause a decrease in deer, elk, moose populations within the park.
- Tourist and hiker safety.
- None, if respect is shown to the wolf we should have no reason to fear them.
- Concerned about the wolves attacking people, especially small children.
- Only for hikers and children using the park.
- Public safety and livestock and pet safety if food is scarce.
- Too much research on that high profile species...other species ignored.
- Only being overpopulated and killing deer, elk, moose, etc.

Do you have any other concerns with wolves being present in RMNP?

Grandview:

- I believe more timber wolves are coming out to follow deer. In time to come they might be a real problem. Wolves that venture too far out usually get shot.
- I see no need for them. They do kill and leave the animal alive after eating a portion of it.
- Safety.
- Because they kill wild game and livestock.

LG District of the Park:

- Outside pressures and attitudes are unfair.
- Children's safety.
- They are dangerous to hikers, skiers etc. They are by far more dangerous than any bear.

McCreary:

- I don't like to see too large a pack.
- No, as long as they are properly managed and controlled.
- I would like to see more wolves in the wild.
- The danger to livestock and hikers.

Ochre River:

- If you want them in the park keep them there and not on my farm.
- No comment.
- There are enough wolves in the park now; they are holding their own. Don't bring in any more. You guys are bringing them in and thats not right. I agree that wolves clean up some of the older, sick animals but they usually kill a deer a day around here, and they like a fresh kill. Wolves don't always eat beaver either. If the big game aimals increase, let the poor people shoot one for meat, cut down on welfare costs.
- They keep deer and elk out of the park and deer and elk won't go to other areas.
- They are a mean killing machine. Animals suffer more from their killing methods than from mans' guns and traps.

Rosedale:

- I don't like wolves around because of the danger to children.

Rossburn and Village of Rossburn:

- If population gets too high relocate to the Northern wilderness.
- With regards to the wolf population this should be left at its natural level.
- A wolf is a beautiful and exciting animal and should be left alone.

Do you have any other concerns with wolves being present in RMNP?

Shellmouth:

- I wouldn't want too many in the park for peoples' hiking safety.
- There is no reason that they shouldn't be in RMNP.
- Nature looks after the balancing of animals.
- Wolves killed by human predators.

Shoal Lake and the Village of Shoal Lake:

- Present levels are acceptable. Introducing more could be a problem.
- On unsupervised trail rides or hikes the public be-educated on the wolf and that the land is the wolf's domain.
- Danger to livestock and humans.
- The possibility of them straying out of the park boundries.
- They have a history of killing peoples' family pets.

Silver Creek:

- Their dwindling numbers.

Ste. Rose:

- It is a good place for them. The problem is trying to keep them there.
- A wolf that has rabies could attack humans and be very dangerous.

Strathclair:

- There are always concerns regarding any "kind" of wildlife, it is the ignorance of nature that put people in danger.
- I think they should be in this kind of environment.
- My only concern would be for the safety of humans.