REVIEW OF SOCIAL AND BIOLOGICAL SCIENCE RELEVANT TO WOLF MANAGEMENT IN MICHIGAN

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LIST OF ABBREVIATIONS

BCC	biological carrying capacity
DNR	Department of Natural Resources
LP	Lower Peninsula
MDA	Michigan Department of Agriculture
MSU	Michigan State University
MTU	Michigan Technological University
NLP	northern Lower Peninsula
SCC	social carrying capacity
SLP	southern Lower Peninsula
UP	Upper Peninsula
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

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EXECUTIVE SUMMARY

This document is a review of scientific information pertaining to wolves, wolf-related issues, and wolf-management options in Michigan. Consideration and integration of this information will be critical to efforts to plan wolf management in the State. Evaluation of available science is a necessary component of decision-making; however, wolf-management decisions must also address value conflicts among stakeholders and the acceptability of risks associated with uncertainty. Accordingly, this document does not provide answers to questions of how wolves should be managed in Michigan. Rather, this document facilitates understanding of the potential consequences of certain management approaches, and will thus help managers make decisions based on the best available science.

Wolf Biology and Status

The gray wolf (*Canis lupus*) is Michigan's largest member of the Canidae, or dog family. Wolves are social animals and live in packs. A pack (two or more wolves traveling together, with evidence of breeding behavior) is the functional unit of wolf society, and is typically comprised of two lead or 'alpha' animals, the current year's pups, siblings from previous litters, and occasionally other wolves that may or may not be related to the alpha pair. The alpha male and female normally are the only animals that breed. A pack usually includes 4–6 wolves. Packs live in territories that are actively marked and defended. Territory size depends on the density of wolves and on the density and distribution of prey. Sizes of individual wolf-pack territories identified in Michigan have ranged from 22 to 128 square miles (56–331 km^2). New packs form when subordinate pack members disperse from the pack territory, find animals of the opposite sex, claim and defend a territory, and eventually mate and produce offspring themselves.

Mating takes place in February, dens are dug in March, and pups are born in middle to late April. Litter sizes can vary, but usually include 4–6 pups. Up to 60% of pups may die from disease and malnutrition during their first 6 months. Mortality rates approximate 45% from 6 months to 1 year, and 20% between years 1 and 2. Average annual adult wolf mortality in Michigan is between 24% and 32%. Adults may live past 11 years, but most die much sooner. No animal habitually preys on wolves, but pups occasionally may be killed by bears or other predators. Other natural mortality factors include accidents, malnutrition, starvation, parasites, diseases, and fatal encounters during territorial disputes between packs.

Research in Michigan indicates white-tailed deer (*Odocoileus virginianus*) are the primary prey for wolves during the winter; beaver (*Castor canadensis*), snowshoe hare (*Lepus americanus*) and ruffed grouse (*Bonasa umbellus*) comprise small percentages of winter wolf diet. Research suggests wolf abundance appears to be related to food supply rather than social or territorial restrictions.

In Michigan, the wolf population has shown steady growth since the natural recovery began in the early 1990s. With the exception of 1997, the wolf population has increased

each year, and increased approximately 12–15% each year from 2001 through 2005. Wolves have been found in every county of the Upper Peninsula (UP). Currently, wolf density is higher in the western UP than in the eastern UP.

Wolves and Social Carrying Capacity

The abundance and distribution of wolves in Michigan is influenced by biological carrying capacity (BCC) and social carrying capacity (SCC). The concept of BCC proposes the abundance of any wildlife species is limited by the ability of the available habitat to support it. The concept of SCC proposes the abundance of a wildlife species is limited by the social environment or human tolerance for that wildlife species. Unlike BCC, which defines only a maximum, SCC addresses both the minimum and maximum population levels society will tolerate. Social carrying capacity also is defined by the interactions between humans and wildlife. When stakeholders disagree on what level of interactions is acceptable, issues and conflicts often result. When stakeholders are intolerant of a wildlife situation, they may engage in issue activity (e.g., filing lawsuits, lobbying for legislative changes) that complicates science-based management. The SCC model focuses on the necessity of defining and managing for socially acceptable goals to help prevent the emergence of disruptive conflicts. The model is thus an important tool in the management of a controversial wildlife species such as the gray wolf.

Stakeholders often differ in the minimum and maximum wildlife population levels they will tolerate. An SCC exists when the stakeholder ranges of tolerance (from minimum to maximum) overlap so that socially acceptable goals for wolf abundance and interactions can be set. If overlap among tolerances does not exist, an SCC can be created only by shifting attitudes and tolerances of stakeholders. The SCC model suggests wolf-related conflicts can be reduced by managing (1) wolf abundance and distribution, (2) interactions between wolves and stakeholders (e.g., frequency of livestock depredation) and (3) attitudes and tolerances of stakeholders toward wolves.

A public-attitude survey conducted in 2005 by Michigan State University (MSU) measured the preferences and tolerances of interested citizens regarding levels of wolf abundance and interactions in the UP, northern Lower Peninsula (NLP) and southern Lower Peninsula (SLP). Respondents selected from five situations representing increasing interaction and wolf numbers: Situation 1 involved no wolves and Situation 5 involved the most wolves the habitat could sustain. A statistical procedure called ‘cluster analysis’ placed respondents into one of four groups based on their preference and tolerances: intolerant, least tolerant, mid tolerant, and most tolerant. In all three regions, ‘intolerant’ respondents preferred no wolves, and would not tolerate any wolves. The abundance and interactions preferred and tolerated by the three other tolerance groups differed among the three regions.

Regarding UP wolves, 7% of interested citizens statewide were ‘intolerant,’ 20% were ‘least tolerant,’ 28% were ‘mid tolerant,’ and 32% were ‘most tolerant’ (13% could not be classified). There was little overlap in the tolerances among these groups. One-third of interested citizens would accept no fewer wolves than involved in Situation 3 and

another third would accept no more wolves than involved in Situation 2. No level of wolf abundance was acceptable to a majority of these groups. Therefore, an SCC for wolves in the UP cannot be clearly defined. A shift in stakeholder-group attitudes or a change in the number and type of wolf interactions will be required to create more agreement among the groups.

Interested citizens were less tolerant of wolves in the NLP than in the UP: 13% were classified as 'intolerant,' 10% were 'least tolerant,' 30% were 'mid tolerant,' and 20% were 'most tolerant' (27% could not be classified). Even the most tolerant respondents preferred a lower level of wolf abundance and interactions in the NLP than in the UP. The four tolerance groups were closer in their preferences for wolves in the NLP than in the UP, but the level of disagreement was too great to define an SCC for wolves in the NLP. Lack of a consistent pattern of responses by interested citizens precluded evaluation of SCC for wolves in the SLP.

Tolerance for wolves in both the UP and NLP was highest among SLP respondents and lowest among UP respondents. Compared to non-hunters, hunters tended to be less tolerant of wolves. However, even among these two groups, hunters and non-hunters in the UP were less tolerant of wolves than were their counterparts in southern Michigan.

A livestock-grower survey asked UP and NLP livestock growers about their preferences and tolerances for wolves in the area where they farmed. One-half of the UP growers and more than one-half of the NLP growers preferred no wolves in their farming area. There was a substantial gap between the tolerances for UP wolves expressed by the interested public statewide and by UP livestock growers. Almost two-thirds of the interested public preferred Situation 3 or 4, whereas 80% of UP livestock growers preferred no wolves or the minimum abundance (Situation 1 or 2). Similar differences in preferences and tolerances for NLP wolves were found. Nearly two-thirds of the interested public preferred Situation 3 for the NLP, but two-thirds of NLP livestock-growers preferred no wolves at all. Approximately 80% of the interested public did not accept the absence of wolves as an NLP goal. This difference between livestock growers and the interested public further complicates attempts to define an SCC in both the UP and the NLP.

Managing Wolf Population Size and Distribution

Management of wolf population size and distribution is socially and biologically complex. From a social perspective, wolf population control is controversial and often polarizes stakeholder groups. From a biological perspective, many biological factors (e.g., population size, age and sex structure, birth rates, mortality rates) must be considered to determine the feasibility and effectiveness of potential control methods.

Non-lethal methods of population management include fertility control and translocation. Fertility control has proven to be effective for small-scale predator management in some cases. However, the effectiveness of fertility control has not been established for large-scale population management. Translocation may be a practical method to reduce the number of wolves in areas where populations are small. However, several limitations

are associated with this technique, and translocation in Michigan has become increasingly problematic.

Lethal methods of population control have historically included trapping, snaring, shooting (from the ground or air) and poisoning. These techniques influence population size by increasing mortality rates. Populations vary greatly in the level of mortality they can sustain. The level of mortality required to effectively control a population is determined by many factors, such as population size (current and desired), age and sex structure, immigration and emigration rates, birth rates, and natural and human-induced mortality rates. Moreover, wolf mortality is often compensatory, meaning human-induced mortality can sometimes replace mortality that would otherwise occur due to natural factors, such as starvation, disease or intraspecific aggression.

Recently, wolf-control programs have been carried out by government agencies in Alaska and Canada to reduce wolf numbers in specific areas. The effectiveness of those programs for achieving local management objectives was equivocal. Historically, bounties were effective in reducing or eliminating wolves in local areas, but bounty payments posed a substantial financial burden on government agencies administering them. Poisoning was used in the past to eliminate wolves from certain areas, but is now unacceptable for biological, social and legal reasons.

Results of the 2005 public-attitude survey indicate patterns of public support for management of wolf numbers and distribution were generally tied to the method being proposed. Support for reducing the wolf population by killing a portion of the animals ranged from 49% when addressing deer predation, to 54% when addressing loss of domestic animals, to 59% when the issue was public concern for safety. Fertility control to address any of those three issues was supported by approximately one-half of interested citizens. Three-fourths of interested citizens supported selectively killing problem wolves and also live trapping with relocation to address either public safety concerns or loss of domestic animals.

An alternative to active management of wolf population size and distribution is passive management. Under such an approach, management would not prevent a wolf population from increasing to the maximum size the habitat could support. However, actions of individuals intolerant of wolves above a certain level would likely maintain the population below the maximum potential size. If a population did approach biological limits, natural checks on wolf numbers (e.g., starvation and disease) would occur and wolf-human conflicts would increase. Results of the 2005 public-attitude survey show interested citizens statewide were as likely to agree as to disagree (45% each) with the passive-management approach. Respondents from the UP and the NLP were more supportive of actively managing wolves.

Wolves and Human Safety

Worldwide, most wolf attacks on humans in the past century have involved rabid wolves, habituated wolves, provocation by humans, or highly modified environments. Between 1900 and 2002, confirmed wolf attacks in North America caused two human deaths.

The role of wolves in one human death that occurred in Saskatchewan, Canada in 2005 remains unclear.

Public-safety risks and concerns posed by wolves can be reduced through several management approaches, including reducing the incidence of rabies in the wolf population, providing ample natural prey, and providing the public with information on using non-lethal techniques to help prevent wolf habituation. Wolves can become habituated by having frequent and increasingly closer contact with humans, and by receiving food rewards for their boldness. Aversive conditioning is occasionally used to help prevent habituation of wolves; when aversive conditioning occurs, an object (e.g., rubber bullet) or sound (e.g., siren, cracker shells) is intended to cause discomfort, pain, or an otherwise negative experience for the wolf.

Lethal control is another option to reduce threats to human safety posed by wolves. Under Federal regulations, Michigan Department of Natural Resources (DNR) employees and designated agents can take endangered wildlife, without a permit, to remove animals that constitute a demonstrable but non-immediate threat to human safety. Federal regulations also state that any person may take endangered wildlife in defense of human life.

Results of the 2005 public-attitude survey indicate the risk to human safety posed by wolves is an important concern among Michigan residents. Approximately one-half of interested respondents indicated human-safety issues should be an important factor when considering wolf population goals. Respondents were asked how much importance they would assign to five potential reasons for lowering the number of wolves in an area. 'A concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes' was assigned the greatest importance by interested citizens in all regional samples. Livestock growers in the UP and the NLP were particularly likely to rate human safety as a 'very important' reason to lower the number of wolves in an area; their responses consistently showed they were more sensitive to the matter of fearless and nuisance wolves than was the statewide distribution of interested citizens.

Respondents to the public-attitude survey were asked to express their support or opposition to several management options when applied to three different scenarios of wolf problems: (1) loss of livestock, hunting dogs and pets; (2) public concern over human safety; and (3) deer predation that lowered hunter harvest rates. The management options offered were to: leave wolves alone; selectively kill problem wolves; reduce wolf population size by killing a portion of the wolves; live trap and relocate wolves; and use fertility control to reduce population size. Respondents were most supportive of all options when the problem to be addressed was public safety or loss of domestic animals, and least supportive of options to reduce predation on deer.

Wolf Depredation of Livestock and Dogs

Wolves normally prefer wild prey such as deer, beaver and elk (*Cervus elaphus*), but sometimes kill or injure domestic animals. A depredation event consists of one or more

animals being killed or injured at a given time. Compared to wolf depredation in Minnesota and Wisconsin, verified depredation in Michigan has been relatively rare. More than 900 livestock farms occur in the UP. From 1998 through 2005, 46 wolf depredations were verified on 34 of those farms. However, a survey of UP livestock growers indicated that 31% of them suspected losses to wolves in at least one out of the last 5 years. No wolf depredation has been documented in the Lower Peninsula (LP).

Management of wolf depredation of livestock has included the use of non-lethal and lethal control measures implemented on a case-by-case basis. Techniques that may reduce or prevent wolf depredation of livestock include improved husbandry practices, fencing, livestock-guarding animals, scare tactics, aversive conditioning and lethal control.

Livestock compensation programs were originally designed with the intention of increasing overall public acceptance for wolf recovery by reimbursing livestock growers for losses. Currently, Michigan livestock growers may be compensated for verified losses (losses caused wolf or coyote) through two programs: a State program administered by Michigan Department of Agriculture and a privately funded program administered by the International Wolf Center. Since 1998, almost $20,000 has been paid to livestock growers from these funds. The 2005 public-attitude survey found the majority of UP and NLP livestock growers (84% and 65%, respectively) and the majority of interested citizens statewide (58%) supported the use of tax dollars to compensate for livestock killed by wolves.

According to the 2005 public-attitude survey, the majority (78%) of UP and NLP livestock growers would be satisfied if they were provided compensation for losses, were empowered to remove problem wolves that threaten depredation, and had a Michigan DNR program available to remove problem wolves. The strategy growers preferred most was to allow them to control depredating wolves. However, even with the availability of a preferred management strategy, almost one-half (45%) of livestock growers would remain intolerant of wolves. Most interested citizens statewide were concerned about losses of domestic animals to wolves and strongly supported (75%) the selective killing of problem wolves as well as empowering livestock growers to handle their own problems (88%).

Since 1996, wolves killed or injured at least 31 dogs in Michigan; approximately one-half of the incidents involved hounds used to hunt bears. The 2005 public-attitude survey found a majority of interested citizens was concerned about losses of domestic animals to wolves and strongly supported the selective killing of problem wolves. Hunters who used dogs for hunting strongly supported the selective killing of problem wolves (83%) and killing a portion of a regional wolf population (92%) to reduce depredation of domestic animals. Most interested citizens did not support using tax dollars or hunting and trapping funds from the Michigan DNR to compensate owners of hunting dogs (approximately 33% supported) or pets (approximately 40% supported) for their losses. Hound hunters were more supportive (64%) of using tax dollars to compensate hunters for the loss of hunting dogs.

Wolf-Prey Relationships

The impact of wolves on prey populations has been the subject of numerous scientific studies and has been debated at length by the public. The relationship between wolves and prey is complex and broad descriptive statements cannot be made. In some cases, wolves limit prey populations and in other cases they do not. Ungulates such as deer, moose (*Alces alces*), elk and caribou (*Rangifer tarandus*) are the primary prey species for wolves. The relationship between wolves and prey is influenced by a host of factors that can vary both spatially and temporally. These factors include the number of different prey species available, the number of different predator species in the system, the relative density of wolves and prey in an area, the response of wolves and prey to changes in prey numbers, and the effects of weather and disease on wolves and prey.

Wolves and prey have evolved together and prey species have developed physical and behavioral traits that help them avoid predation. Wolves tend to select more vulnerable individuals, such as the young, old or sick. However, vulnerability is not necessarily determined by age or poor health. Environmental factors, such as deep snow conditions, can make otherwise healthy animals vulnerable to predation. If wolves only killed individuals that would have otherwise soon died from other causes, wolves would have no effect on the prey population. The extent to which wolf predation is additive to other forms of prey mortality has not been adequately studied in wolf-deer systems like that found in Michigan.

Public attitudes concerning wolf-prey relationships varied among regions in Michigan and between hunters and non-hunters. The majority of interested survey respondents believed that having wolves to help control some wildlife populations is a benefit. Three-fourths of SLP residents felt this ecological role of wolves was a benefit, but only about one-half of UP residents shared this view. Hunters were less likely to think wolf predation and its possible effect on wildlife populations was a good reason for having wolves in the State.

Despite the scientific uncertainty regarding the effect of wolves on prey populations, the majority of survey respondents who were hunters believed that healthy wolf populations will result in poorer deer hunting. By contrast, less than one-half of all interested respondents statewide felt that wolves would reduce the quality of deer hunting. Just more than one-half of interested respondents felt the wolf population should be managed if wolves were shown to be reducing deer-hunter success. Nearly three-fourths of hunters supported managing the wolf population if wolves reduce the number of deer available to hunters.

Wolf Harvest as a Recreational Opportunity

Recreational harvest of wolves is a controversial issue that often polarizes stakeholder groups. Wolf harvests have recently occurred in Canada, Alaska, Europe and Asia. In these areas, hunters and trappers annually removed as much as 28% of the wolves in an area, but the populations appeared to remain stable or to increase. However, comparisons between wolf harvests in other areas and a potential public wolf harvest in

Michigan are problematic. Differences in the number of people, access, and habitat conditions limit the utility of such comparisons.

Less than one-half of interested respondents to the 2005 public-attitude survey agreed that potential game status of wolves was a reason to have wolves in Michigan. Non-hunters were almost twice as likely as hunters to indicate that the potential for wolves to become a game species was not a reason for having wolves in Michigan. However, approximately one-half of all interested respondents statewide agreed that a legal, controlled hunting season or trapping season should be created if the wolf population could support it. Approximately two-thirds of interested respondents statewide supported use of licensed hunters or trappers as a means of controlling wolf populations. Of this supportive group, roughly three-fourths also agreed with hunting and trapping for recreational purposes. The greatest difference of opinion on a hunting or trapping season for wolves was between hunters and non-hunters. A hunting season for wolves was supported by 83% of hunters statewide. However, non-hunters were split: 43% supported a season and 42% opposed a season. Most hunters (75%) also supported a recreational trapping season for wolves, but non-hunters were more likely to oppose (51%) than support (36%) a trapping season.

Habitat Linkages and Corridors

Migration and gene flow are important for the long-term persistence of wolves in Michigan and the Great Lakes region, and the current Michigan and Wisconsin wolf plans identify the need to ensure adequate habitat linkages and dispersal corridors among jurisdictions. Wolves are capable of dispersing long distances; movements between the UP and Wisconsin, Minnesota and Ontario have been frequently documented since wolves became re-established in Michigan. Wolves are capable of crossing many potential barriers, such as highways, croplands, rivers and frozen lakes. A series of linear obstacles, however, may be more likely to hinder wolf movements. Analysis of land-use trends in Michigan has indicated sufficient habitat will be available to support a viable wolf population into the future. The amount and configuration of public wild lands in Michigan, Wisconsin, Minnesota and Ontario suggests habitat linkages can be effectively conserved.

Information and Education

Much attention has been given to wolves in recent decades through a variety of media. However, public knowledge of wolves in Michigan remains somewhat poor. Researchers, managers and stakeholder groups generally agree an informed public is important for effective wolf conservation and management. The current Michigan wolf plan identifies education as a high priority.

Wolves tend to produce strong opinions among members of the public. Those opinions are often based on core values, which are resistant to change. The predisposition of people to accept or reject information based on pre-conceived notions and values presents challenges for a wolf education program. Another challenge is to present information that is not biased toward a particular point of view. A third challenge

involves the focus on controversy and extreme opinions characteristic of many popular media reports: the public may receive inaccurate or exaggerated impressions of the extent of wolf-related conflicts. These challenges may be mitigated or overcome by (1) targeting individuals who do not already hold strong opinions about wolves, (2) developing education materials in partnership with organizations trusted by certain stakeholders, and (3) working with the media to foster the presentation of accurate information to large audiences.

Although the Michigan DNR has not developed a comprehensive wolf information and education plan, it does engage in a number of wolf education activities. These activities include presentations to stakeholder groups, responses to public inquires, distribution of wolf-information sheets, promotion of Wolf Awareness Week, development of brochures with information on ways to reduce wolf–livestock and wolf–human conflicts, provision of wolf information on its website, and display of interpretive signs.

Funding for Wolf Management

Since their reestablishment, wolves have become an integral part of Michigan's natural resources and are a necessary focus of Michigan DNR research and management activities. As the wolf population has grown, research and management costs have also increased. Due to long-term commitments to conserve and manage the wolf population, the program will continue to be expensive into the foreseeable future. Funding and personnel involved in wolf research and management in Michigan is provided by a variety of sources, agencies, non-governmental organizations and tribes. The majority of research and management activities in Michigan have been funded by the State, in some cases using Federal dollars earmarked exclusively for State-administered programs. A notable exception in Michigan has been the work conducted by the U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services (USDA Wildlife Services). USDA Wildlife Services personnel have been involved with the wolf program in Michigan since 2000, and have played a key role in research trapping, the winter track survey, training of field staff, and program planning.

INTRODUCTION

This document is a review of scientific information pertaining to wolves, wolf-related issues, and wolf-management options in Michigan. It summarizes the best available biological and social science relevant to these topics, identifying where significant uncertainty remains, as appropriate. The information presented was obtained from published scientific literature, agency and university reports, unpublished agency data, and personal communication with wolf experts. Results of public-attitude surveys and focus-group discussions conducted by MSU in 2005 are presented throughout this document. Detailed methods and results of the MSU research are presented in Appendices I through IX.

This document can be a source of information for anyone interested in wolves and wolf management. Consideration and integration of the scientific information it contains will be critical to efforts to plan wolf management in the State of Michigan, because science allows managers to predict consequences (both social and biological) of particular management actions. Science is thus a tool of primary importance for identifying those actions that could effectively achieve particular wildlife-management goals. The importance of using sound science when making wildlife-management decisions is formalized in the Michigan Natural Resources and Environmental Protection Act (Part 401 of Public Act 451 of 1994).

Although evaluation of available science is a necessary component of decision-making, science alone does not establish wildlife-management goals. Those goals are often determined within a social context where stakeholder values and priorities must be addressed. Therefore, the decision-making process is science-based, but it also depends on social negotiation to resolve stakeholder conflicts inherent in issues. That social negotiation constitutes the 'socio-political' portion of decision making[a]. It is this portion of decision-making, not science, that assigns priorities to the values held by diverse stakeholders with regard to particular management approaches. Science can help predict the biological and social consequences of controlling or not controlling wolf population size, for example, but a socio-political process determines whether the consequences of either option are acceptable.

Science provides the best possible information regarding the probable consequences of certain management decisions, but it generally does not eliminate all uncertainty. In some cases, remaining uncertainty may be small and of little concern; in others, it may be considerable and pose important risks. Those individuals responsible for formulating policy and management plans must determine how to address the risks posed by remaining uncertainty.

[a]The term is preferred over 'political' which technically refers to the processes of government. The wolf planning process is truly an integration of social and political forces and the term seems appropriate.

Wolf-management decisions must be made within a socio-political context that considers value conflicts and acceptability of risks associated with uncertainty. Accordingly, this document does not provide answers to questions of how wolves should be managed in Michigan. Rather, this document facilitates understanding of the potential consequences of certain management approaches, and will thus help managers make decisions based on the best available science.

Basis of Stakeholder Conflicts

Generally, three questions must be answered to understand the basis of stakeholder conflicts associated with wolf management.

1. How effectively can available science and technology predict consequences of wolf management and offer reliable management tools?

As discussed above, existing information from science and technology rarely eliminates all uncertainty. Frequently, decision-making cannot wait for new information and must be based on available information and assessment of risks posed by the uncertainties.

2. To what extent are stakeholder conflicts based on differences in beliefs about what is true in a particular situation?

Whether or not available science can answer particular questions (and especially when it cannot), the public can be expected to disagree on what is true. Stakeholders will disagree about the potential consequences of alternative actions or of no action at all. For example, some stakeholders will believe hunting wolves will endanger the population; others will be confident hunts can be held with no detrimental impact. Differences of opinion about what is true sometimes can be handled by educating stakeholders, but only when 'true' answers are known, and when stakeholders will believe the source of information.

3. To what extent are stakeholder conflicts based on the importance (values) that should be assigned to consequences of particular actions?

Even when available science can answer particular questions and everyone agrees on the consequences of alternative actions, conflict regarding values can still exist. Many Michigan stakeholders place high values on the wolf's existence in Michigan and on what they see as benefits of the species (Kellert 1990, Mertig 2004; see Appendices III through IX for the 2005 MSU public-attitude survey results). Many others do not share those values, at least at the same level, and they place a higher value on the costs and the risks posed by the presence of wolves in the State. Even if these opposing stakeholders agreed on what benefits, costs and risks are associated with wolves in Michigan, the difficult challenge of finding a combination of management approaches to satisfy all stakeholder values would still remain.

Major Issues Identified by Michigan Residents

The following list provides an overview of wolf-related issues that Michigan residents identified as important during a recent series of public meetings, public-attitude surveys, focus-group discussions, and public-comment periods.

- Wolf distribution and abundance
    - What are appropriate goals regarding distribution of wolves in Michigan?
    - What are appropriate goals regarding numbers of wolves in Michigan?
    - What priorities should be set on benefits and costs of wolves to determine appropriate wolf numbers and distribution?
    - What are appropriate methods for managing wolf abundance and distribution in the event that such management is necessary?

- Wolves and human safety
    - What are the risks to humans posed by wolves?
    - What are appropriate methods for preventing or minimizing risks to human safety?

- Wolf depredation on livestock and pets
    - What is the extent of depredation?
    - What are appropriate methods for preventing or minimizing depredation?

- Wolf-prey relationships
    - What are the impacts of wolves on prey populations and other species?

- Recreational harvest
    - Should a regulated harvest of wolves be provided as a recreational opportunity (separate from the question of its possible use as a population control method)?

- Habitat linkages
    - Is habitat connectivity sufficient to allow persistence of a viable wolf population?

- Information and education
    - What importance should be given to outreach efforts (public education) as a means of managing wolf-related issues?

- Funding
    - What are appropriate sources of funding for wolf management?
    - How will funding for wolf management be assured?

This document reviews in detail what is known about the science, public beliefs and public values that apply to each of these issues.

CHAPTER 1: WOLF BIOLOGY AND STATUS

Taxonomy

The recovery plan for the eastern timber wolf (*Canis lupus lycaon*) (U.S. Fish and Wildlife Service 1978, 1992) was written under the assumption that wolves currently and historically inhabiting the northeastern United States were a subspecies of the Eurasian-evolved gray wolf (*C. lupus*). Since then, the taxonomic classification of wolves in the eastern part of the United States, including the Great Lakes region, has been the subject of numerous studies with differing results (e.g., Nowak 1995, Wayne et al. 1995, Wilson et al. 2000). Recently, a genetic analysis suggested the eastern timber wolf is not a subspecies of the gray wolf, but rather a different species (*C. lycaon*) that evolved in North America (Wilson et al. 2000). This putative species has been called the eastern Canadian wolf (Wilson et al. 2000) or eastern wolf (Grewal et al. 2004). The putative eastern wolf is smaller than the gray wolf and may range into northwestern Ontario, Minnesota and Manitoba (Wilson et al. 2000). However, the range of gray wolves also extends into the same area (Nowak 1995). Gray wolves are thought to inhabit Minnesota, but there is some evidence they have hybridized to an unknown degree with eastern wolves (Mech and Federoff 2002). There have been no genetic studies of wolves on the UP mainland (excluding Isle Royale); thus, which species occurs there is not known with certainty. However, wolves from the UP are as large as or larger than wolves found in Minnesota (Theberge and Theberge 2004, D. E. Beyer, Michigan DNR, unpublished data), suggesting they are more similar to gray wolves than eastern wolves.

Description

The wolf is Michigan's largest member of the Canidae, or dog family. Other native Michigan canids are the coyote (*Canis latrans*), red fox (*Vulpes vulpes*) and gray fox (*Urocyon cinereoargenteus*). Wolves are larger than coyotes, with body dimensions exceeding those of a fully grown German shepherd or Alaskan malamute. In Michigan, weights of adult gray wolves range from 58 to 112 pounds (26–51kg), with males (average: 87 lbs; 39 kg) weighing slightly more than females (average: 76 lbs; 34 kg). Wolves are approximately 6 feet (1.8 m) long from the nose to the end of the tail. Adults stand 30–34 inches (75–85 cm) tall at the shoulder. The feet of wolves are large, with tracks measuring 3.5–4 inches (9–10 cm) wide and 4.5–5 inches (11–13 cm) long. Wolves have cheek tufts that make their faces appear wide and their heads large. Their tails are bushy and straight, not curled like those of most dogs.

Wolves are predators well-adapted to cold and temperate climates. The dense underfur in their winter coats is protected by guard hairs that may be up to 6 inches (15 cm) long over the shoulder. Their skeletal and muscular structures make them well-adapted to travel. They have tremendous stamina and often spend 8–10 hours per day on the move, primarily during early morning and evening.

Social Structure and Behavior

The life of an individual wolf is centered on a distinct family unit or pack (Baker 1983). The basic functional unit of a pack is the dominant breeding pair, often called the 'alpha' pair (Mech and Boitani 2003*a*). A pack is typically comprised of these two dominant animals, their pups from the current year, siblings from previous litters, and occasionally other wolves that may or may not be related to the alpha pair (Young and Goldman 1944, Stenlund 1955, Mech 1966). A dominance hierarchy occurs within the pack, where each member occupies a rank or position (Mech 1970). The alpha male and female are normally the only animals that breed, but there are exceptions (Ballard et al. 1987).

Based on ten studies, the average pack size of wolves that prey primarily on deer (*Odocoileus* spp.) is 5.7 (Fuller et al. 2003). This size is similar to the most recent estimate of mean pack size in Minnesota (mean=5.3; Erb and Benson 2004). Average pack size in Michigan in winter 2005 was slightly lower, suggesting pack size may still increase (B. Roell, Michigan DNR, unpublished data; Table 1.1).

Table 1.1. Summary of wolf pack composition data collected during the winter wolf population surveys in the Upper Peninsula of Michigan, 2000–2005 (B. Roell, Michigan DNR, unpublished data).

Year	*n* Packs[a]	*n* Pairs	*n* Loners	$\bar{x}$ Pack size	Range
2000	63	27	14	3.2	2–7
2001	70	33	5	3.5	2–11
2002	63	17	8	4.3	2–10
2003	68	18	11	4.6	2–14
2004	77	24	6	4.6	2–12
2005	87	24	6	4.6	2–13

[a]A pack is defined as two or more animals. The number of packs includes the pairs that are listed in the second column.

Wolves establish and maintain territories (Ballard et al. 1987, Fuller 1989, Mech and Boitani 2003*a*). Howling between packs and scent-marking along territory edges are the principal means of spacing in wild wolf populations. Territory size can vary greatly and depends upon the density of wolves and on the density and distribution of prey. Estimates of territory size also vary depending on the calculation methods used and the number of telemetry relocations (Fritts and Mech 1981, Bekoff and Mech 1984, Mech et al. 1998).

Sizes of individual wolf pack territories in the UP have ranged from 22 mi^2 to 128 mi^2 (56–331 km^2) and in 2004, averaged 65 mi^2 (169 km^2) (Huntzinger et al. 2005). Average pack territory size has decreased approximately 37% from 2000 to 2004 as the UP wolf population has increased (Huntzinger et al. 2005).

Reproduction

Some wolves which were held in captivity were capable of breeding at 9–10 months of age (Medjo and Mech 1976), but wild wolves typically reach sexually maturity at 22 months of age (Mech 1970, Fuller 1989). Mating takes place in February, dens are dug in March, and pups are born in middle to late April (Peterson 1977, Fuller 1989).

Litter sizes can vary, but usually include 4–6 pups (Mech 1970). Pups are born with their eyes and ears closed and lack the ability to properly regulate their body temperature (Mech 1970). Pups' eyes open when they are between 11 and 15 days old (Rutter and Pimlott 1968, Mech 1970). When they are approximately 3 weeks old, pups emerge from their dens and can be found playing nearby (Young and Goldman 1944). Pups are weaned at approximately 9 weeks and moved to a rendezvous site. By the time pups are 4–6 months old, they are nearly as large as an adult wolf (Carbyn 1987).

Causes of Mortality and Survival Rates

Annual mortality of wolves can fluctuate widely from year to year. Up to 60% of pups may die from disease and malnutrition during their first 6 months of life. Mortality rates approximate 45% from 6 months to 1 year, and 20% between years 1 and 2 (Pimlott et al. 1969, Mech 1970, Mech and Frenzel 1971, Van Ballenberghe et al. 1975, Fritts and Mech 1981). Annual adult wolf mortality in Wisconsin averaged 39% during a period of population decline, and 19% during a period of population increase (Wydeven et al. 1995). Adults may live past 11 years, but most die much sooner (Mech 1988). No animal habitually preys on the wolf, but pups may occasionally be taken by bears (*Ursus* spp.) or other predators. Both moose and deer have injured or killed wolves (Nelson and Mech 1985, Mech and Nelson 1989). Other natural mortality factors include accidents, malnutrition, starvation, parasites, diseases, and fatal encounters during territorial disputes between packs. Human-caused mortality includes vehicle strikes and illegal shooting.

Causes of wolf mortality are often compensatory (Mech 2001, Fuller et al. 2003). For example, human-induced mortality can sometimes replace mortality that would otherwise occur due to natural factors, such as starvation, disease or intraspecific aggression (Fuller et al. 2003). Studies in Minnesota and Denali National Park, Alaska, where wolves are not harvested, reported that approximately 10% of the wolves in each population were killed by other wolves (Mech 1977*a*, Mech et al. 1998). By contrast, in areas of Alaska where wolves were legally harvested, mortality due to intraspecific aggression was much lower (Peterson et al. 1984, Ballard et al. 1987, Ballard et al. 1997). This comparison supports a conclusion that mortality caused by other wolves is compensatory to that caused by harvesting (Mech 2001).

In Michigan, illegal killing of wolves accounted for 40% of radio-collared wolf mortality during 1999–2004 (Table 1.2). Wolves with radio-collars could be more or less likely to be killed illegally because radio-collars can be visible when wolves are sighted. If radio-collared wolves are less likely to be killed, then the actual proportion of mortality due to illegal activity could be higher. Almost 60% of the radio-collared wolf mortality is directly

related to humans. It is important to note these estimates of mortality are biased because captured wolves were vaccinated for a variety of diseases and treated for mange prior to 2004. These handling protocols may have reduced the amount of natural mortality observed in the Michigan sample.

Table 1.2. Causes of mortality for radio-collared wolves in the Upper Peninsula of Michigan for bioyears[a] 1999–2004 (B. Roell, Michigan DNR, unpublished data).

Mortality factors	1999	2000	2001	2002	2003	2004	Total	Percentage
Unknown	1	0	2	2	1	2	8	16%
Natural[b]	1	1	3	2	2	4	13	26%
Illegal killing	1	1	3	5	3	7	20	40%
Vehicle	2	1	0	2	3	1	9	18%
Total	5	3	8	11	9	14	50	100%

[a]Bioyear is defined as April 15 to April 14.
[b]Natural causes include wolf, mange, stress and pulmonary congestion.

Huntzinger et al. (2005) estimated annual survival of radio-collared wolves in the UP from 1999 to 2005. Two sets of annual survival rates were calculated. In the first set, missing wolves were censored and their survival rate was assumed to be the same as that of collared wolves which were monitored. The second set of annual estimates assumed a worse-case scenario in which missing radio-collared wolves all died. The best estimate of survival is expected to be found somewhere between the two sets.

Estimates of annual survival rate varied between 65% and 85% (average of 76%) when survival of missing wolves was considered to be the same as monitored wolves and between 54% and 82% (average of 68%) when missing wolves were assumed to have died (Figure 1.1). The average difference between the two estimates was approximately 8%, which could be important biologically (Huntzinger et al. 2005). Although the confidence limits were large and the estimates varied annually, there was no trend in annual survival. In other words, survival of wolves did not increase or decrease with time. Huntzinger et al. (2005) also evaluated seasonal patterns of survival and found, on average, summer survival (≈0.94) was higher than winter survival (≈0.79).

Immigration and Emigration

Most wolves disperse because animals rarely assume a breeding position within their natal packs (Mech and Boitani 2003*a*). Wolves are capable of dispersing long distances and movements greater than 500 mi (800 km) have been reported (Ballard et al. 1983, Fritts 1983, Boyd et al. 1995). A male wolf captured and tagged in Gogebic County, Michigan in 1999 was later killed near Trenton, Missouri in October 2001. The straight-line distance between the two points is 457 mi (756 km). Dispersal rates vary geographically and temporally with no clear differences between sexes (Mech and Boitani 2003*a*).

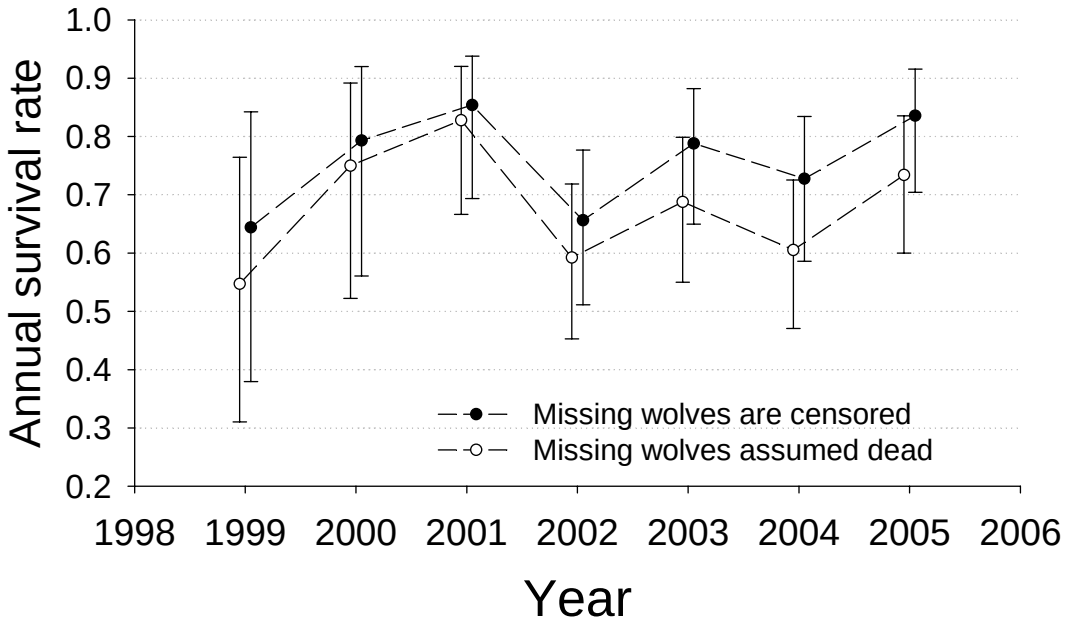


Figure 1.1. Comparison of annual survival rates of radio-collared wolves in Michigan for two sets of assumptions: annual survival of censored wolves is considered equal to that of monitored wolves (black circles) and missing wolves are assumed dead (open circles) (Huntzinger et al. 2005). Circles represent expected rates of survival, and vertical bars represent 95% confidence intervals. A year is defined as 16 October of the previous year through 15 October of the year indicated on the x-axis.

Movements of wolves among Minnesota, Wisconsin and Michigan have been confirmed through the recovery or observation of marked animals (ear-tagged and/or radio-collared) (Mech et al. 1995, A. P. Wydeven, Wisconsin DNR, unpublished data, D. E. Beyer, Michigan DNR, unpublished data). There is also evidence of wolf movements between the eastern UP and Ontario across Whitefish Bay and the St. Mary's River (Jensen et al. 1986, Thiel and Hammill 1988). Movements and gene flow among these jurisdictions helps preserve or enhance genetic diversity within populations and helps mitigate the effects of detrimental demographic fluctuations due to environmental catastrophes (Simberloff and Cox 1987, Boitani 2000).

Wolf Food Habitats

Wolves prey on a variety of wildlife species, and predation on those species often changes seasonally and geographically (Voigt et al. 1976, Fritts and Mech 1981, Potvin et al. 1988, Fuller 1989, Mech and Peterson 2003). In general, prey abundance, distribution, vulnerability and behavior influence a prey species' importance to wolves as a food source. In multiple-prey systems, the more-vulnerable species commonly predominates as the main food source for wolves (Van Ballenberghe et al. 1975, Fritts

and Mech 1981). In Minnesota, white-tailed deer, moose and beaver comprise the majority (>75%) of annual wolf diet. The predominance of deer remains in wolf scat indicates deer are the principal prey throughout the year despite relatively high densities of moose (Van Ballenberghe et al. 1975).

Seasonal variation, or prey switching, is known to occur in most wolf populations and is usually associated with changes in prey abundance or vulnerability. For example, during spring and early summer months, beaver become an important food source (Van Ballenberghe et al. 1975, Voigt et al. 1976, Fritts and Mech 1981, Potvin et al. 1988, Fuller 1989). In June and July, wolves are thought to prey heavily on deer fawns and moose calves when they are more vulnerable and occur in relatively high densities (Voigt et al. 1976, Fritts and Mech 1981, Fuller 1989). Mandernack (1983) analyzed scats of Wisconsin wolves to determine the relative abundance of prey species in their diet. Deer comprised 55% of the diet, beaver comprised 16%, snowshoe hare comprised 10%, and other small mammals and miscellaneous items comprised 20%. Beaver provided as much as 30% of a Wisconsin wolf's spring diet.

In the UP, white-tailed deer and moose constitute the ungulate prey available for wolves. However, moose are rarely preyed upon by wolves, probably due to the lack of overlap in distribution with wolf pack territories, the low abundance of moose in comparison to deer, and differences in vulnerability (D. E. Beyer, Michigan DNR, personal communication). Research in Michigan indicates deer are the primary prey item for wolves during winter, with smaller animals such as beaver, snowshoe hare and ruffed grouse making up minimal percentages of their diet (Huntzinger et al. 2004). Early studies in the UP found wolves ate shrews, snowshoe hares, red squirrels (*Tamiasciurus hudsonicus*), mice, ruffed grouse, crayfish and grass in addition to white-tailed deer (Stebler 1944, 1951).

Wolf-Prey Interactions

The influence of wolves on prey populations has been the topic of much research and debate. Results of public meetings, public-attitude surveys, focus-group discussions and public-comment periods indicate many Michigan residents are concerned about the extent to which wolves may be reducing deer numbers (R. B. Ben Peyton, MSU, personal communication). Research has shown the level of impact depends on local conditions. In some situations, wolves may significantly reduce local prey populations, whereas in others, the impact may be negligible (Mech and Peterson 2003). The wolf-prey relationship is complex and is influenced by many factors, including the number of prey species in a system, the relative densities of wolves and prey, the responses of both wolves and prey to fluctuations in prey densities, and the effects of environmental influences (e.g., winter severity and disease) on wolves and prey (Mech and Peterson 2003). Each of these factors varies geographically and temporally; thus, there is no general answer to the question of how wolves affect prey densities. A more detailed discussion of wolf-prey interactions is presented in Chapter 6: Wolf-Prey Relationships.

Ecological Function

Wolves are a top predator and can have a major influence on the ecological systems in which they live (Mech and Boitani 2003*b*). Primary effects of wolves include the removal of less-fit individual prey, control of prey numbers, and increased availability of food for scavengers (Mech 1970). Wolves may also limit populations of competitors such as coyotes (Crabtree and Sheldon 1999). These primary effects can also cause changes (indirect effects) in other elements of the ecosystem. These indirect effects have been termed 'trophic cascades' (Paine 1966) because changes at one trophic level (e.g., carnivores such as wolves) cause changes at another trophic level (e.g., herbivores such as deer).

On Isle Royale, McLaren and Peterson (1994) documented a top-down trophic cascade among wolves, moose and balsam fir (*Abies balsamea*). In this system, wolves controlled moose numbers and moose controlled growth of balsam fir. A similar relationship has been observed in Yellowstone National Park after wolves were reintroduced. Wolf predation on elk is allowing several tree species, which were formerly limited by elk browsing, to recover (Ripple and Larsen 2000, Ripple et al. 2001, Ripple and Beschta 2003). The mechanism that starts the trophic cascade may be direct (wolves limit prey numbers; McLaren and Peterson 1994), or indirect (risk of wolf predation causes a change in ungulate behavior and browsing patterns; Ripple and Beschta 2004). The interactions of lethal and non-lethal effects of predation are not yet well understood (Ripple and Beschta 2004).

Wolf Habitat

Wolves are habitat generalists and have the potential to occupy areas with an adequate abundance of hoofed prey (Fuller 1995). Given sufficient prey, the chance of an area being occupied and the number of wolves that could be supported is related to the proximity of source populations and the extent of human-caused mortality (Fuller 1995).

Road density has been used as an index of wolf–human contact and appears to be related to illegal and accidental killing of wolves (Mladenoff et al. 1995). A spatial habitat model based on road density has been used to predict areas of wolf re-colonization in the northern portions of Minnesota, Wisconsin and Michigan (Mladenoff et al. 1995). This model predicted a road-density threshold of 0.72 mi/mi^2 (0.45 km/km^2): wolves would be unlikely to occupy areas with road densities higher than this threshold. Although the model successfully predicted wolf occupancy in northern Wisconsin (Mladenoff et al. 1999), the results for the UP were questionable because areas of low prey (deer) density (Doepker et al. 1995) were identified as suitable habitat. Areas with low deer density are unlikely to be occupied by wolves. Recognizing this problem, Potvin et al. (2005) developed a spatial habitat model for the UP that incorporated measures of road density and deer density. This model identified a road-density threshold of 1.1 mi/mi^2 (0.7 km/km^2) and a deer-density threshold of 6–15 deer/mi^2 (2.3–5.8 deer/km^2). The deer-density threshold is near the point where wolves become nutritionally stressed (Messier 1987). The two models produced similar estimates of habitable area (Mladenoff et al. 1999: 11,331 mi^2 or 29,348 km^2; Potvin et

al. 2005: 10,695 mi^2 or 27,700 km^2) but differed in how the suitable habitat was distributed. The Potvin et al. model predicted most occupiable habitat is in the southern portion of the UP. By contrast, the Mladenoff et al. model suggested many areas in the northern portion of the UP will be occupied.

Using an earlier version of the Potvin et al. (2005) model, Potvin (2003) estimated the NLP contained approximately 3,089 mi^2 (8,000 km^2) of suitable wolf habitat. Gehring and Potter (2005) applied the Mladenoff et al. (1995) model to the NLP and estimated 1,634 mi^2 (4,231 km^2) of suitable habitat was available. Both modeling efforts suggested wolf habitat in the NLP is more fragmented than habitat in the UP.

Biological Carrying Capacity

Biological carrying capacity is generally defined as the number of animals the available habitat can support. Estimates of biological carrying capacity are of interest, but are usually imprecise. Wolf numbers appear to be related to food supply (Mech and Peterson 2003) rather than social or territorial restrictions (Packard and Mech 1980). There is a general relationship between wolf density and prey density (Fuller 1989, Fuller et al. 2003), but prey density is not equivalent to food supply because some prey are not vulnerable. Potvin (2003) used an estimate of the relationship between wolf density and deer density (Fuller 1989) to estimate the number of wolves the UP and NLP could support. The estimates of deer density in Michigan were based on counts of deer pellet groups. Estimates derived by the pellet-group count technique are sensitive to the estimate of the average number of deer pellet groups an individual deer deposits per day. Estimates of this deposition rate range from 13 to 31 pellet groups per day (Ryel 1971, Rogers 1987). Potvin (2003) used the ends of the range of pellet-group deposition to bound his estimates of carrying capacity. He estimated the carrying capacity of the UP ranged from 590 to 1,330 wolves. The carrying capacity of the NLP ranged from 210 to 480 wolves. Obviously, the estimates of carrying capacity vary considerably because of the uncertainty in the estimate of pellet-group deposition rate. Importantly, the uncertainty associated with the model that describes the relationship between wolf and deer density is not reflected in Potvin's carrying capacity estimates. The uncertainty associated with estimates of carrying capacity limits their value for making management decisions.

Population Viability

The goal of Michigan's current wolf management plan (Michigan DNR 1997) is to ensure the long-term survival of a self-sustaining wolf population. The plan adopted the definition of a viable isolated population identified in the Eastern Timber Wolf Recovery Plan (U.S. Fish and Wildlife Service 1992) as a recovery criterion. When the wolf population maintained a level of 200 or more wolves for 5 consecutive years, the species could be removed from the State's list of threatened and endangered species. This criterion reflected a conservative approach because the wolf population in the UP is not isolated. Movement of radio-collared wolves among Minnesota, Wisconsin and Michigan has been documented (D. E. Beyer, Michigan DNR, unpublished data).

Population viability analyses have been conducted for wolves in Wisconsin and Michigan (Rolley et al.1999, Hearne et al. 2003). These analyses can aid understanding of population dynamics (White 2000) and help identify information gaps. However, resulting estimates of minimum population sizes necessary to avoid extinction should be viewed with great caution because of uncertainty of inputs such as frequency of catastrophic events and effects of environmental fluctuations (Fritts and Carbyn 1995).

History of Wolves in Michigan

The wolf has been part of Great Lakes fauna since the melting of the last glacier and as such is native to the land area known as Michigan. Stebler (1951) suggested that pioneer documents and museum specimens of gray wolves show wolves were once present in all counties of Michigan.

Throughout the history of aboriginal peoples of present-day Michigan, wolves figured prominently in tribal culture and beliefs. For example, the wolf is a sacred clan animal among the Anishinaabe people (Ojibwe). In the Anishinaabe creation story, Ma'iingan (i.e., the wolf) is a brother to the Original man. Ma'iingan and man traveled together to name and visit all the plants, animals and places on earth. Later, the Creator instructed them to walk their separate paths, but indicated each of their fates would be always tied to that of the other. They would be feared, respected and misunderstood by the people that would later join them on earth (Benton-Banai 1988).

Settlers brought their wolf prejudices with them (Lopez 1978). European werewolf mythology, fairy tales, and religious beliefs, along with views that wolves were incompatible with human civilization, resulted in the persecution of wolves in Michigan as well as the rest of the United States. This practice led to the near-extermination of wolves in the contiguous United States.

The United States Congress passed a wolf bounty in 1817 in the Northwest Territories, which included what is now Michigan. A wolf bounty was the ninth law passed by the first Michigan Legislature in 1838. A wolf bounty continued until the period between 1922 and 1935, when a State trapper system was in effect. The bounty was reinstated in 1935 and repealed in 1960, only after wolves were nearly eliminated from the State. Michigan wolves were given legal protection in 1965.

By the time bounties were imposed in the 1800s, wolves were nearly extirpated from the SLP. They were absent from the entire LP by 1935, if not sooner (Stebler 1944). In the more sparsely settled UP, the decline was less precipitous. In 1956, the population was estimated at 100 individuals in seven major areas in the UP (Arnold and Schofield 1956). The Michigan wolf population was estimated at only six animals in the UP in 1973. Sporadic breeding and occasional immigration of wolves from more-secure populations in Ontario and Minnesota were postulated as the factors that maintained the small number of wolves in the UP (Hendrickson et al. 1975). It is likely that a few animals persisted in remote areas of the UP and that wolves were never completely extirpated from the State.

Beginning around 1973, the wolf population in Minnesota began to expand southward from its northern range. In 1975, a pack of wolves occupied a territory which included part of Douglas County, Wisconsin (Thiel 1993). This signified the beginning of re-occupation of former wolf range in Wisconsin. Since 1975, the wolf population in Wisconsin has grown to more than 425 animals occupying suitable habitat in the northern counties (Wydeven and Wiedenhoeft 2005). Wolves occupying the UP are probably descendants of immigrants from Wisconsin (Thiel 1988) and Minnesota (Mech et al. 1995).

Only one wolf reintroduction has been attempted in Michigan. Four wolves from Minnesota were released in Marquette County in March 1974 and all died as a result of direct human activities between July and November 1974. These wolves did not reproduce and did not contribute to the current wolf population (Weise et al. 1975).

Current Status and Distribution in Michigan

A winter wolf survey has been used to monitor the status of Michigan wolves and has been important for documenting the recovery of the population. The purpose of the winter wolf survey is to determine a minimum estimate of the number of wolves in the UP, excluding Isle Royale. The winter wolf survey consists of an intensive and extensive search of roads and trails throughout the UP for wolf tracks, scats and other sign. The search is systematic and guided by citizen observations of wolves, previous winter survey results, and movement information collected on radio-collared wolves. The survey also incorporates observations of packs with radio-collared wolves made from fixed-wing aircraft.

The integrity of the minimum population estimate is maintained by using established procedures designed to avoid double-counting of wolves. Details of the survey procedures are presented in Potvin et al. (2005).

The wolf population has shown steady growth since the natural recovery began in the early 1990s (Figure 1.2). With the exception of 1997, the wolf population has increased each year, and increased approximately 12–15% each year from 2001 through 2005. If this population growth rate is maintained, the population size will double in 5–6 years. However, the growth rate is expected to decline as the population approaches carrying capacity (Huntzinger et al. 2005).

Wolves have been found in every county of the UP, but they have been absent in Keweenaw County in some years. Wolf density is higher in the western UP (approximately 12 wolves/1000km^2 in 2005) than in the eastern UP (approximately 7 wolves/1000km^2 in 2005) (Huntzinger et al. 2005). Wolves may not be able to establish year-round territories in the deep snow areas of the northern UP because of low deer density during the winter (Potvin et al. 2005).

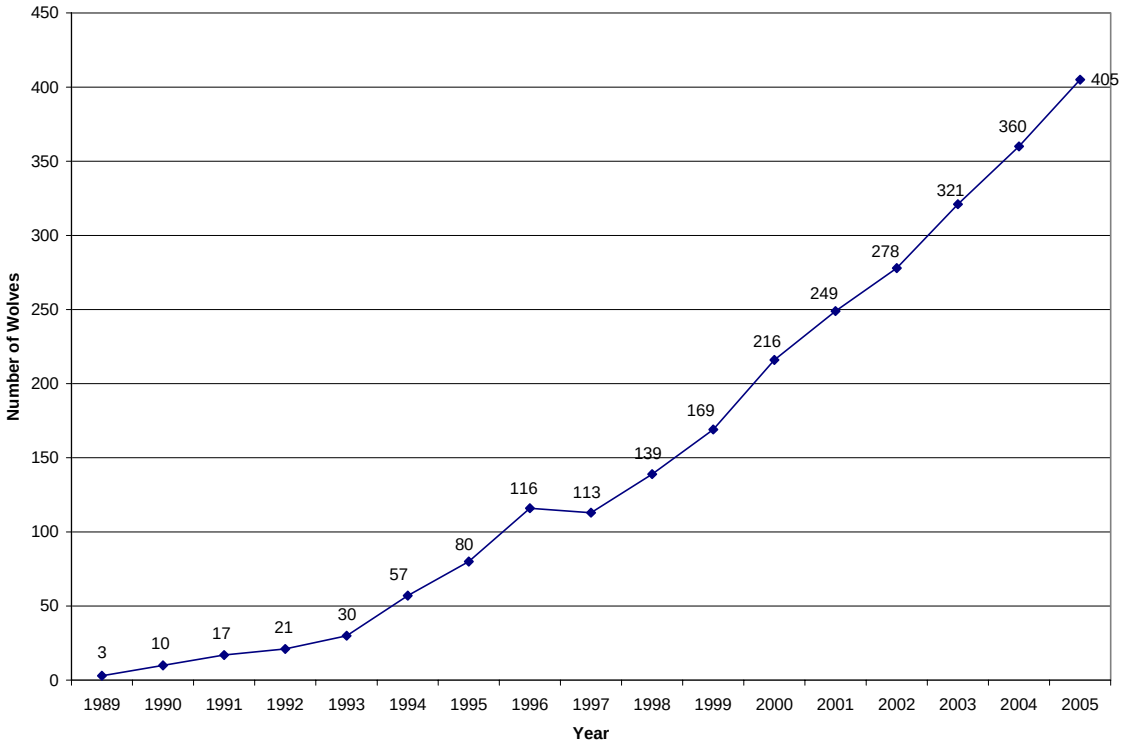


Figure 1.2. Minimum estimates of the number of wolves in Michigan's Upper Peninsula, 1989–2005 (B. Roell, Michigan DNR, unpublished data).

In October 2004, a wolf that had been captured and radio-collared in the eastern UP was captured and killed by a coyote trapper in Presque Isle County of the LP. This event represented the first verification of a wolf in the LP in at least 65 years. Tracks of two other wolves were found in the same vicinity of Presque Isle County in December 2004. However, winter track surveys during 2005 and 2006 failed to confirm the presence of any wolves in the NLP.

Population estimates of wolves in Michigan have been characterized by some members of the public as grossly underestimating the actual population size. During a 5-year period (2001–2005), two independent wolf surveys were conducted in a 750-mi^2 (1,940-km^2) area to evaluate the Michigan DNR population estimates (B. Huntzinger, Michigan Technological University, unpublished data). The surveys were conducted by DNR and Michigan Technological University (MTU). No communication on survey results between the two groups was allowed until each year's survey was completed. The MTU crew spent the majority of the winter counting and recounting wolves in the study area, whereas the DNR crew spent much less time in the area. Thus, it was assumed that the MTU estimates would be more accurate. Overall, the counts were similar, suggesting the DNR survey results are reliable (Table 1.3).

Table 1.3. Two independent wolf-population counts conducted by the Michigan Department of Natural Resources (DNR) and Michigan Technological University (MTU) during five winters in a 750-mi^2 (1,940 km^2) area in the Upper Peninsula of Michigan (B. Huntzinger, MTU, unpublished data).

	2001		2002		2003		2004		2005	
Pack	DNR	MTU	DNR	MTU	DNR	MTU	DNR	MTU	DNR	MTU
Ewen	6	5	3	3	3	3	4	4	4	6
Baraga Pl.	5	5	7	8	7	7	7	7	8	8
Clear Cr.[a]	–	–	0	0	0	3	0	2	0	4
Silver Mt.[a]	–	–	0	0	0	2	0	0	0	2
Sidnaw	–	–	4	4	3	3	8	4	11	6
Trout Cr.	–	–	5	5	2	2	4	6	4	5
Gardner	–	–	–	–	6	5	9	8	7	3
Curwood	–	–	–	–	9	11	3	4	5	2
Loners	0	1	0	0	0	2	0	3	0	1
Totals	11	11	19	20	30	38	35	38	39	37

[a]These packs may be included in the Baraga Plains pack by the DNR.

Isle Royale

Isle Royale is a 210-mi^2 (544-km^2) island in northwestern Lake Superior. The nearest mainland is Ontario, 15 miles northwest of the island. Isle Royale National Park was authorized by Congress in March 1931 by President Herbert Hoover "to conserve a prime example of North Woods Wilderness," but was not established until April 1940 by President Franklin D. Roosevelt.

Protection of the native flora and fauna became the primary management goal on the island. The first evidence of moose was thought to have been found in 1904 (Peterson 1995*a*). Prior to the arrival of moose on Isle Royale, the primary large mammals were the woodland caribou (*Rangifer tarandus caribou*), lynx (*Lynx canadensis*) and coyotes. Wolves were first thought to have arrived in 1948 when a few tracks were reported (Mech 1966, Peterson 1995*a*). A failed attempt to release four captive wolves from the Detroit Zoo occurred in 1952 (Peterson 1995*a*). When wolves arrived naturally on the island, they found a substantial moose population, which became their primary food source.

The wolf and moose populations on the island followed a pattern of dynamic fluctuations, wherein high moose numbers (particularly older moose) were followed by high wolf numbers. Wolves influenced moose numbers predominantly through the direct killing of calves and have remained the only consistent source of moose mortality on the island. The moose–wolf population patterns held until a dramatic crash occurred in the wolf population in the early 1980s, in which wolf numbers dropped from 50 to 14. There is circumstantial evidence the decline in wolf numbers was related to the

introduction of canine parvovirus (Peterson 1995*a*, Kreeger 2003). Wolf reproduction progressively declined during 1985–1992; numbers dropped to their lowest level (a dozen animals). The moose population grew steadily throughout the 1980s and 1990s, but the wolf population increased more slowly. The wolf population increased to 30 animals in 2005, one more than the previous year (Peterson and Vucetich 2005). Recently, the moose population has declined to the lowest level since monitoring began and a reduction in wolf numbers is expected (J. Vucetich, MTU, personal communication).

CHAPTER 2: WOLVES AND SOCIAL CARRYING CAPACITY

Introduction

Management of wolf population size and distribution involves two major categories of issues: (1) establishing goals and (2) selecting methods to achieve those goals. This chapter discusses the social issues associated with establishing goals for wolf abundance and distribution in Michigan. The next chapter (Managing Wolf Population Size and Distribution) discusses the biological impacts and social acceptability of the management options for achieving established goals.

The next section introduces the idea of social carrying capacity (SCC) and how it relates to the problem of setting goals for wolf abundance in the State. The following section describes the extent SCC for wolves in Michigan can defined based on the 2005 public-attitude surveys.

The SCC model used here is intended to organize an understanding of public attitudes regarding wolf abundance and distribution in Michigan. The model proposes that some level of wolf abundance must be acceptable to most stakeholders for an SCC to exist. Otherwise, any level of abundance will create conflict and threaten to disrupt a wolf-management program. The SCC is not simply the highest level of wolf abundance that will be accepted. The abundance that different stakeholder groups prefer and the minimum abundance they will tolerate are also critical points in the description of an SCC. The model also identifies three management targets: (1) wolf abundance; (2) wolf-human interactions; and, (3) human attitudes and tolerances regarding wolves. The model measures success by whether issues associated with the presence of wolves are manageable, or whether they are disrupting attempts at management.

Background on Social Carrying Capacity

The number and distribution of wolves in Michigan, as well as wolf-management approaches, will ultimately be influenced by both biological and social carrying capacities. The concept of biological carrying capacity (BCC) proposes that the abundance of any wildlife species within a given geographical space is limited by the ability of the biological environment to support it. The BCC is a function of the habitat. Habitat is a system comprised of many interacting environmental components such as food, water, shelter and space (discussed in more detail in Chapter 1: Wolf Biology and Status). The BCC can be managed to support more or fewer wolves by increasing or decreasing those components. Alternatively, attempts could be made to manage the wolf population to ensure it fits the existing carrying capacity of the habitat.

Social carrying capacity is a similar notion proposing that human society represents a social environment also capable of setting limits on the number and distribution of a wildlife species. However, BCC and SCC differ in important ways. First, BCC addresses only the maximum population size that can be sustained. Social carrying capacity is defined by both the maximum and minimum population sizes society will

tolerate. That is, Michigan society may not tolerate too many wolves, but it may not tolerate too few either. Second, whereas BCC focuses only on wildlife population size and distribution, SCC is also defined by the interactions between humans and a wildlife species. Issues and conflicts are created when stakeholders disagree on what level of interactions is acceptable. The status of such wolf-related issues is a critical feature of the SCC model. Wolf management can be less about management of wolves than about managing the issues created by wolf-human interactions and differences in stakeholder tolerances regarding those interactions.

Wolf-human interactions can be negative or positive. Negative interactions can occur, for example, in the form of depredation of domestic animals and threatening wolf behaviors. Some positive interactions, such as opportunities for studying, viewing or listening to wolves, are equally direct but most are more indirect and tend to be less measurable. Nonetheless, they are highly valued by some stakeholders and an important component of their tolerances and preferences for wolf abundance. For example, many stakeholders value the existence of a vigorous, widespread population of wolves and would not tolerate a situation where the population was reduced to some unacceptable minimum level. In some cases, an interaction can be viewed as positive by some stakeholders and negative by others. Wolf predation on deer may be a negative interaction for a hunter but a positive one for a farmer experiencing crop damage by deer.

When stakeholder tolerances are exceeded by too few or too many interactions, the resulting issues can disrupt planned management programs. Issue activity can be expressed as a demand for agency response to a perceived problem, but it can also be an action that seeks resolution through litigation or legislative means. Judicial and legislative procedures remove the management decision from the purview of resource agencies. At that point, the agencies no longer have the opportunity to seek ways to resolve conflicts by addressing public tolerances, wolf-human interactions and/or wolf abundance. It is in the best interest of all stakeholders and the natural resource for agencies to seek resolution of issues before they become disruptive. This makes the concept of SCC an extremely important one.

A regional SCC for wolves is defined by the level of abundance and interactions acceptable to enough stakeholders such that there is a low level of wolf-related issues (Minnis and Peyton 1995). When wolf abundance and interactions with stakeholders fall within a range that most stakeholders can accept, wolves are being managed within SCC. If there is no range that is agreeable to key stakeholders, an SCC does not exist and could only be created by shifting attitudes and tolerances of stakeholders. Similarly, as with BCC, there is the potential to change SCC to support more or fewer wolves, or to manage the abundance and distribution of wolves to fit an existing SCC. The SCC model suggests three specific factors that can be targeted by management to reduce wolf-related issues: (1) the abundance and distribution of wolves; (2) the interactions between stakeholders and wolves; and (3) the attitudes and tolerances of stakeholders. They are each important as three separate management targets, but they are often related.

Figure 2.1 shows the tolerances and preferences for wolves in the UP of a single hypothetical stakeholder group. The x-axis could be either a range of 'wolf-human interactions' or a range of 'wolf abundance.' Both are used in this example. Stakeholders most often react to the 'interactions' with wolves, but those interactions are linked to wolf abundance. The figure suggests three hypothetical points for this group regarding wolf population levels: (1) the minimum level it will tolerate; (2) the maximum level it will tolerate; and (3) the level it prefers. The minimum level could be considered a 'minimum demand' for wolves and the maximum is a 'wolf acceptance capacity.' Between this minimum and this maximum is the range of acceptance for the group ('latitude of acceptance' in the figure). When the wolf-human interactions are considered to be too low or too high by certain stakeholders, the interactions are outside their range of acceptance. At that point, if they place a high value on the consequences of the interactions, they are likely to become intolerant and engage in some issue activity (e.g., they may take their issues to court). These stakeholders could be livestock growers intolerant of depredation rates or they could be members of a wolf-advocacy group intolerant of declining wolf abundance.

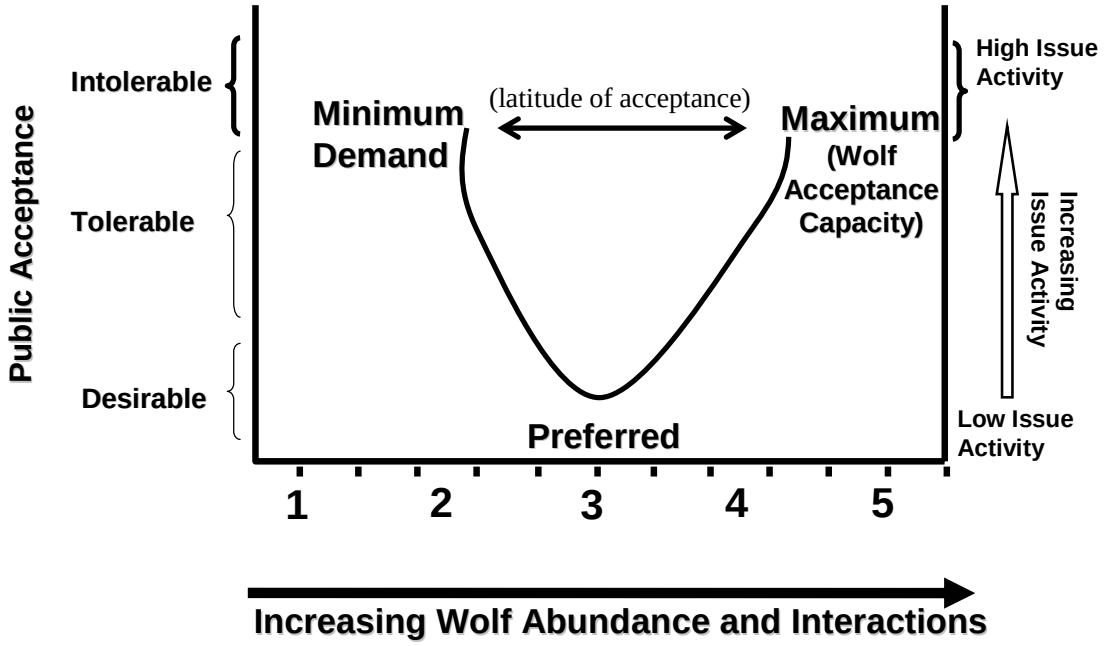


Figure 2.1. The three points (minimum, preferred, maximum) showing the preference and tolerances of a single stakeholder group for wolf abundance and interactions. When wolf abundance exceeds the maximum level tolerated or falls below the minimum level tolerated, stakeholders may become intolerant and take some actions to change the situation. The range of acceptance between the minimum and maximum levels is called 'latitude of acceptance' in the figure.

Figure 2.2 shows a situation in which two stakeholder groups have ranges of acceptance that do not overlap. When key stakeholder groups do not have overlapping ranges of acceptance, management is difficult. For example, when the maximum number of wolves that hunters and farmers will accept is below the minimum number that wolf advocates will accept, conflicts are guaranteed. In fact, if stakeholder ranges of acceptance do not overlap, there is no SCC because there is no wolf-population level that is agreeable. In this situation, any wolf-population goal set by a management agency can be expected to generate political and/or legal opposition. Management is unable to resolve this issue, leaving the other two management targets to be addressed. One option is to shift the attitudes of stakeholder groups to create some agreement. For example, if conflicting group tolerances are due to incorrect perceptions, education may be able to increase tolerance sufficiently to achieve some agreement among groups. To illustrate, some hunter intolerance of wolves may be based on unrealistic perceptions of wolf impacts on white-tailed deer. Other stakeholders with a demand for high wolf abundance may have unrealistic perceptions that wolves could have no impact at all on other wildlife species. An effective education campaign might shift those ranges of acceptance to gain some overlap. A second approach is to address wolf-human interactions that are creating intolerance. For example, a cost-effective means of avoiding livestock depredation or mitigating losses might increase livestock grower tolerance of wolves.

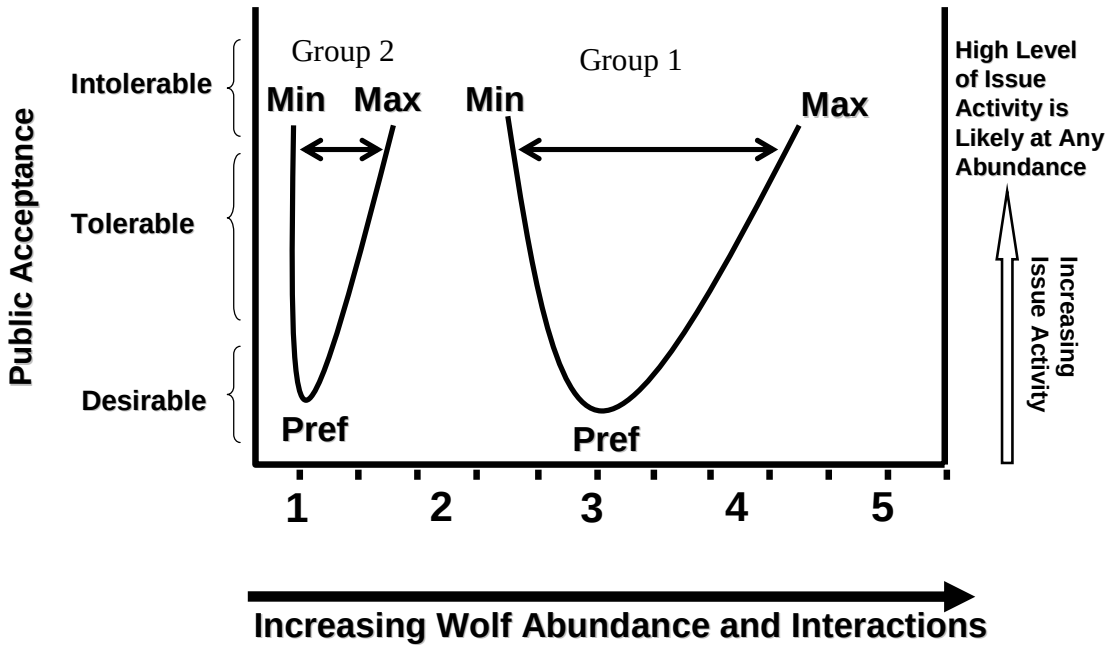


Figure 2.2. Points showing the preferences and tolerances of two stakeholder groups for wolf abundance and interactions. The ranges of acceptance do not overlap; therefore, no social carrying capacity can be defined. That is, there is no level of wolf abundance and/or interactions that would be acceptable to this society of two stakeholder groups.

Figure 2.3 adds a third stakeholder group and shows some shift in tolerances of groups 1 and 2 to create some overlap in stakeholders' ranges of acceptance. This overlap defines an SCC; that is, it suggests a level of wolf abundance and interactions that would be acceptable to most members of the three hypothetical stakeholder groups.

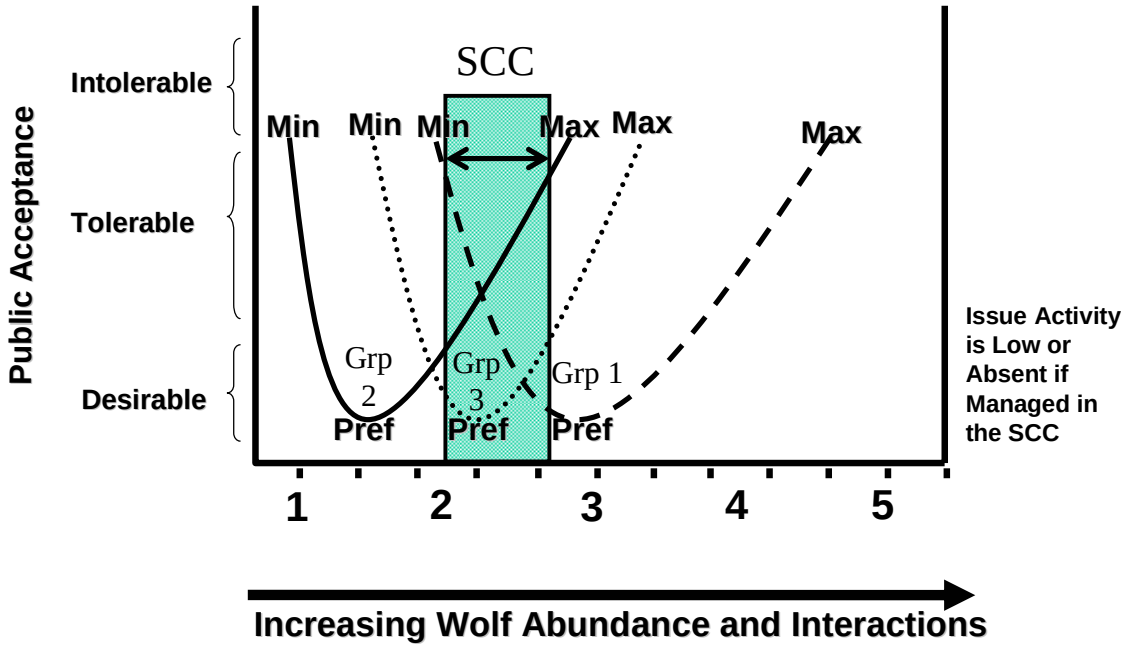


Figure 2.3. Points showing the preferences and tolerances of three stakeholder groups for wolf abundance and interactions. In this idealized situation, another group has been added and groups 1 and 2 have shifted their tolerances so the three stakeholder groups have some overlap in their ranges of acceptance. This overlap defines a social carrying capacity. If wolf abundance and/or interactions can be kept within this common range of acceptance, issue activity will be minimal.

Trends in Public Support for Michigan's Wolves

Prior to the 2005 public-attitude survey, other studies (Kellert 1990, Mertig 2004) had assessed Michigan-citizen attitudes toward wolves. The Kellert survey occurred when wolves were beginning to re-establish in the UP. When the more recent Mertig survey was done, wolves were well-established in the UP and reclassifying them to threatened status was being initiated. In 2005, removal of wolves from the Federal endangered species list was being debated. These historical differences influenced the designs and outcomes of the surveys. Further, the Kellert and Mertig surveys looked at support for 'efforts' of wolf recovery and re-establishment, whereas the 2005 survey asked about approval of 'having wolves in Michigan.' The differences in history and in design of the

questions require caution when comparing results to infer trends in Michigan-citizen support for wolves.

Kellert (1990) found that 64% of UP and 57% of LP respondents 'supported re-establishing timber wolves in the UP.' By 2002, support may have decreased among UP respondents but remained somewhat constant among LP respondents. Mertig found 'efforts to help wolves recover in the UP' was supported by 46% of UP, 57% of NLP, and 64% of SLP respondents.

The 2005 survey found 41% of UP, 52% of NLP, and 49% of SLP respondents 'strongly or somewhat approved' of having wolves in Michigan. The differences suggest a trend for lower approval of wolves in Michigan. However, the differing contexts of the survey questions may also have influenced some of these results.

The format of the 2005 survey enabled the identification and analyses of respondents interested in Michigan wolves. When disinterested respondents were removed (21, 26 and 34% of UP, NLP and SLP respondents, respectively), the portion of interested respondents who approved of wolves in the State was 52% in the UP, 71% in the NLP, and 74% in the SLP.

Social Carrying Capacity for Wolves in Michigan

Overview of the 2005 Survey and Analysis Methods

Qualifying the sample used

The 2005 public-attitude survey was designed to assess the status of the SCC for wolves in three regions of Michigan (UP, NLP, SLP). To ensure sufficient regional representation for analysis, stratified samples were used. The UP and NLP were sampled separately (n=500 and 2,000, respectively) and the SLP was sub-divided into the SLP rural, SLP metro and Detroit-area samples (n=2,000, 1,500 and 1,500, respectively). In each region, survey recipients 18 years or older were selected randomly so the five initial samples were representative of their regional populations. However, to project findings to a statewide distribution of opinions, respondent data from each sample were weighted to reflect the correct statewide distribution of respondents. Response rates ranged from 78% among the UP livestock growers to 38% among the Detroit-area recipients. Overall response rate was 53%. Appendix I presents further detail on the sampling and weighting procedures, response rates, and treatment of non-responses.

It is important to note that conclusions and inferences refer to 'interested citizens' rather than Michigan's entire resident population to avoid the biases due to different response rates and percentage of interested citizens in the five sample regions. Those individuals who did not respond to any of the repeated survey mailings were assumed to be 'uninterested survey recipients.' In addition to these, a portion of respondents checked 'not interested' and returned the uncompleted questionnaire. This latter group ranged from 39% of Detroit-area respondents to 23% of UP respondents. Only the number of

interested respondents (hereafter referred to as 'respondents') was used in calculation of statewide distributions, comparisons between regions, and analyses of specific segments (e.g., hunters, livestock producers). This approach was considered to be most practical because interested-citizen opinions were of the most utility. It also accommodated the different response rates and portions of interested respondents from each region that precluded generalizing to the entire Michigan population. Interpreting findings as descriptive of the Michigan population would be inappropriate. For example, '36% of interested citizens preferred Situation 3 as the UP wolf abundance' does not mean 36% of Michigan's public preferred this situation level. More details on the survey and analysis methods are provided in Appendix I.

Measuring social carrying capacity

The survey presented respondents with five situations (1–5) that described wolf abundance and distribution and several wolf–human interactions (Table 2.1). Levels of abundance and interactions increased with situation number. Situation 1 had no wolves present. In Situation 5, wolves existed in all counties in the highest numbers that could be sustained by the habitat. This scenario was associated with frequent sightings and depredation of livestock, hunting dogs and pets. Situation 3 described approximately the combination of wolf abundance and wolf–human interactions that existed in the UP at the time of the survey (2005). The levels of depredation in Situations 4 and 5 were conservative. They were based on Minnesota reports that suggested the impacts on livestock and other domestic animals would stabilize and not continue to increase with increasing wolf densities beyond a certain point. However, there is evidence that the rate of wolf depredation of livestock also may be related to wolf density and learning; thus, depredation rates described in Situation 5 may be low.

Respondents were asked to select one situation as their preferred situation for the UP and also to identify the two scenarios that represented the highest number of wolves and the lowest number of wolves they could accept in that region. The questions were repeated regarding wolf abundance in the NLP and SLP. It was not stated on the survey that wolf abundance and interactions in Situation 3 approximated the situation in the UP during 2005.

Analyzing group tolerances and preferences with 'cluster analysis'

A data-analysis approach known as 'cluster analysis' created groups of respondents based on the preferred, minimum and maximum situations they selected for each of the three regions. Respondents who selected 'undecided' for all three questions pertaining to a region were dropped from that regional analysis: 3.5% (n=91), 4.7% (n=125) and 5.9% (n=156) of respondents for the UP, NLP and SLP wolf questions, respectively. The four groups that emerged differed in their tolerances toward wolves and were named the intolerant, least tolerant, mid-tolerant and most tolerant groups. Separate cluster analyses were conducted for the UP, NLP and SLP questions so there are three sets of the four groups.

Table 2.1. Situations presented on the 2005 public-attitude survey for selection of preferred, minimum and maximum levels of wolf abundance and interactions.

Increasing wolf numbers	***SITUATION 1:***	* No Wolves
	SITUATION 2:	* Wolves in a few counties at **very low** numbers * Rare sightings * No loss of livestock to wolves in most years * Rare loss of pets or hunting dogs to wolves * The Michigan DNR finds no impact on hunter deer harvest due to wolves
	SITUATION 3:	* Wolves in many counties but at **low** numbers * Occasionally seen near rural homes or roads in some areas * Less than 1% of farms per year lose livestock * Some loss of pets and hunting dogs likely – less than 10 per year * The Michigan DNR finds no impact on hunter deer harvest due to wolves
	SITUATION 4:	* Wolves exist in **most** counties at **moderate** numbers * Often seen near rural homes or roads in many areas * About 1% of farms per year lose livestock (about 7 farms in the UP and 40 in the NLP) * Pets and/or hunting dogs known to be lost yearly to wolves averages 15 to 20 * The Michigan DNR finds a small decrease in hunter deer harvest is due to wolves
	SITUATION 5:	* Wolves exist in **all** counties in the **highest** numbers that can be sustained by the habitat * Frequent, widespread sightings near rural homes and roads, occasional sightings near towns * About 2% of farms per year lose livestock (about 14 farms in the UP, 80 in the NLP) * Pets and/or hunting dogs known to be lost yearly to wolves averages 20 - 25 * The Michigan DNR finds a moderate decrease in hunter deer harvest due to wolves

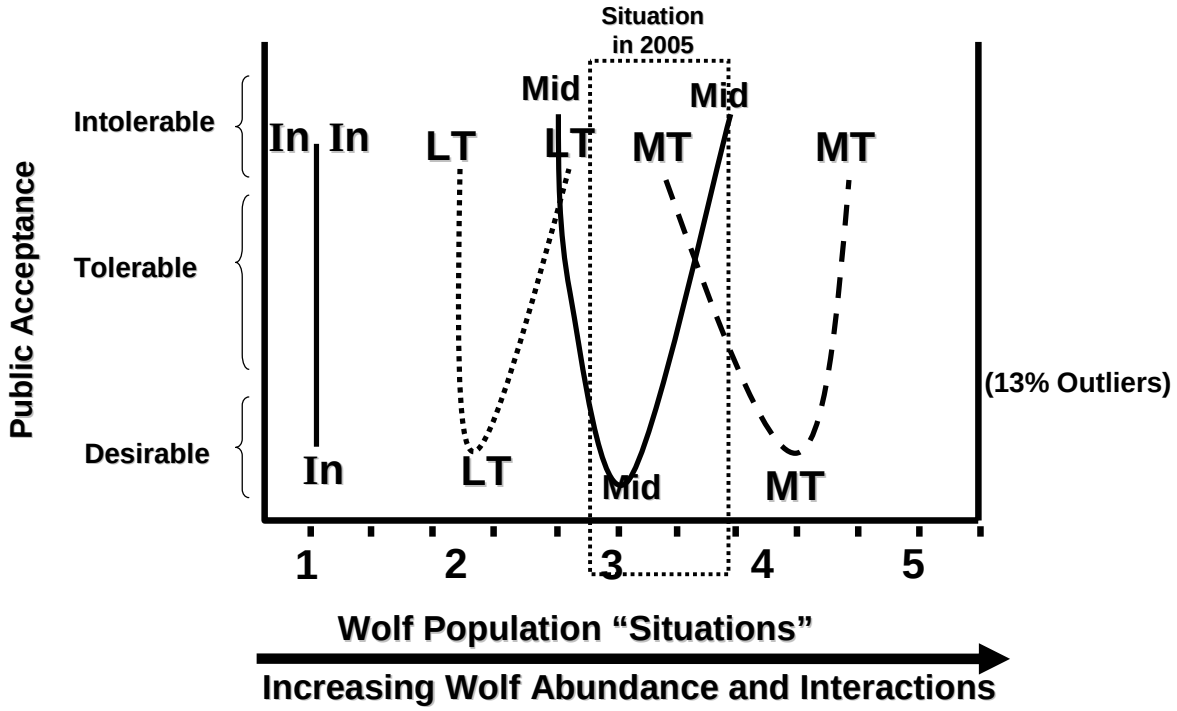
Regardless of the region in question, the 'intolerant groups' preferred 'no wolves' and said they would not tolerate any ('intolerant group' implies the same level of no tolerance for wolves in each region). However, the other three tolerance groups are not comparable across regions. For example, the 'most tolerant' group regarding UP wolf abundance accepted much higher situations of wolves than did the 'most tolerant' group regarding SLP wolf abundance. Membership in the tolerance groups also changed with the regions being considered because an individual respondent might have belonged to one group (e.g., the mid-tolerant group) when considering appropriate wolf abundance in the UP, but shifted to another group (e.g., least tolerant group) when the NLP or SLP regions were addressed.

The cluster analysis for each region also created an 'outlier' group of respondents who did not fit well into any of the four clusters because their pattern of responses to the preference and two tolerance questions did not correspond to any of the patterns used to create the four groups. This is an artifact of the cluster analysis method and did not preclude using their data in any of the other analyses. Proportions of respondents categorized as 'outliers' were 13%, 26% and 42% in the UP, NLP and SLP analyses, respectively. Outlier respondents were maintained in the data but generally were not used to describe the SCC. Using the four tolerance groups and excluding the outlier group provided a sufficient basis for understanding the nature and distribution of attitudes that determine the SCC for wolves in the UP and the NLP. However, the large outlier group for the SLP compromises the inferences that can be drawn about SCC in that region. The consequences of wolves in the SLP may have been more difficult for respondents to evaluate, resulting in less consistent patterns and less reliable responses for that issue. Given their limited utility, the results of the SLP SCC analysis are not presented in this chapter, aside from a summary presentation in Table 2.2.

Social Carrying Capacity for Wolves in the UP

Although they cannot be viewed as precisely quantified points, the five situations presented in the survey (Table 2.1) represented a continuum of wolf abundance and wolf-human interactions that could be used by survey respondents to describe their preferences and tolerances (minimum and maximum) for each of the three regions. Their responses regarding the UP produced four clusters that included 87% of the interested citizens (13% were outliers that did not 'fit' in the defined clusters). When data were weighted to adjust for statewide distribution, 7% of interested citizens belonged to the intolerant group, 20% comprised the least tolerant group, 28% were in the mid-tolerant group, and 32% were in the most tolerant group (Figure 2.4).

Figure 2.4 shows the four groups do not overlap well in their preferences and tolerances for wolves in the UP. Without a level of wolf abundance that is acceptable by even a majority of the four groups, there is no defined SCC for wolves and their interactions in the UP. A shift in attitudes that create the tolerances of interested citizens and/or a change in the impacts of the wolf-human interactions will be required to create more agreement among the groups.



In = Intolerant (7%)	LT = Least Tolerant (20%)	Mid = Mid-Tolerant (28%)	MT = Most Tolerant (32%)

Figure 2.4. Social carrying capacity for the Upper Peninsula of Michigan. Cluster analysis produced four segments of interested citizens regarding the maximum, minimum and preferred situations for wolves in the Upper Peninsula they selected (weighted *n*=2,408). Data were weighted to represent the distribution of interested citizens. All but 13% (outliers) of interested citizens fit into one of the four clusters, ranging from 'intolerant' to 'most tolerant.' The situation that existed in the year of the survey overlapped with the mid-tolerant group preference (28% of the interested citizens).

The wolf abundance and interactions existing in the UP in 2005 were best described by Situation 3. Situation 3 surpassed the maximum tolerances of 27% of interested citizens (intolerant and least tolerant groups) but barely satisfied the minimum level of wolf abundance and interactions desired by the most tolerant group (32%). The overlap of the mid-tolerant group with the least and most tolerant groups is encouraging and suggests that goals acceptable to each of those groups are attainable. A considerable challenge will be presented by the wide range of tolerance between the intolerant and tolerant groups.

If wolf abundance and associated interactions continue to increase in the UP, they will soon surpass the maximum tolerances of two-thirds of interested citizens (comprised of

the mid-tolerant group and nearly one-half of the outlier group not shown in the graph). Increased tolerances in those groups could occur through some means (e.g., education or management to reduce interaction impacts and risks). Even so, another third of interested citizens would prefer to maintain or even increase wolf abundance, creating potential for more conflict. Considerable conflict over the appropriate level of wolf abundance and interactions in the UP will need to be resolved for the purpose of creating an SCC and setting acceptable wolf-management goals. This task will be assisted by an understanding of who makes up these tolerance groups.

Regional composition of UP tolerance groups

Table 2.2 shows how the tolerance groups were distributed regionally and among interest groups. Tolerance for wolves in the UP was highest among SLP respondents and lowest among UP respondents. Statewide (weighted data), substantially more UP respondents (24%) were intolerant than were NLP respondents (10%) and SLP respondents (5%). Combined, the least and mid-tolerant groups included 41% of UP respondents and nearly one-half of NLP and SLP respondents. Approximately 33% of SLP respondents, 28% of NLP respondents, and 17% of UP respondents were in the most tolerant group. From 12% to 17% of respondents in each region were in the outlier group.

Relationship of UP tolerance with participation in outdoor recreation

Statewide (weighted), approximately one-half of interested citizens who identified themselves as hunters were in the mid-tolerant and most tolerant groups and only 12% were intolerant (Table 2.2). However, hunter tolerances were significantly different by region ($p<0.05$). Roughly one-third of UP hunters (35%) were intolerant compared to 15% and 9% of NLP and SLP hunters, respectively. Consistently fewer UP hunters (11%) than NLP (23%) and SLP (32%) hunters were in the most tolerant group.

Statewide (weighted), two-thirds of interested citizens were non-hunters. Non-hunters had slightly higher tolerances for UP wolf abundance than did hunters (Table 2.2; $p<0.001$). Only 5% of non-hunters were intolerant statewide (versus 12% of hunters), 20% were least tolerant, and 61% (versus 54% of hunters) were distributed in the mid-tolerant and most tolerant groups. However, the same trends were found regionally, with UP non-hunters more than twice as likely as NLP and SLP non-hunters to be intolerant and fewer UP non-hunters belonging to the most tolerant group (25% versus 32% in NLP and 35% in SLP).

Interested citizens who did not hunt or raise livestock but did participate in other outdoor recreation activities were less likely than hunters to be intolerant. Only 4% of this group (versus 12% of hunters) was intolerant statewide and 35% of this group was most tolerant. Regional differences were found: UP participants were more likely to be intolerant (11%) compared to NLP participants (5%) and SLP participants (3%), and southern residents were more likely than northern residents to be in the mid-tolerant and most tolerant groups.

Table 2.2. Distribution of interest groups among tolerance clusters in the UP, NLP and SLP.

Weighted Stakeholder Segment	Percent of Stakeholders in Each Tolerance Group														
	UP Tolerance Groups[a]					NLP Tolerance Groups					SLP Tolerance Groups				
	In	LT	Mid	MT	OI	In	LT	Mid	MT	OI	In	LT	Mid	MT	OI
Interested Public (2,410)[b]	7	20	28	32	13	13	10	30	20	26	22	6	22	8	42
UP (5%)[c]	24	21	20	17	17	25	14	22	15	24	27	8	20	7	37
NLP (16%)	10	20	27	28	15	19	12	28	20	21	25	8	26	6	35
SLP (79%)	5	20	29	33	12	11	10	31	21	27	20	6	21	9	44
Hunters	12	21	26	28	13	20	11	28	19	23	29	7	19	7	37
UP (3%)	35	19	16	11	19	34	14	20	11	21	33	9	20	6	32
NLP (8%)	15	21	24	23	16	27	10	25	16	22	31	9	25	6	29
SLP (22%)	9	21	28	32	11	16	10	30	21	23	28	7	17	7	41
Non-hunters	5	20	28	34	13	10	10	32	21	27	18	6	23	9	44
UP (2%)	12	22	27	25	14	16	13	27	18	27	21	7	19	9	44
NLP (8%)	5	20	29	32	13	11	13	31	25	21	21	5	28	6	39
SLP (53%)	4	20	28	35	12	9	10	32	21	28	17	6	23	10	45
Non-hunting, non-farming, outdoors public	4	20	29	35	13	8	10	32	21	29	17	6	23	10	44
UP (2%)	11	22	26	26	15	15	12	27	20	27	20	5	20	10	45
NLP (7%)	5	20	28	33	14	11	12	31	24	22	20	6	27	6	41
SLP (47%)	3	19	29	36	13	7	9	32	21	30	16	7	23	10	44

[a]In = Intolerant, LT= Least Tolerant, Mid= Mid-Tolerant, MT= Most Tolerant, OI = Outliers.
[b]Number in parentheses is the total number of interested respondents.
[c]Percent in parentheses is the approximate percent of that segment of all interested respondents (not all interested respondents reported their hunting orientation so percents do not sum to 100).

Social Carrying Capacity for Wolves in the NLP

There was a lower tolerance among interested citizens statewide for NLP wolves than for UP wolves as shown by (1) the lower maximum level of NLP wolves that is tolerated by each of the tolerance groups and (2) the shift of membership toward the least tolerant and intolerant groups (Figure 2.5). The maximum tolerances for wolves in the NLP are lower in each of the three tolerance groups than for wolves in the UP. Even the most tolerant group will not accept a higher level than Situation 4. The lack of overlapping tolerances among groups precludes setting population goals based on an existing SCC for the region. Compared to the UP analysis, a larger portion of respondents in the NLP analysis consisted of outliers (26% in NLP versus 13% in UP). A larger portion was also intolerant of NLP wolves (13%) and the most tolerant group was comprised of only 20% of the statewide respondents (weighted). The mid-tolerant respondents (30%) had a range of tolerances that overlapped the least tolerant and most tolerant groups.

Regional composition of NLP tolerance groups

As in the UP, tolerance for wolves in the NLP was highest among SLP respondents, intermediate among NLP respondents, and lowest among UP respondents (Table 2.2; $p<0.001$). Upper Peninsula respondents were as likely to be intolerant of wolves in the NLP (25%) as in the UP and more likely than NLP respondents (19%) and SLP respondents (11%) to be intolerant of NLP wolves. Approximately 20% of SLP and NLP respondents were most tolerant compared to 15% of the UP respondents. The least tolerant and mid-tolerant groups combined included approximately 37% of the UP respondents and about 40% each of the NLP and SLP respondents. The SLP respondents included more outliers than the NLP and UP respondents (27%, 21% and 24%, respectively).

Relationship of (NLP) tolerance with participation in outdoor recreation

Statewide (weighted), hunters were more likely to be intolerant of NLP wolves than UP wolves (20% versus 12%). Fewer hunters were in the group most tolerant of NLP wolves (19%) than were most tolerant of UP wolves (28%). Hunters from the three regions varied in their tolerances of NLP wolves as they had regarding UP wolves. Distribution of UP hunters in the four tolerance groups were similar for the UP and NLP wolf abundance questions. SLP hunters were almost twice as likely to be intolerant of NLP wolves as UP wolves and fewer were in the most tolerant group (21% versus 32% for the UP).

Differences between hunters and non-hunters were smaller than those found for the UP question but were still statistically significant ($p<0.001$). The major difference was the proportion of each group that was intolerant. Hunters were twice as likely as non-hunters to be intolerant of NLP wolves (20% versus 10%). Although non-hunters were more likely than hunters to be in the more tolerant groups, the differences were not substantial. Non-hunter distribution in the four groups followed the expected regional tendencies described previously.

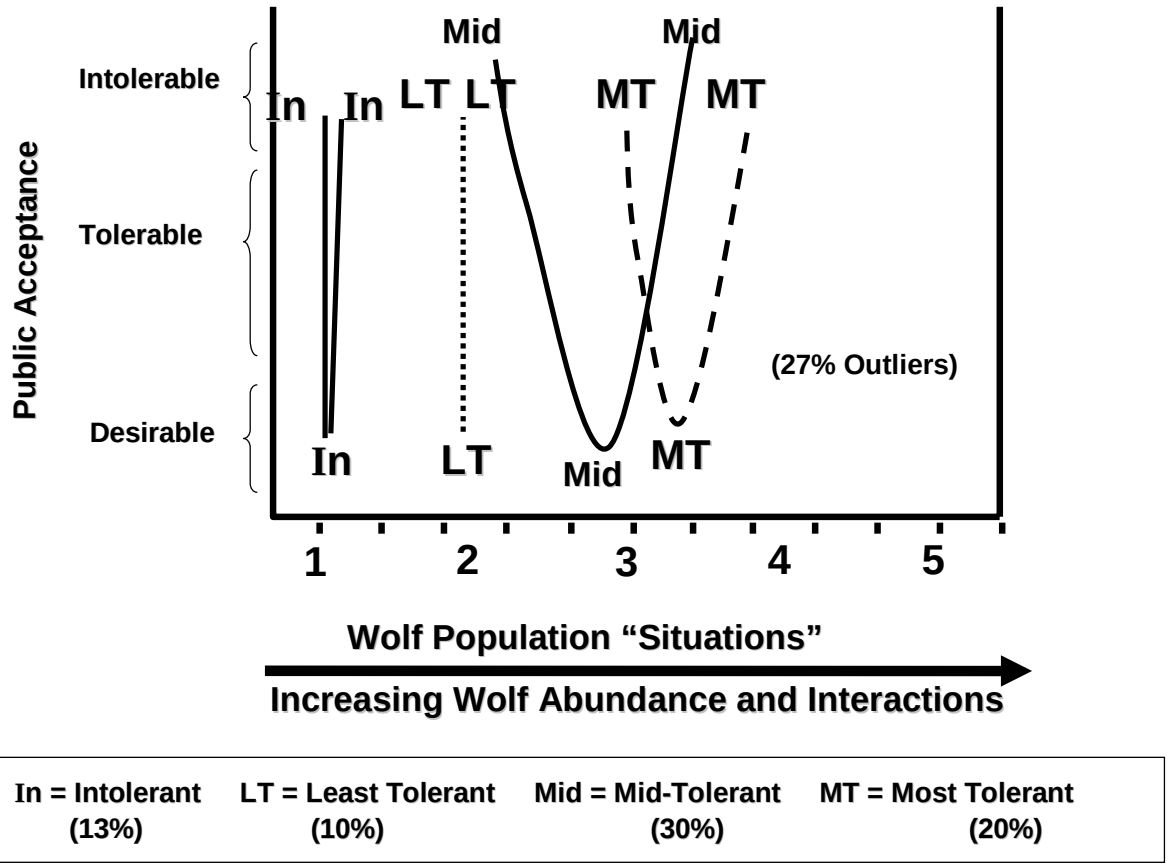


Figure 2.5. Social carrying capacity for the northern Lower Peninsula. Cluster analysis produced four segments of interested citizens regarding the maximum, minimum and preferred situations for wolves in the NLP they selected (weighted *n*=2,408). Data were weighted to represent the distribution of interested citizens. Approximately 74% of interested citizens fit into one of the four clusters, ranging from 'intolerant' to 'most tolerant' (26% were 'outliers').

UP and NLP Livestock Grower Tolerances for Wolves in the Area where They Farm

Livestock growers are a small portion of Michigan's population. A detailed analysis of livestock growers' views would not be possible through analysis of the general-public survey alone, because only a few livestock growers were included in the random regional sample. Therefore, 1,400 livestock growers in the UP and NLP were surveyed in a separate sample. Names were obtained from MSU Extension lists. Four hundred people (200 from the UP, 200 from the NLP) whose names occurred on the lists were randomly selected to receive the general-public version of the survey. In addition, a livestock grower version of the survey that included questions from the general-public version but also focused on depredation issues was sent to about 500 individuals each in the UP and NLP. The tolerances shown by the two livestock grower samples were very similar. For purposes of brevity, only the results of the livestock grower survey version are discussed here.

Almost one-third (31%) of the livestock grower sample did not return a survey and 17% of the sample reported they were not livestock growers. Of those respondents who were livestock growers, 5% indicated they were not interested in wolf issues. The overall adjusted response rate for this group was 69%. This yielded responses from 469 interested livestock growers (267 in UP, 202 in NLP). Regional response rates suggested more interest among UP growers than NLP growers. Interested growers replied to 51% of the original UP mailings, whereas interested growers replied to 38% of the original LP mailings.

The livestock grower survey asked respondents about their preferences and tolerances for wolves in the area where they farmed rather than for wolves in the UP, NLP or SLP. When all interested livestock grower respondents were combined for cluster analysis, growers from the UP and NLP were significantly different (p=0.001) in their distribution in the four tolerance groups. Growers in the NLP were more likely than UP growers to be intolerant of wolves in their farming area. Almost one-half were in the intolerant group compared to one-third of UP growers. However, there was a slightly higher percentage of NLP growers than UP growers in the most tolerant group (18% versus 14%). Due to these regional differences and to enable regional comparisons with the general-public results, the cluster analysis was repeated separately for the UP and NLP growers.

Upper Peninsula grower tolerances for wolves in the area where they farm

Upper Peninsula livestock growers (n=257) had low tolerances for wolves in their farming area (Figure 2.6). One-half of the UP growers preferred no wolves in their farming area and one-third preferred the lowest level of abundance (Situation 2). Situation 3 surpassed the highest tolerance for nearly two-thirds of UP growers. Approximately 18% of the group was classified as outliers and this group was more tolerant than the tolerance groups. One-half preferred Situation 3 and one-third preferred even higher levels.

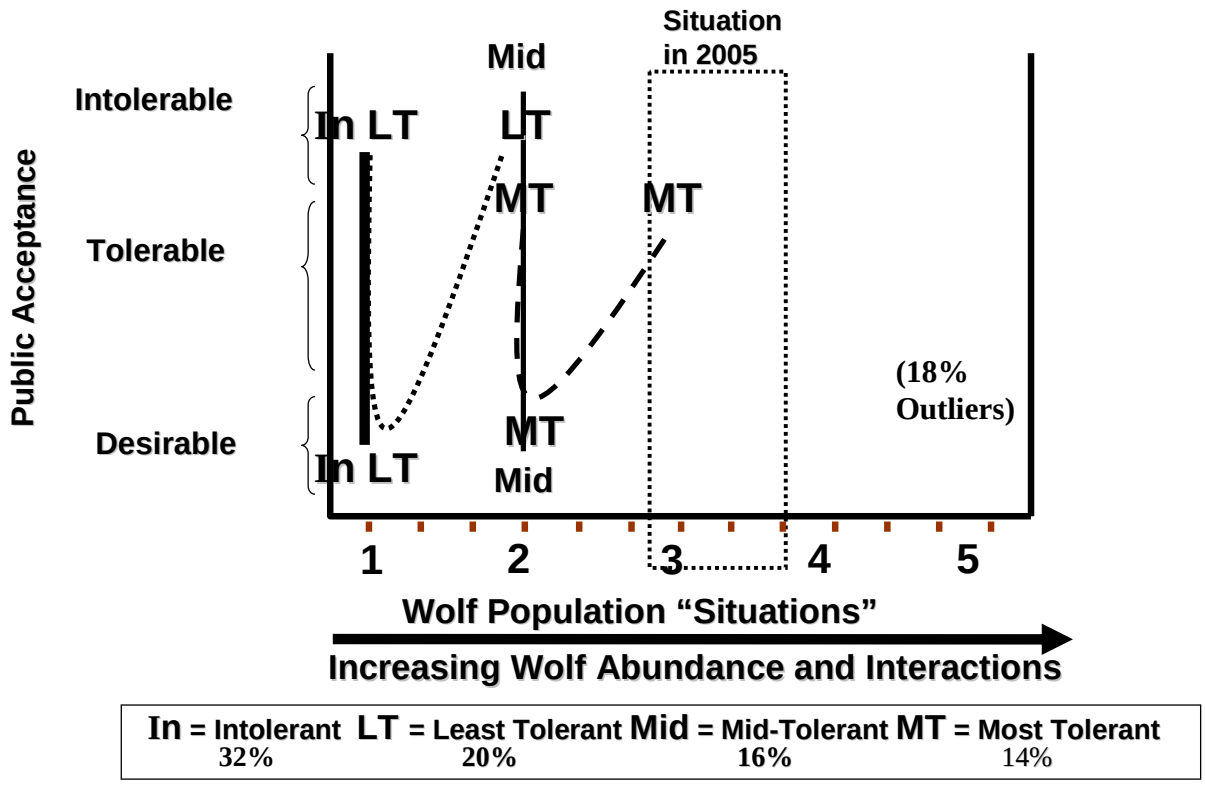


Figure 2.6. Interested Upper Peninsula livestock growers (*n*=257) grouped according to their tolerances for wolves in the area where they farm (from livestock grower survey version).

Defining an appropriate goal for UP wolf abundance will be made more difficult by the gap between the tolerances for UP wolves expressed by the general public statewide and UP livestock growers (Figures 2.7 and 2.8). Almost two-thirds of the general public preferred Situation 3 or 4, whereas 80% of UP livestock growers preferred no wolves or the minimum abundance (Situation 1 or 2). Situation 3 (the 2005 level of wolf abundance) was the lowest level of UP wolves tolerated by 36% of the general public statewide and another 13% wanted even higher minimum levels. However, Situation 3 surpassed the maximum tolerance of two-thirds of UP livestock growers.

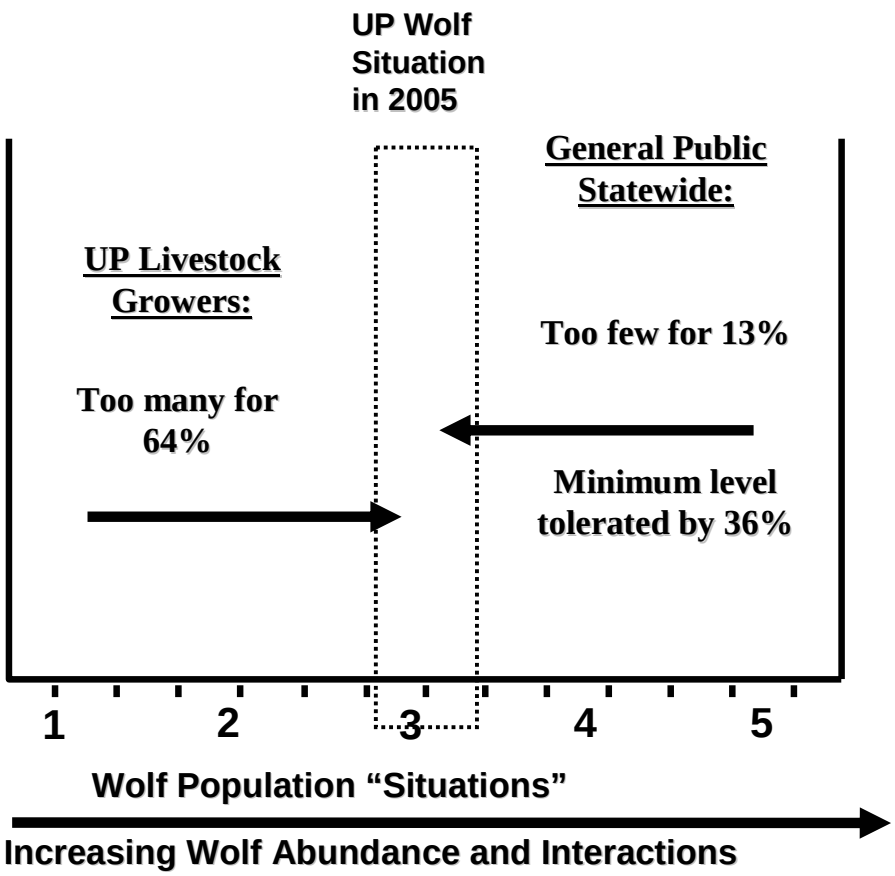


Figure 2.7. Differences in wolf levels preferred by interested Upper Peninsula livestock growers and the interested general public statewide.

Northern Lower Peninsula grower tolerances for wolves in the area where they farm

Livestock growers in the NLP had even lower tolerances for wolves in their own farming area than did the UP growers (Figure 2.9). Most NLP growers preferred no wolves in their farming area and one-fourth preferred Situation 2. Having no wolves (Situation 1) would be acceptable to 70% and Situation 2 was the lowest acceptable situation for approximately 24%. Situation 3 would exceed the highest level tolerable for 68% of the NLP growers. Approximately 11% of NLP livestock growers were placed in the outlier group.

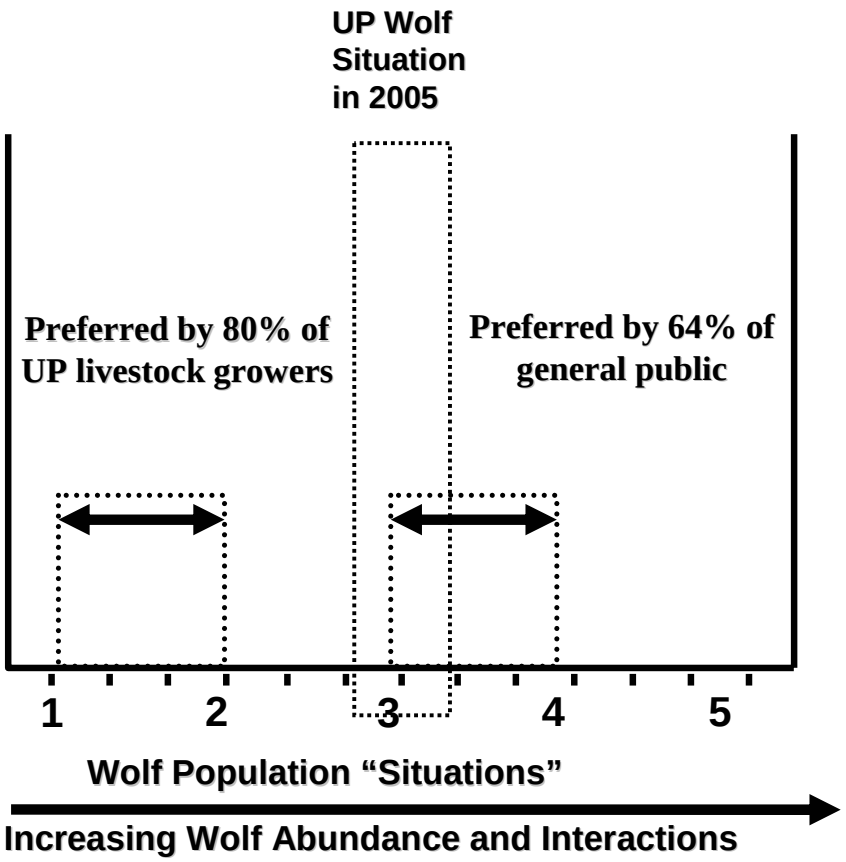


Figure 2.8. Differences in the maximum level of wolf abundance acceptable to interested Upper Peninsula livestock growers and the minimum level acceptable to the interested general public statewide.

Both the general public and NLP livestock growers preferred a lower abundance of wolves in the NLP than in the UP. The interested general public was more variable in its preferences, but nearly two-thirds preferred Situation 3 (38%) or Situation 2 (26%). Most (62%) NLP livestock growers preferred no wolves (Situation 1) and one-fourth preferred the minimum level (Situation 2). However, about 80% of the general-public sample reported that Situation 1 (no wolves) was not acceptable for the NLP and 44% preferred at least the minimum level (Situation 2). By contrast, nearly one-half (46%) of NLP livestock growers said they preferred Situation 1 (no wolves) and only 21% would accept Situation 2 as their highest level.

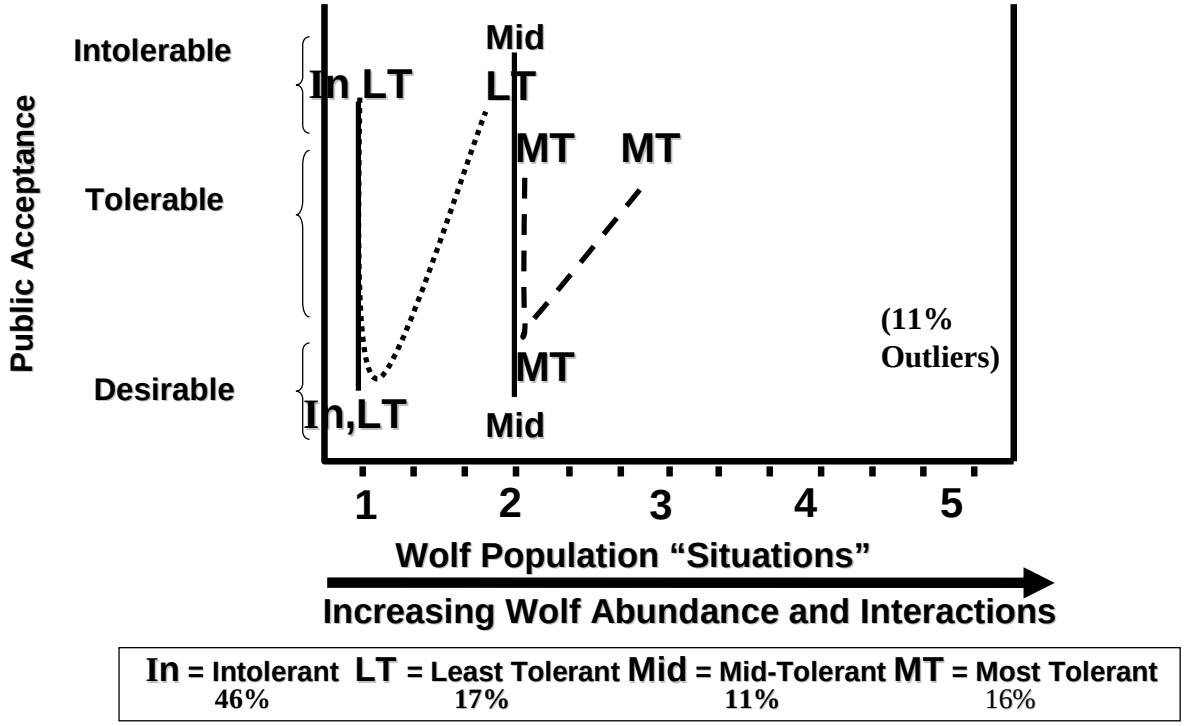


Figure 2.9. NLP livestock growers (*n*=190) grouped according to their tolerances to wolves in the area where they farm (from livestock grower survey version).

CHAPTER 3: MANAGING WOLF POPULATION SIZE AND DISTRIBUTION

Introduction

History shows that wolf populations can be controlled, even eliminated, through human actions. The use of poison is believed to be the primary mechanism that allowed the extermination of wolves from many parts of their range throughout the world (Boitani 2003). In the territory that eventually became the United States, the hatred and killing of wolves by European settlers was fueled by the desire for territorial conquest, agricultural settlement and livestock production, and further supported by European folklore (Coleman 2004). More recently, it has been shown that wolves are resilient and populations can grow quickly with protection and sufficient prey (e.g., Wydeven et al. 1995, Wabakken et al. 2001).

As wolf populations have recovered, wolf–human conflicts have occurred. In some cases, these conflicts can be addressed by changing the behavior of humans or wolves or by removing individual wolves. In other instances, reducing the size and/or growth rate of a wolf population with non-lethal or lethal methods has been proposed as a management strategy.

Wolf population control is beset by many issues, both social and biological in nature. For example, killing wolves to control population size is a controversial and contentious issue that often polarizes stakeholder groups interested in wolf conservation and management. Controlling a wolf population is also biologically complex. The number of wolves that must be treated or removed for effective control is determined by many factors, such as population size (current and desired), age and sex structure, immigration and emigration rates, birth rates, and natural and human-induced mortality rates.

If managers are presented with the necessity of controlling wolf populations at some level, they will need to understand what proportion of the population to remove or treat, the frequency that control actions are needed, which method(s) will be used, and what areas will be subject to the control actions.

This chapter provides background on options for management of wolf population size and distribution. It provides a review of recreational wolf harvests and control programs that have occurred in North America as well as other parts of the world. It also addresses the social issues surrounding wolf population control and summarizes the current understanding of Michigan stakeholder beliefs and values regarding wolf population control options.

Non-lethal Control

Population control methods fall into two categories: non-lethal and lethal. Non-lethal methods include fertility control and relocation.

Fertility Control

Research suggests sterilization does not influence the basic social and territorial behavior of wolves; sterilized dominant wolves continue to maintain pair bonds and retain their dominant status. Thus, sterilizing alpha wolves may slow wolf population growth. Two methods are most often used to control the fertility within a wolf population: surgical sterilization and non-surgical contraception.

Surgical sterilization

An ongoing study across eastern interior Alaska and the Yukon Territory assessed whether non-lethal wolf-management techniques could help restore the Fortymile caribou herd. The management plan called for sterilization (vasectomies and tubal ligations) of the alpha pair in up to 15 packs over 3 years and translocation of remaining pack members to locations at least 100 miles away (www.wildlife.alaska.gov). Between November 1997 and May 2001, wolf numbers were reduced in 15 packs and the Fortymile caribou population doubled in size (www.wildlife.alaska.gov). Future studies will focus on the post-treatment effects of reducing wolves on caribou, wolf, moose and sheep (*Ovis* spp.) populations.

In Utah, Bromley and Gese (2001*a, b*) studied the effects of sterilization on the social and sexual behavior of coyotes and whether sterilization would modify coyote predatory behavior and reduce predation on sheep. Their results indicated sterilization had no effect on pair-bond maintenance and territorial behavior among free-ranging coyotes (Bromley and Gese 2001*b*). Because the study sterilized as many pack members as possible, no data exist on whether non-sterile pack members would reproduce/replace the sterile alpha pair. Bromley and Gese (2001*a*) indicated that coyotes change their predatory tendencies when pups are present because of the need to provide them with food. Based on the results that sterile coyotes maintained pair bonds and territories and had higher survival rates, a sterile coyote pair could prove to be a viable small-scale management tool to reduce coyote predation on sheep (Bromley and Gese 2001*a, b*).

Spence et al. (1999) conducted a fertility-control study in Aishihik, Yukon within a free-ranging wolf population. The objective was to determine whether surgical sterilization of breeding pairs altered their social and territorial behavior. Six male and seven female wolves were sterilized via vasectomies and uterine horn ligations, respectively. These sterilization techniques were chosen because they do not induce changes in hormonal cycling and therefore do not alter social and sexual behavior. Two female wolves died as a result of surgical complications. All surviving sterilized wolves maintained their pair bonds and remained in their territories. One sterilized wolf pair produced a litter of one pup; the male in this pair was not sterilized and the female may have already ovulated and bred before her ligation (Spence et al. 1999). Two lone treated wolves met and formed a pair bond during the denning season. Spence et al. (1999:120) indicated that "sterile wolf pairs, which can continue to hunt together because the females are not confined to the den, will have less of an impact than larger packs upon caribou and moose calves." The researchers suggested surgical sterilization represents an alternative to lethal control for small-scale wolf management (Spence et al. 1999).

From 1987 through 1994, Mech et al. (1996) conducted a male wolf sterilization study in the Superior National Forest in northeastern Minnesota. Uterine ligations were not performed during this study due to the complex nature of the surgery. Five male wolves were live-trapped, transported to a veterinary lab, and surgically vasectomized (Mech et al. 1996). The wolves were observed for 1, 3, 4 and 7 years post-vasectomy; in all years, the pack size remained the same or decreased and all vasectomized wolves remained in their territories. Sterilizing wolves that cause chronic depredation may reduce the local wolf population by two-thirds, thereby reducing depredations (Mech et al. 1996).

A simulation model of wolf dynamics was developed to predict the population effects of different wolf-sterilization and removal strategies (Haight and Mech 1997). The results suggest the effects of sterilization and removal depend largely on annual immigration rates. With low immigration, periodic sterilization reduced pup production and resulted in lower rates of territory re-colonization. Average pack size, number of packs, and population size were significantly smaller than for a non-sterile population. Similar results were observed when periodically removing a proportion of the population; however, more than twice as many wolves had to be removed than sterilized. With high immigration, periodic sterilization decreased pup production but not territory re-colonization and produced only moderate reductions in population size.

Bromley and Gese (2001*b*) estimated the cost of surgically sterilizing a coyote to be $560 per animal. Till (1982) estimated that locating and removing one den of coyote pups costs $208. Wagner and Conover (1999) estimated that it costs approximately $185 to kill a coyote from an aircraft and about $805 to trap a coyote on the ground. Bromley and Gese (2001*b*) suggested that on a small-scale livestock operation (experiencing depredation by only one pack), the cost to surgically sterilize one coyote pack was recovered by the amount of losses averted within the same year. Cost estimates for wolf-sterilization activities are unavailable.

Non-surgical contraception

Injecting a chemical sclerosing agent into the ductus deferens of a male wolf is one non-surgical contraception technique. This technique shows promise in domestic dogs, but more research is needed (Spence et al. 1999). During non-surgical female contraception, an immunocontraceptive drug blocks fertilization. The drug allows the body to produce antibodies that prevent sperm from implanting (Fayrer-Hosken et al. 2000). Gardner et al. (1985) administered oral contraceptives to five captive female wolves, resulting in controlled estrus and sterility; however, young wolves exhibited increased aggression.

Fertility-control limitations

Spence et al. (1999) noted that all reported immunocontraception of canids was associated with undesirable side-effects. The effectiveness of fertility control has not been established for large-scale population management. Several inherent difficulties are associated with fertility control, including accuracy in identifying the dominant

breeding pair in a pack and the changing nature of pack hierarchies. Sterilization also requires surgery, and this technique is not viable as a widespread management method.

Relocation/Translocation

Translocation may be a practical method of removal when a wildlife population is small and each individual is important to the survival of the species. Nuisance wildlife is sometimes translocated to new areas in hopes it will not cause similar damage. Several limitations are associated with translocating wildlife: (1) animals may return to their original capture locations; (2) translocated animals may cause new problems in the areas surrounding their relocation sites; (3) animals may be moved into another pack's territory and be killed as trespassers (Sillero-Zubiri and Switzer 2004); and (4) other wolves from surrounding packs may rapidly repopulate an area where a wolf was originally removed (Bjorge and Gunson 1985) and may cause additional problems.

Release sites are often based on the size and suitability of public lands in an area, distance from farms, and whether the area already contains wolf packs. Experiments on translocated wolves in Minnesota indicated wolves must be moved at least 45 miles or they will return to their capture area (Fritts et al. 1984). In the study area, translocation was largely unsuccessful at keeping problem wolves out of livestock production areas (Fritts et al. 1984).

In some States, wolves are translocated to new areas following confirmed livestock depredations. Research in the northwestern United States suggests translocated wolves depredate again near their release site and often attempt to return to the capture site (Bradley et al. 2004). Bradley et al. (2004) concluded that translocation was ineffective at meeting wolf-management objectives.

In Michigan, trapping and translocation has become increasingly problematic. None of the 24 wolves trapped and relocated from five depredation sites has remained in the vicinity of the release sites. As the wolf population increases, there are fewer suitable places to release wolves where a resident wolf pack does not already exist (B. Roell, Michigan DNR, personal communication).

Lethal Control

Lethal methods include trapping, snaring, shooting (from the ground or air) and poisoning. Depending on the nature of specific control programs, lethal methods could be used by government agencies, the public, or both.

Mortality Rates and Population Control

The growth of any population, including wolves, is dependant on the interaction of the rates of reproduction, mortality, immigration and emigration. From a wolf-management perspective, the rate of mortality is the factor over which managers can exert the most control.

Wolves are prolific, with litters averaging 4–7 pups across much of their range (Fuller et al. 2003). This reproductive capability is higher than that of most ungulates. As a result, wolf populations can remain stable or increase despite relatively high mortality rates (Fuller 1989, Mech 2001).

Annual mortality tends to fluctuate widely from year to year and is often compensatory (Fuller et al. 2003, Mech 2001). That is, human-induced mortality can sometimes replace mortality that would otherwise occur due to natural factors, such as starvation, disease or intraspecific aggression (Fuller et al. 2003).

Studies in Minnesota and Denali National Park, Alaska, where wolves are not harvested, reported that approximately 10% of the wolves in each population were killed by other wolves (Mech 1977*a*, Mech et al. 1998). By contrast, in areas of Alaska where wolves were legally harvested, mortality due to intraspecific aggression was much lower (Peterson et al. 1984, Ballard et al. 1987, Ballard et al. 1997). This comparison supports a conclusion that mortality caused by other wolves is compensatory to that caused by harvesting (Mech 2001).

While excluding mortality of pups from birth through autumn, Fuller et al. (2003) estimated that, on average, a wolf population can be expected to stabilize when the total annual mortality rate is approximately 34%, or when the human-induced annual mortality rate is approximately 22%. However, the effects of human-induced mortality can vary substantially among populations (Peterson et al. 1984, Ballard et al. 1987, Fuller 1989, Lariviere et al. 2000, Hayes et al. 2003). In north-central Minnesota, a wolf population experiencing a human-induced mortality rate of 29% was found to be stable or increasing (Fuller 1989). In Alaska, a wolf population declined after harvests ranging from 42 to 61%, but increased by 58% following a take of 32% (Peterson et al. 1984). In Quebec, a population remained stable while facing a sustained harvest of 74%; this population was apparently maintained by immigration (Lariviere et al. 2000). Several other studies have shown that wolf populations can sustain annual winter harvests of 28–47% without permanent declines in their numbers (Mech 1970, Ballard et al. 1987, Ballard et al.1997). Sources of variation include the age and sex structure of the population, the degree of compensation among mortality factors, reproductive status of harvested animals, and the rates of reproduction, immigration and emigration (Fuller 1989, Fuller et al. 2003). In addition, some variation is the result of measurement error and/or the analysis technique used.

Annual mortality rates of radio-collared wolves in the UP averaged between 24% and 32% from 1999 through 2005 (Huntzinger et al. 2005). It is important to note that these mortality estimates are biased because captured wolves were vaccinated for a variety of diseases and treated for mange prior to 2004. This practice may have reduced the amount of natural mortality observed in the Michigan sample.

Additional Impacts

Although wolf populations are able to recover numerically from human-induced reductions, harvest may impact wolves in ways that are less obvious than changes in

population size. Wayne (1996) indicated kinship ties affect social stability and pack persistence. Lehman et al. (1992) found, compared to two protected populations, a heavily harvested population exhibited fewer kinship ties and showed a more rapid rate of genetic turnover. Harvest may also affect age structure of a wolf population. In Denali National Park, where the population is protected, wolves often live 7–10 years (Haber 1996). By contrast, wolves rarely live more than 5–7 years in harvested populations (Stephenson and Sexton 1974, Hayes et al. 1991).

Wolf Population Control Programs

Wolf-control programs have been carried out by government agencies in Alaska and Canada to reduce wolf numbers in specific areas. The primary purpose of these control programs has been to allow populations of game species such as moose and caribou to increase. Larger populations of ungulates were desired for increased harvest by recreational and/or subsistence hunters (National Research Council 1997). Most, if not all, of these control programs were controversial.

The National Research Council (1997) conducted an extensive review of ten predator-control projects designed to increase the number of ungulates available for human harvest. Eight of these projects involved the use of aircraft to reduce wolf numbers and two projects involved ground-based wolf control. The Council concluded that problems in how these predator-control experiments were conducted limited how much could be learned from these efforts. Nevertheless, the Council found that "wolf control . . . resulted in prey increases only when wolves were seriously reduced over a large area for at least four years." It cautioned that the experiments that appeared to be successful used methods (e.g., aerial shooting) that were not politically acceptable. It is not known from these studies whether wolf numbers can be reduced sufficiently with less-controversial methods. Further, the Council found that wolf populations usually recovered to pre-control levels within 4 or 5 years after control efforts had stopped. The design of these experiments did not allow investigators to determine whether the control programs resulted in higher ungulate numbers that lasted long after predator control was stopped.

Only one study has examined wolf control in an area where white-tailed deer are the primary prey. Potvin et al. (1992) evaluated the effect of reducing wolves in a reserve in Quebec on deer numbers, fawn survival and buck harvest. Similar to other wolf-control programs, wolf removal was conducted by aerial shooting. Because of heavy forest cover, wolves were captured and radio-collared during the summer to aid in locating packs during the winter control operations. The results of this study were at least partially confounded by a series of mild winters that allowed deer numbers to increase in the area where no wolf control was applied. Despite this problem, in the area where wolf numbers were reduced by an average of 71% for 3 years, the deer population increased at a rate 15% higher than in the area where no wolf control was applied. This increase in deer numbers did not result in a measurable increase in buck harvest.

Public Harvest

Since the 1970s, when wolves became legally protected in the lower 48 States, legal recreational harvest of wolves in North America has been restricted to Alaska and most provinces of Canada (Hayes and Gunson 1995, Musiani and Paquet 2004). Legal recreational harvest also continues in several Western Europe and Eurasian countries. Chapter 7 (Wolf Harvest as a Recreational Opportunity) summarizes regulations, levels of take, and population impacts associated with recent recreational harvests of wolves in various parts of the world.

Poison

In the past, baits containing poison were often used to eliminate wolves and coyotes from areas in North America and Europe (Sillero-Zubiri and Switzer 2004). Poison baits can be effective, inexpensive to use, but they can kill non-target species (e.g., bears, dogs) and are poorly regarded by the public. Poison (strychnine and compound 1080) used for predator management was banned in the United States in 1972 (Fritts et al. 2003).

Bounties

Bounties are rewards, usually money, given as an incentive for people to capture and/or kill an animal considered to be a threat or pest. In contrast to other wolf population management strategies, bounties are unique because their aim is not to reduce wolf numbers or maintain them within specified limits, but rather to exterminate the species from a particular area (Boitani 2003).

Bounties for the killing of wolves have a long history (Boitani 2003), beginning in Greece in the sixth century B.C. In medieval Europe, efforts to exterminate wolves became organized and focused on killing as many animals as possible, a strategy that continued until the late 1800s (Mallinson 1978). In France, for example, two laws enacted between 800 and 813 A.D. entitled special wolf hunters to receive payment from residents within 4 miles of a kill site (Hainard 1961, Victor and Lariviere 1980). In 1883, 1,386 wolves were killed via this program (Victor and Lariviere 1980); the last recorded observation of a wolf in the original French population occurred in 1934 (Beaufort 1987).

In the area of the lower 48 United States, bounties on wolves were instituted by English colonists in Plymouth, Massachusetts in 1630 (Boitani 2003), approximately 120 years after the last wolves in England were killed (Beddard 1909). By 1700, wolves were exterminated from New England. As the country expanded with settlement westward, principal wolf prey species such as bison (*Bos bison*) were killed off to facilitate livestock grazing (Fritts et al. 2003). Lacking their normal prey, wolves increasingly killed domestic stock. This behavior fueled wolf-extermination efforts, often through use of bounties. In Montana, for example, bounty legislation was enacted in 1883, and by 1930, wolves had been eradicated from that State (Riley et al. 2004). Compared to the rest of the country, wolf populations in the Upper Great Lakes region persisted longer. Bounties were repealed in Wisconsin in 1957, in Michigan in 1960, and in Minnesota in

1965 (Thiel 1993). However, by 1970, the wolf population in the Upper Great Lakes region was restricted to northern Minnesota, and individual wolves were observed only occasionally in Wisconsin and Michigan.

These historical accounts suggest bounties can be extremely effective in managing wolf populations if the management objective is extermination. This effectiveness is enhanced in situations where the population is small and accessible, and mitigated, at least to some extent, when the population is in a remote area (as in Minnesota). The critical threshold occurs when bounty-driven killing exceeds the reproductive rate of the population. Historically, bounty killing was somewhat more effective when carried out by government-sponsored professionals than the general public, but both approaches eventually exterminated the targeted wolf populations.

The economics of bounties are complex. Economic losses from depredation of livestock have historically been one of the most common arguments used to justify bounties (Fritts et al. 2003). However, the costs of administering bounty programs can be substantial. By one estimate, roughly 300 years of North American wolf bounty programs cost governments, livestock associations and private individuals approximately $100 million (Hampton 1997). During the Soviet period, Russia spent more than $300 million on wolf bounties and other payments related to wolf damage (Fritts et al. 2003). Whatever the actual costs, the necessity of making bounty payments and administering a bounty program are always financial liabilities to a government agency.

Zoning

The development and use of zones to manage wildlife is a common approach applied by many natural-resource organizations. Zones can be developed and applied for a number of reasons, including controlling species distribution, varying population density across the landscape, and regulating harvest (e.g., harvest levels, season length, season timing, bag limits). Zoning has been applied in wolf recovery plans (U.S. Fish and Wildlife Service 1992) as well as State management plans that will be implemented after the wolf is removed from the Federal list of threatened and endangered species (Wisconsin DNR 1999, Minnesota DNR 2001). Zone management for wolves is designed to vary management according to available wolf habitat and the potential for wolf-human conflict (Wisconsin DNR 1999). In Minnesota and Wisconsin, wolf-management zones have been developed primarily to manage wolf depredation of livestock. Wyoming's proposed wolf management plan included the use of zones to differentiate management in National Parks and Forest Service wilderness areas and the remainder of the State (Wyoming Game and Fish Department 2003). The Idaho and Montana wolf-management plans do not incorporate zoning but Montana does vary management based on patterns of land ownership (Idaho Legislative Wolf Oversight Committee 2002, Montana Fish, Wildlife and Parks 2003).

Passive Management

Another approach to management of wolf population size and distribution would be to not actively manage the population and let it naturally regulate itself. Under such an approach, management would not prevent a wolf population from increasing to the maximum size the habitat could support. However, actions of individuals intolerant of wolves above a certain level would likely maintain the population below the maximum potential size. If a population did approach biological limits, natural checks on wolf numbers, such as starvation and disease, would likely increase. Large die-offs due to disease during periods of stress, such as winter, would be possible. No agency effort would be expended to control population size. However, this approach would probably require more agency resources for managing wolf-human conflicts.

The number of wolves that could occur in the UP in the absence of human-induced population control can only be roughly estimated. Potvin et al. (2005) developed a spatial habitat model of suitable wolf habitat. Results from the model suggest approximately 27,700 km^2 of habitat in the UP could be occupied by wolves. Maximum midwinter wolf densities (excluding Isle Royale) usually do not exceed 40 wolves per 1,000 km^2 (Fuller et al. 2003). Applying this wolf density to the estimate of suitable wolf habitat suggests the UP could support approximately 1,100 wolves.

Attitudes of Michigan Residents

Setting goals for wolf abundance and distribution in Michigan will be challenging given the conflicting preferences and tolerances of stakeholders (see Chapter 2: Wolves and Social Carrying Capacity). Another challenge will be to determine how to achieve those goals once they are established. Understanding public attitudes regarding the management options is a fundamental step in that process.

This section discusses relevant findings from the 2005 public-attitude study that surveyed a sample of more than 8,000 Michigan driver's license holders statewide and 1,000 livestock growers in the UP and the NLP. Details of the study methods and additional results are presented elsewhere in this document (e.g., Chapter 2; Appendices I through IX). Whereas the discussion in the next chapter (Wolves and Human Safety) centers on managing individual wolves to address problematic wolf-human interactions, the discussion here focuses on methods to manage wolf populations for the purpose of achieving a desired wolf abundance and distribution.

Passive Management of Wolf Populations

One option is to allow wolves to naturally maintain their own population level without active management of wolf abundance or distribution in Michigan (i.e., passive management). Statewide, interested citizens were polarized on the statement that wolves should be allowed to establish their own population levels without management. Interested citizens were as likely to agree as to disagree (45% each) with the passive-management approach, but a slightly larger portion strongly disagreed (21%) than strongly agreed (15%). Respondents from the UP and NLP were more supportive of

actively managing wolves. Regionally, 65% of UP respondents, 49% of NLP respondents, and 43% of SLP respondents disagreed with the passive-management approach. Most UP (78%) and NLP (68%) livestock growers disagreed with a passive-management approach; however, a third more UP growers strongly disagreed. Regardless of residence, respondents who were less tolerant of wolves also preferred active management over a passive approach. Intolerant respondents strongly disagreed with allowing wolves to determine their abundance and distribution (76%). The majority of least-tolerant respondents (64%) disagreed with a passive-management approach, and mid-tolerant respondents were split (44% agreed, 43% disagreed). The most tolerant group tended to agree with allowing wolves in the UP to achieve natural abundance without management (65%).

Further insight is provided by respondent attitudes regarding 'leave the wolves alone' as an option for managing problems associated with wolf-human interactions. This was the least-supported option for each problem scenario presented on the survey. Support for leaving wolves alone was highest when problems involved wolf impacts on deer numbers (32% supported leaving wolves alone) and lowest when interactions involved domestic-animal depredation or public-safety issues (approximately 21% supported leaving wolves alone).

Active Management of Wolf Populations

In general, patterns of support for management of wolf numbers and distribution were closely tied to the method being proposed. Support for lowering the wolf population by killing a portion of the animals ranged from 49% when addressing deer predation, to 54% when addressing loss of domestic animals, to 59% when the issue was public concerns for safety. Fertility control to address any of the three problem situations was supported by approximately one-half of interested citizens. Three-fourths of interested citizens supported selectively killing problem wolves and live trapping with relocation to address either public safety concerns or loss of domestic animals. Reducing the population by trapping and relocating wolves was the most-supported option (65%) for addressing problems with predation on deer.

Fertility control

Effective and affordable means of using fertility control to manage wolf abundance have not yet been proven through research. When asked whether cost-effective means of fertility control to control wolf abundance were already available, one-third of interested citizens were undecided, and one-fourth responded negatively. However, a larger portion of northern respondents thought cost-effective fertility control was not yet possible (e.g., 37% of UP respondents versus 22% of Detroit-area respondents). Approximately 40% of interested citizens believed the technology for effective fertility control did exist at the time of the survey and most of them approved of its use. Only 15% of this group opposed the use of fertility control to address public-safety concerns. Approximately 39% of those respondents who believed the technology did not exist (26%) would approve of its use to address public-safety concerns if it were available.

Lethal control

Respondents were asked to assume the Michigan DNR had decided some wolves had to be removed in a region and to indicate their support or opposition regarding each of four means of lethal removal. In the weighted sample of interested citizens, use of licensed hunters and trappers to remove wolves received the greatest support and use of trained, paid professionals received the least support.

- The use of trained, paid professionals to shoot wolves was supported by 38% and opposed by 49% of interested citizens statewide. Support was highest in the UP (43%) and lowest in southern samples (e.g., 33% of the SLP metro sample).

- The use of trained, paid professionals to trap and lethally remove wolves was supported by only 26% of interested citizens statewide. More support was found in the UP (34%) and less support was found in the urban samples (approximately 24% in the SLP metro and Detroit-area groups).

- Providing a limited number of permits to licensed hunters as a means of reducing wolf abundance was supported by two-thirds of interested citizens statewide. Support ranged from three-fourths of the UP and NLP samples to 57% of the Detroit-area sample.

- Providing a limited number of permits to licensed fur trappers to remove wolves was supported by 60% of interested citizens statewide. Support was highest among UP (75%) and NLP (70%) respondents and lowest in southern urban samples (59% of the SLP metro group, 51% of the Detroit-area group).

The lower approval of wolf trapping is consistent with the lower approval of trapping generally reported among the general public. For example, Koval and Mertig (2002) reported findings of three Michigan surveys (in 1999, 2000 and 2001) showing three-fourths of the public were not opposed to recreational hunting, but only one-half accepted trapping for fur.

Approximately 34% of the weighted statewide sample used for the preceding analysis was comprised of individuals who identified themselves as hunters. Hunters were over-represented among respondents because they have a greater interest in these issues than many non-hunters. Because they held different opinions regarding some of the four options than did non-hunters, a summary of hunter and non-hunter responses are reported separately below.

- The use of trained, paid professionals to shoot wolves was supported by one-third of hunters and opposed by more than one-half (53%). Non-hunters were somewhat polarized on the option. It was supported by 40% and opposed by 47% of this group.

- The use of trained, paid professionals to trap and lethally remove wolves was supported by even fewer hunters (26%) and opposed by 59%. The results among non-hunters were the same.

- Providing a limited number of permits to licensed hunters as a means of reducing wolf abundance was supported by 89% of hunters (71% strongly supported). More than one-half of non-hunters also supported the option (58%) but support was strong among only 27%.

- Providing a limited number of permits to licensed fur trappers to remove wolves received slightly less support from hunters. Although 81% supported the option, only 61% strongly supported it. Fifty-one percent of non-hunters supported this option and 39% opposed it.

Approximately 8% of interested citizens statewide were classified as 'anti-hunting' because they indicated they were opposed to all forms of recreational hunting. They comprised about 15% of the non-hunters and were included in the results above. The anti-hunting group was strongly opposed to all four options but was slightly more opposed to methods that involved trapping. Approximately 60% of the anti-hunting group strongly opposed the use of professionals to shoot wolves, whereas 73% strongly opposed the use of professionals to trap and remove wolves. If this group is removed from the non-hunter respondents, the remaining non-hunters are more supportive of the options and differences between hunter and non-hunter opinions are less substantial.

Hunter opinions on the four options did not differ substantially by region. Although SLP hunters were significantly more opposed (p=0.004) to using professionals to remove wolves by trapping, the difference was small.

CHAPTER 4: WOLVES AND HUMAN SAFETY

Introduction

In a study of wolf attacks worldwide, Linnell et al. (2002) identified four factors commonly associated with wolf attacks on humans:

- rabies
- habituation
- provocation
- highly modified environments (e.g., agriculture, parks)

Numerous records of attacks were made prior to the 20th century, but many cannot be verified. Since 1900, 273 attacks causing a total of 27 human deaths have been documented in Europe; more than 80% of those attacks involved rabid wolves. Attacks have been more frequent in India, Russia, China, Iran and Afghanistan, where 1,579 attacks were reported through 2003; more than 70% of them involved rabid wolves (Linnell et al. 2002, U.S. National Park Service 2003*a*). Predatory attacks on children are more frequent in countries such as India, where natural prey abundance is low, people are generally unarmed, and children often guard livestock. Because of major differences in ecology, geography and local conditions, the frequency of attacks in other areas of the world may not accurately indicate the risks to humans posed by wolves in North America.

Wolf attacks in North America since 1900 were summarized by McNay (2002*a, b*). Eighty wolf-human encounters were reviewed and classified based on seven types of wolf behaviors considered to be causative factors in the attack. Behavior types included agonism (aggressive behavior), predation, prey testing (assessment of an individual as a potential prey item), self-defense, rabies, investigative searches, and investigative approaches. Thirty-nine cases involved aggression by apparently healthy wolves, 12 cases involved rabid wolves, and 29 cases involved fearless or habituated wolves. Included in these cases were several attacks on children, primarily in Alaska and Algonquin Park, Ontario, which resulted in severe injuries in some cases. Between 1900 and 2002, wolf attacks in North America resulted in only two confirmed deaths, both involving rabid wolves (McNay 2002*a, b*). In 2005, wolves were reported to be the cause of death of a man in Saskatchewan, Canada (e.g., Canadian Broadcasting Corporation news report, November 10, 2005). However, the role of wolves in this incident remains unclear.

Management Options

Linnell et al. (2002) suggested three management strategies to reduce the chances of a wolf attack:

- reduce incidence of rabies
- manage habitat and prey populations to provide adequate natural prey
- prevent wolf habituation

In North America, the first two strategies are generally well established. Programs are in place to minimize the incidence of rabies in domestic and wild animals, and prey populations in Michigan far exceed the sizes required to support the wolf population. By contrast, strategies to prevent wolf habituation have only recently received attention. Several national parks recently established wolf-human conflict management plans (U.S. National Park Service 2003*a, b*) that address management of fearless or habituated wolves. These plans focus on a graduated series of responses (D. W. Smith, National Park Service, personal communication). Responses in order of their use include:

1) public education and prevention measures
2) aversive conditioning of fearless wolves
3) temporary closures of facilities with fearless wolf problems
4) lethal removal

A similar approach has been used in Michigan.

Public Education and Prevention

Several techniques appear to be somewhat effective at reducing the impacts and risks of fearless and/or nuisance wolves. Public education on the use of those techniques could help prevent the habituation of wolves and help reduce risks to public safety. Public education could also help foster a realistic understanding of the risks and impacts of Michigan wolves.

In January, 2004 the Michigan DNR began distributing a wolf-activity form designed to track (1) citizens' concerns or complaints about wolf activity in their areas and (2) agency responses to those issues (Prior to 2004, only depredation complaints and wolf observations were recorded). From 1 January 2004 through 31 December 2005, a total of 108 wolf-activity forms were completed. Of all the concerns listed, a perceived threat to personal or family safety was the most commonly checked item on the activity report (35%; n=38). Complaints of livestock depredation (22% n=24) was the second most-commonly checked item. Home/property owners (49%; n=53) comprised the largest percentage of people who called with concerns or complaints. Farmers/livestock producers (31%; n=36) made up the second-largest percentage of callers.

In response to concerns or complaints about wolf activity, the Michigan DNR and USDA Wildlife Services personnel frequently makes site visits to determine the cause of the

concerns and to discuss options for minimizing the perceived problems. Seventy-six site visits were made in response to the 108 wolf-activity forms completed through December 2005. When livestock were involved at particular sites, agency personnel used site visits to discuss husbandry practices that could minimize or eliminate wolf problems, even though neither the Michigan DNR nor USDA Wildlife Services has the authority to require livestock practices that may reduce wolf-livestock conflicts.

Relocation/Translocation

In the past, problem wolves in Michigan were captured and released in remote areas on public lands. However, relocation is no longer recommended as a management technique. This is due to the current difficulty of finding unoccupied territories for relocated animals, and because research has shown translocated wolves do not remain near release sites. Moreover, residents have expressed opposition to the release of wolves near their communities.

Aversive Conditioning

An aversive stimulus causes discomfort, pain or an otherwise negative experience. Examples of aversive stimuli previously used on wolves include rubber bullets, cracker shells, and electronic dog-training collars (shock collars). Effectiveness of aversive conditioning is dependent on learning; wolves may not associate aversive stimuli with their problematic behavior. Research suggests depredation often continues despite the use of aversive stimuli; predators sometimes redirect attacks to avoid sites treated with highest concentrations of repellents (Mason 2001).

In Michigan, a wolf behavior modification kit (a device capable of firing loud cracker shells) is available to residents as a means to conduct aversive conditioning. The personal ability to actively manage wolves with such a device has met with approval among private individuals (B. Roell, Michigan DNR, personal communication). Two other items that have been used on occasion in Michigan have been propane cannons and a wolf siren/light scare device.

Lethal Control

Killing habituated or nuisance wolves is generally tolerated by the public, but it is regularly scrutinized if non-lethal techniques are available (Fritts et al. 2003). Results of the 2005 public-attitude surveys reviewed below show strong public support for killing wolves known to be causing problems. Further, comparison of the 2002 (Mertig 2004) and 2005 surveys with the 1990 survey (Kellert 1990) suggests the support is increasing. The 2005 survey results showed that trapping and shooting, the most common methods used to kill depredating wolves, was acceptable to a large portion of interested Michigan citizens.

Legal Considerations

Under Federal regulations (50 CFR 17.21), Michigan DNR employees and designated agents can take endangered wildlife, without a permit, to remove animals that constitute a demonstrable but non-immediate threat to human safety, provided the taking is done in a humane manner. The taking may involve killing or injuring only if it has not been reasonably possible to eliminate such threat by live-capturing and releasing the specimen unharmed in a remote area. The regulations also state that any person may take endangered wildlife in defense of human life.

The Michigan Endangered Species Protection Law (Part 365 of Public Act 451 of 1994) states that upon good cause and where necessary to alleviate damage to property or to protect human health, wildlife on the Michigan threatened and endangered species list may be removed, captured or destroyed, but only pursuant to a permit issued by the Michigan DNR. Carnivorous animals found on the State list may be removed, captured or destroyed by any person in emergency situations involving an immediate threat to human life, but the removal, capture or destruction must be reported to the Michigan DNR within 24 hours of the act.

Orders authorized under the Wildlife Conservation Act allow the Michigan DNR to issue a permit allowing a person to take a protected (not threatened or endangered) animal upon complaint of damage and following an investigation into the complaint. The Michigan DNR can set conditions of taking and reporting; all permittees are required to keep records of control efforts. Hazing and other methods that do not harm a protected animal (e.g., fencing) do not require a permit in damage-control situations. Orders also allow the permitting of private businesses to contract with private individuals for handling of damage control.

Attitudes of Michigan Residents

Public-attitude Surveys: 1980s-2002

In the 1980s, national studies documented contemporary American attitudes toward wolves (Kellert 1985, 1986). These studies indicated the percentage of Americans with negative views of wolves was almost as large as that which held positive views. Livestock producers as a group were conspicuous in their strong negative views of wolves. Llewellyn (1978) reviewed and analyzed letters to the U.S. Fish and Wildlife Service (USFWS) concerning reclassification of wolves in Minnesota, and found wide variations in attitudes toward wolves. In general, the most favorable impressions of wolves were held by wildlife advocates and residents of urban areas, whereas the most unfavorable positions were held by people in rural areas living closest to Minnesota's wolf range.

Kellert (1990) conducted a survey of public attitudes and beliefs about wolves in Michigan. He found strong support for wolves among most stakeholder groups, with the notable exception of farmers. Deer hunters and trappers had strong positive opinions of wolves. In general, LP residents were supportive of wolves, but exhibited more fear and

less knowledge of wolves than did UP residents. Kellert's survey was conducted in 1990, when wolves were just beginning to re-occupy the UP.

A follow-up survey was conducted by the MSU Department of Sociology in 2002 (Mertig 2004). By this time, wolves had become well-established in the UP. The results of the survey indicated there had been a decline in fear of wolves since the previous survey. Although the public was still generally supportive of wolves, the survey also found strong support for managing both nuisance wolves and wolf numbers. Concerning fear of wolves, 21% of respondents strongly or moderately agreed with the statement: 'wolves in the woods are dangerous to people.' Twenty-nine percent agreed with the statement: 'if I were in the woods and saw a wolf, I would be afraid it might attack me.' Responses to questions concerning management of nuisance wolves indicated considerable support for 'leaving wolves alone so long as no one is injured' (84% of respondents strongly or moderately agreed with this statement). Seventy-three percent of respondents strongly or moderately agreed with 'kill[ing] individual wolves definitely known to be causing problems for people.' Eighty-four percent of respondents agreed with 'trap[ping] and relocat[ing] individual nuisance wolves.' Support for 'killing wolves to reduce their numbers' was mixed: 39% of respondents strongly or moderately supported this action, whereas 35% of respondents strongly or moderately opposed it.

2005 Public-attitude Survey

This section discusses relevant findings from a MSU 2005 public-attitude study that surveyed a sample of more than 8,000 Michigan driver's license holders statewide and 1,000 livestock growers in the UP and the NLP. Details of the study methods and additional results are presented elsewhere in this document (e.g., Chapter 2; Appendices I through IX).

Public perceptions of the wolf as a threat to public safety

Results of the 2005 public-attitude survey do not suggest a continuation of the decline in public fear of wolves found by Mertig's 2002 survey. Sampling and questionnaire designs were different, preventing direct comparisons between the two studies. However, the 2005 data suggest a substantial portion of the public in northern areas consider the public-safety threat posed by wolves to be a serious factor when considering wolf-population goals. The importance of public-safety concerns was assessed by asking whether respondents agreed with the statement: 'the chance of a wild Michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in Michigan.' Approximately one-half of interested citizens statewide agreed with the statement and one-third disagreed. Agreement was strongest in the UP and the NLP (56% and 55% agreed, respectively) and lowest in the two urban samples (38% of the SLP metro and Detroit-area samples agreed). Approximately 16% of interested citizens in each region strongly disagreed.

Respondents were asked how a decision to vacation in a State or National forest area in Michigan might be affected by the presence of wolves. Answers did not differ among

regions, with more than one-half of interested citizens statewide indicating that wolf presence would not affect their choice of where to recreate. Almost one-fifth (17%) of interested citizens indicated the presence of wolves in a particular area might make them more likely to recreate in that area, whereas 22% of interested citizens would be less likely to visit an area if wolves were present. Eight percent of interested citizens were undecided.

A greater portion of the livestock growers indicated the presence of wolves would prevent them from choosing an area for recreation (53% of UP and 40% of NLP livestock growers). Only 3% of UP livestock growers and 6% of NLP livestock growers would be more likely to recreate in an area because of the presence of wolves. Approximately 40% of both groups indicated wolves would not affect their choice. More NLP livestock growers were uncertain (15% of NLP growers versus 2% of UP growers).

A strong majority of interested citizens agreed public concerns about human safety would be an important reason for lowering the number of wolves in an area. Respondents were asked how much importance they would assign to five potential reasons for lowering the number of wolves in an area. 'A concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes' was assigned the greatest importance by interested citizens in all five regional samples (UP, NLP, SLP rural, SLP metro, Detroit area). This concern was 'very important' for 70% of interested citizens statewide and 'somewhat important' for 17% of interested citizens statewide (both numbers based on weighted data). Livestock growers in the UP and NLP were even more likely (81%) to rate human safety as a 'very important' reason to lower the number of wolves in an area.

The second most important reason to reduce wolf numbers among the five posed to respondents was the number of pets actually attacked near homes. Approximately 62% and 24% of interested citizens statewide indicated this reason was 'very important' and 'somewhat important,' respectively. 'The number of farm animals actually lost to wolves" was rated as 'very important' by more than one-half (52%) of interested citizens statewide, ranging from 61% in the UP to 44% in the Detroit area. Fewer than 4% of respondents in each region indicated that this was 'not a reason' to lower the number of wolves in an area. Compared to concern for pets and farm animals, concern for the impact of wolves on deer harvest was much lower and differed regionally. Approximately 44% of UP respondents versus 18% of Detroit-area respondents rated effects on deer harvest as 'very important.' Almost one-third (32%) of Detroit-area respondents and 16% of UP respondents rated this as 'not a reason' to lower wolf numbers. Concern for the loss of hunting dogs showed the same regional trends as did concern for effects on deer harvest, but more respondents rated it as 'very important' (approximately one-fourth of Detroit-area respondents and 41% of UP respondents). Approximately 14% of interested citizens statewide thought a loss of hunting dogs to wolves was not a reason to reduce wolf numbers.

Livestock growers represent a rural group of stakeholders in the northern regions of the State with more exposure to wolf-human interactions. Their responses consistently showed they were more sensitive to the matter of fearless and nuisance wolves than

was the statewide distribution of interested citizens. On the question of whether a safety threat posed to the public was great enough to warrant consideration when deciding how many wolves should be in Michigan, three-fourths of livestock growers agreed, whereas 52% of the general public statewide agreed. More than one-half of the livestock growers (57%) strongly agreed.

Livestock growers were also presented with a list of six factors and asked how much each affected their willingness to have wolves in their farming area. In both the UP and NLP, 63% of livestock-growers said their willingness to have wolves in their farming area was 'greatly decreased' because wolves can force changes in lifestyle for their family, such as reducing their freedom to enjoy their property and roam it at will. Only 10% said their willingness to have wolves in their area was not affected by that condition.

When livestock growers were asked how important each of five conditions would be if they were considering whether wolf numbers should be reduced in their area, 'concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes' was rated as a 'very important consideration' by more than 80% of respondents. Only the 'number of farm animals actually lost to wolves' garnered more concern (87% of livestock growers rated that as a 'very important consideration'). 'The number of pets actually attacked by wolves near . . . homes' was very important to 71% of respondents in both regions. Reduction of deer for harvest and the number of hunting dogs lost were consequences of wolves that caused concern for the fewest livestock growers (about 40% rated each of these reasons as 'very important').

Public perceptions of options to manage wolf problems

Respondents were asked to express their support or opposition to several management options when applied to three different scenarios of wolf problems: (1) loss of livestock, hunting dogs and pets; (2) public-concern over human safety; and (3) deer predation that lowered hunter harvest rates. The management options offered were to:

- leave wolves alone
- selectively kill problem wolves
- reduce wolf population size by killing a portion of the wolves
- live trap and relocate wolves
- use fertility control to reduce population size

Selectively killing problem wolves was not included as an option for the deer predation scenario because it would not be feasible or effective.

Support and opposition regarding the management options depended somewhat on the situation where it would be applied. Respondents were more supportive of all options when the problem to be addressed was public safety or loss of domestic animals, and less supportive of options to reduce predation on deer. However, patterns of support were more closely tied to the method being proposed. Support for the least-preferred option of leaving wolves alone was highest when the issue was wolf predation on deer

(33%) and lowest when public safety was at issue (20%). Reducing wolf population size by killing a portion of the animals to address deer predation was supported by 49% of respondents. Slightly more respondents supported this method for addressing loss of domestic animals (54%) and public concerns for safety (59%). Fertility control to address any of the three problem scenarios was supported by roughly one-half of interested citizens. Selectively killing problem wolves and live trapping and relocating to address either public-safety concerns or loss of domestic animals were each supported by three-fourths of interested citizens. Reducing population size by trapping and relocating wolves was the most supported option (65%) for addressing problems with predation on deer.

There were some regional differences in support for the various options except the option to 'leave wolves alone.' When human safety was at issue, there was more support in the UP for selectively killing problem wolves. Approximately 81% of UP respondents supported the killing of individual wolves (14% opposed). Among Detroit-area respondents, 70% supported and 22% opposed that option. The trend was reversed for the trap and relocation option. Approximately 55% of UP respondents (35% opposed) and 82% (13% opposed) of the Detroit-area sample supported that option. Killing wolves to reduce population size to address public-safety concerns was supported more by northern respondents (e.g., 67% supported and 24% opposed in the UP; 52% supported and 35% opposed in the Detroit-area sample). Northern respondents were polarized on the use of fertility control to address public-safety concerns (43% supported and 40% were opposed in the UP). Southern respondents were more supportive of using this technique (e.g., 59% supported and 27% opposed in the Detroit-area sample).

Effective and affordable means of using fertility control to manage wolf abundance have not yet been proven through research. When asked whether cost-effective means of fertility control to control wolf abundance were already available, one-third of interested citizens were undecided, and one-fourth responded negatively. However, a larger portion of northern respondents thought cost-effective fertility control was not yet possible (e.g., 37% of UP respondents versus 22% of Detroit-area respondents). Approximately 40% of interested citizens believed the technology for effective fertility control did exist at the time of the survey and most of them approved of its use. Only 15% of this group opposed the use of fertility control to address public-safety concerns. Approximately 39% of those respondents who believed the technology did not exist (26%) would approve of its use to address public-safety concerns if it were available.

CHAPTER 5: WOLF DEPREDATION OF LIVESTOCK AND DOGS

Introduction

Wolves normally prefer natural prey, such as deer, beaver and elk, but may kill or injure domestic animals, including pets. When wolves kill or injure a domestic animal in Michigan, management options vary depending on whether the animal is considered livestock. As defined by the Michigan Animal Industry Act (Public Act 466 of 1988), livestock include but are not limited to cattle, sheep, new world camelids, goats, bison, privately owned cervids, ratites, swine, equine, poultry, aquaculture and rabbits. Under Michigan law, livestock do not include dogs and cats. Of the different species of pets, only dogs have been reported killed or injured by wolves in Michigan. In the following sections, livestock and dogs are discussed separately to highlight the differences in available management options.

Livestock Industry in Michigan's Wolf Range

More than 900 livestock farms occur in the UP (USDA 2004; Table 5.1). Farms in this region tend to be clustered because of soil and climatic conditions. Farms are concentrated in the eastern UP, but several other, smaller clusters occur in the northwest and southern portions of the UP (Figure 5.1). Cattle and calf operations are the most common type of farms in the region. The number of livestock present in the UP is approximately 15% of the number present in wolf range in either Wisconsin or Minnesota (T. Meier, USFWS, unpublished data).

More than 2,100 livestock farms occur in the NLP (USDA 2004; Table 5.1). The majority of the farms in the NLP are concentrated around the shorelines of Lake Michigan and Lake Huron and in southern Missaukee County (Figure 5.1). As in the UP, cattle and calf operations are the most common type of farms. There is an average of one farm per 5.1 square miles in the northernmost 21 counties of the NLP versus an average of one farm per 18.1 square miles in the UP. If a wolf population becomes established in the NLP, the higher density of livestock farms in this region suggests the number of wolf depredations could be higher than what has been experienced in the UP.

Privately owned cervids (e.g., deer and elk raised in enclosures) are legally defined as livestock in Michigan. O'Brien et al. (2005) summarized an audit of privately owned cervid facilities in Michigan and found there were 740 such facilities housing more than 32,000 animals. These facilities range in size from less than 1 acre to more than 5,000 acres. At the time of the audit, the UP contained approximately 48 active privately owned cervid facilities housing approximately 2,300 animals. The NLP had approximately 136 active facilities housing approximately 8,900 animals.

Table 5.1. The type and number of farms in the Upper and northern Lower Peninsulas of Michigan (USDA 2004).

Type of Farm	Upper Peninsula	Northern Lower Peninsula[a]
Livestock, poultry and their products (all farms)	916[b]	2,188[b]
Poultry and eggs	107	300
Cattle and calves	643	1,451
Milk and other dairy products from cows	174	316
Hogs and pigs	100	210
Sheep, goats and their products	95	237
Horses, ponies, mules, burros and donkeys	124	330
Aquaculture	6	15
Other animals and other animal products	63	183

[a]Northern Lower Peninsula is defined as the northernmost 21 counties in the Lower Peninsula.
[b]Some farms have more than one type of livestock.

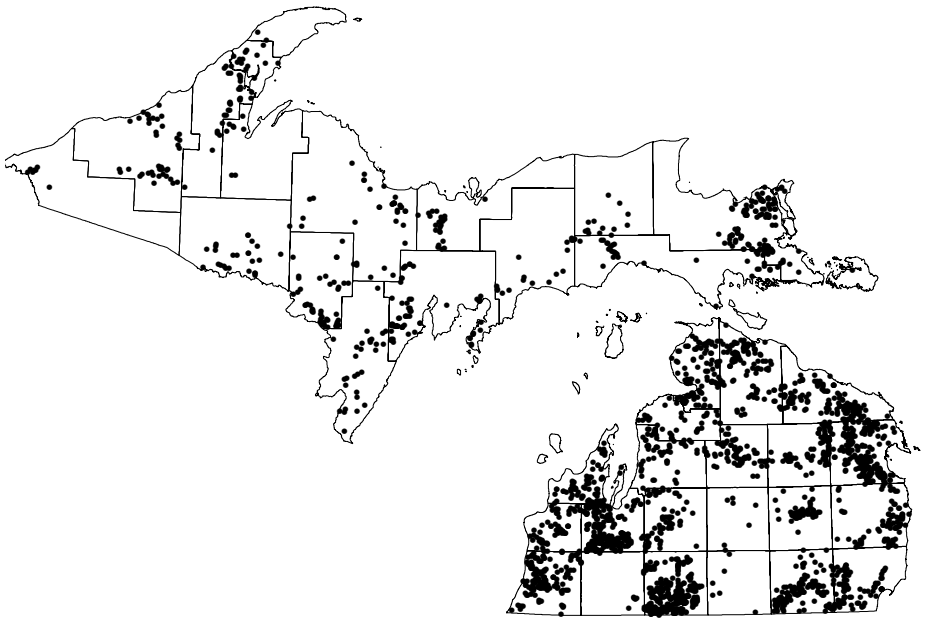


Figure 5.1. Distribution of livestock farms in the Upper and northern Lower Peninsulas of Michigan (B. Nelson, Michigan Department Agriculture, unpublished data).

Wolf Depredation of Livestock in Michigan

A depredation event consists of one or more animals being killed or injured at a given time. From 1998 through 2005, 46 wolf depredation events on 34 different UP farms were verified by Michigan DNR personnel and agents (Table 5.2). To date, no wolf depredation events have been verified in the NLP. With the exception of depredation events involving poultry, the vast majority of events in the UP have involved the loss of a single animal. From 1998 through 2005, approximately 4% of UP farms experienced a verified wolf depredation. Seven of the affected 34 farms have experienced more than one depredation event. The first two cases of verified wolf depredation on privately owned cervids (white-tailed deer) occurred in 2004. The number of livestock depredations has generally increased as the wolf population has grown (Table 5.2). However, wolf depredation can be sporadic and annual fluctuations occur. Experience in Minnesota suggests the number of wolf depredations in Michigan will continue to increase. In Minnesota from 1979 through 1998, the average number of wolf depredations increased from 10 to 100 per year as the wolf population doubled. The increase in wolf depredation was attributed to a combination of three factors: wolf range expansion, colonization of new areas within wolf range, and the learning by some wolves to kill livestock (Harper et al. 2005).

Table 5.2. Number of verified wolf depredation events by livestock type and year in Michigan (B. Roell, Michigan DNR, unpublished data).

Year	Cattle	Sheep	Poultry	Cervids	Total
1998	3	0	0	0	3
1999	1	0	0	0	1
2000	2	1	2	0	5
2001	3	0	0	0	3
2002	4	0	1	0	5
2003	11	1	1	0	13
2004	7	2	0	2	11
2005	2	2	1	0	5
Total	33	6	5	2	46

Wolves are not the cause of all livestock depredations. In 2004, 22 complaints of wolf depredation were recorded in Michigan. Fifty percent of the depredations associated with those complaints were verified as wolf depredation. Twenty-seven percent of the depredations associated with the complaints were verified to have been caused by dogs or coyotes. In the remaining 23% of depredations, causes of death were not determinable; three of five cases involved animals that were missing and no kill sites were found.

Current Management Responses to Depredation of Livestock

An integrated approach that incorporates non-lethal and lethal control measures, technical assistance on animal husbandry practices, and compensation to livestock growers for verified losses has been used to manage wolf depredation in Midwestern and western States (Fritts et al. 2003).

Complaints of wolf depredation of livestock require on-site visits by Michigan DNR or USDA Wildlife Services staff. In addition to assessing the cause of death, the visits provide opportunities to assist livestock growers by providing technical assistance on animal husbandry practices that may reduce future wolf depredations. However, neither Michigan DNR nor USDA Wildlife Services has the authority to enforce regulations regarding livestock practices that may reduce wolf–livestock conflicts. The use of death/carcass pits is illegal under Public Act 239 of 1982, but reports from field staff conducting depredation investigations indicate this law is not routinely enforced.

Compensation for wolf depredation of livestock has been used to encourage wolf conservation in the United States and other countries (Fritts et al. 2003). However, compensation programs are not viewed as a long-term solution to this wolf-human conflict (Wagner et al. 1997). In the United States, compensation programs differ among States in several aspects. Differences include the species for which compensation is offered, requirements of verification prior to compensation, and amount of compensation for depredated animals. In addition, some compensation programs use State funds exclusively whereas other programs use both State and private funds.

In Michigan, two sources of funds are used to compensate growers for losses of livestock to wolves. The State fund is administered by the Michigan Department of Agriculture (MDA) and first became available in 1998. The MDA may seek reimbursement from the Michigan DNR for costs of compensation. The level of compensation to owners has varied over time. The MDA currently pays 100% of the value of the animal at the time of loss. The funding for this program is identified in MDA's annual budget appropriation. Thus, funding could vary from year to year, but it has been consistent for several years. Important stipulations of using this fund are that livestock depredations must be verified by Michigan DNR or its designated agents (i.e., USDA Wildlife Services) before the MDA will pay compensation, and compensation is limited to $4,000 per animal.

The second source of money for compensation is a private fund that was initially provided by Defenders of Wildlife ($5,000) and one citizen ($100) in 2000. This fund has been used to augment MDA payments for young-of-the-year livestock that are killed during the summer. The private fund pays the difference between the value at the time of loss and the fall market value. This fund is administered for the State by the International Wolf Center and as of December 2005, roughly 60% of the money had been disbursed.

Through 2005, the two funds combined paid almost $20,000 for losses of livestock (Table 5.3). Annual payments have generally increased as the wolf population has

grown. Annual compensation payments have been much lower in Michigan than in either Minnesota or Wisconsin (Figure 5.2).

Table 5.3. Payments for wolf depredation of livestock by year and fund in Michigan (B. Roell, Michigan DNR, unpublished data).

Year	MDA[a] ($)	IWC[b] ($)	Total ($)
1998	612.50		612.50
1999	400.00		400.00
2000	850.00		850.00
2001	1,450.00	750.00	2,200.00
2002	3,081.00	567.50	3,648.50
2003	4,370.00	350.00	4,720.00
2004	4,575.00	860.00	5,435.00
2005	1510.00	380.00	1,890.00
Total	16,848.50	2,907.50	19,756.00

[a]MDA - Michigan Department of Agriculture fund; see text for description
[b]IWC - Private fund administered by the International Wolf Center

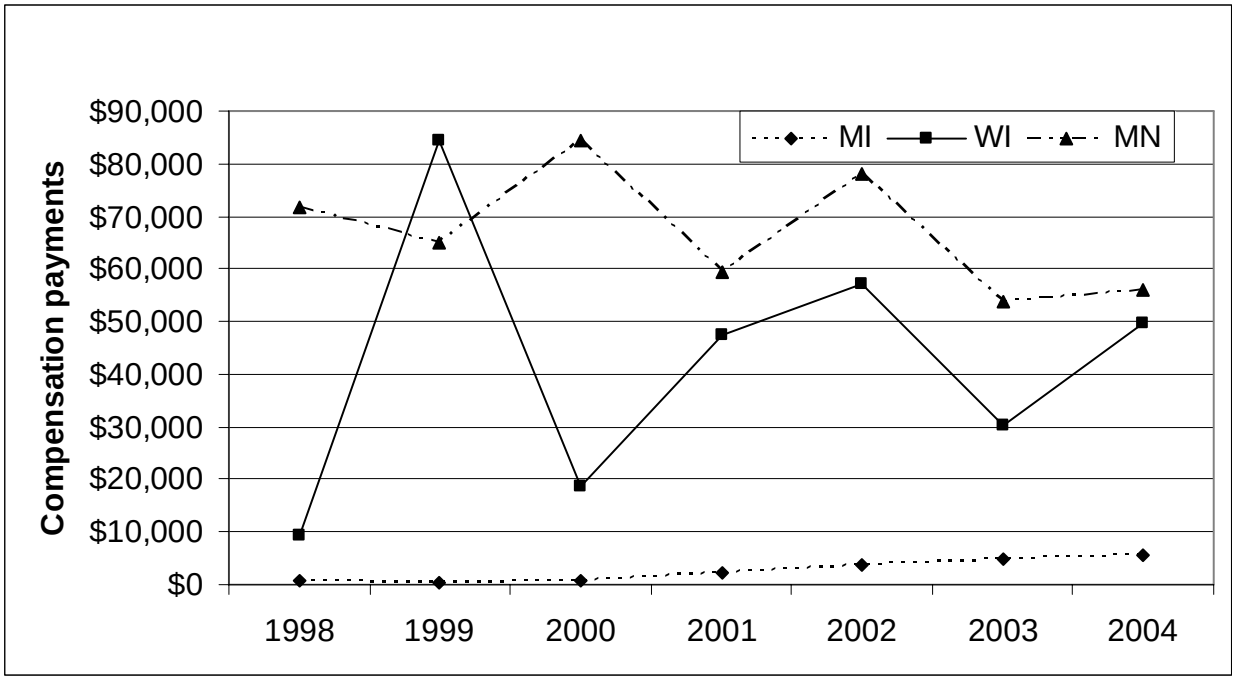


Figure 5.2. Compensation paid for wolf depredation of domestic animals in Michigan (MI), Wisconsin (WI) and Minnesota (MN), 1998–2004. Michigan and Minnesota paid only for livestock and Wisconsin paid for livestock, dogs and veterinary costs.

From 1998 to April, 2003, when wolves were classified by the USFWS as an endangered species, the Michigan DNR and its designated agent (i.e., USDA Wildlife Services) was limited to using non-lethal control techniques to respond to verified wolf depredations. In some cases, light/siren scare devices were deployed, but the primary management response was to trap and relocate wolves from farms that experienced losses. Twenty-three wolves were trapped and relocated from five farms during 1998–2003. These animals were radio-collared and released in areas where there was adequate prey and no known resident wolf packs. Overall, the translocations appear to have been generally effective in preventing further depredation by these animals. Only two of the 23 translocated wolves were associated with a second livestock depredation, and even in these cases, it was not clear whether these animals were responsible for the depredation. In both cases, control activities failed to capture the translocated animals and the wolves remained in these areas and no further depredation occurred. An important drawback of the relocation technique is that the wolves do not stay in the vicinity of the release sites; none of the translocated wolves established a territory that included their release site. Also, given the widespread wolf distribution across the UP at this time, suitable release areas no longer exist. Finally, residents have expressed opposition to the release of problem wolves near their communities.

In April, 2003, the USFWS reclassified wolves in Michigan and other parts of the United States from endangered to threatened (USFWS 2003). As part of the reclassification, authority was granted to allow State, Federal, and tribal agencies and their designated agents to use lethal control when responding to wolf depredation of domestic animals (livestock and pets). This authority was commonly called the '4(d) rule.' Guidelines for responding to livestock depredations under this authority were developed and implemented (Appendix X). During the 22-month period the 4(d) rule was in effect, ten wolves were killed legally in response to verified depredation events.

In early 2005, a U.S. District Court judge enjoined and vacated the Federal rule that reclassified wolves from endangered to threatened status. As a result, wolves were returned to federally endangered status and the Michigan DNR and its designated agents lost the ability to use lethal control.

In April, 2005, the Michigan DNR was issued a sub-permit under a USFWS Region 3 permit (under Section 10(a)(1)(A) of the Federal Endangered Species Act) to kill a maximum of 20 wolves for depredation control during 2005. Under that authority, two additional wolves were killed. In September 2005, a U.S. District Court judge invalidated the Federal sub-permit, on the basis the USFWS issued the sub-permit without providing sufficient public notice and opportunity for public comment.

In September 2005, the Michigan DNR re-applied for a Section 10(a)(1)(A) permit to allow non-lethal, injurious harassment (e.g., rubber bullets) and limited lethal control in response to confirmed depredation events. The permit was issued on May 8, 2006. It authorized the Michigan DNR and its designated agents (i.e., USDA Wildlife Services) to kill a maximum of 40 wolves annually in response to confirmed depredation events. The permit is included as Appendix XI. Guidelines for responding to livestock depredations (Appendix X) are being revised to conform to permit conditions.

Options for Managing Depredation of Livestock

Several potential approaches that may help minimize wolf depredation of livestock have been identified through literature review and consideration of experiences and approaches in other States and countries. These approaches include non-lethal and lethal methods, or combinations of both.

Livestock Husbandry Practices

Depredation risk tends to increase with herd size, distance from people and buildings, proximity to thick cover, and carcasses left in the open (Sillero-Zubiri and Switzer 2004). Thus, husbandry practices influence the risk of wolf-livestock conflicts (Ciucci and Boitani 1998). Provided below are examples of livestock husbandry practices that can be used to minimize conflicts.

- Quickly remove dead livestock. Dead and decaying livestock can attract wolves. Carcass disposal is especially important during the winter because carcasses remain edible for a longer period. Disposal alternatives include using pre-dug holes, composting, and using commercial landfill. Rendering facilities do not exist in Michigan.

- Protect young animals. Delay turnout of young or pregnant livestock until they are more capable of eluding predators (Fritts 1982). Pasture larger, hardier livestock in rougher, distant pastures; pasture young, vulnerable livestock in areas with sparse vegetation cover, close to buildings and humans (Mason 2001, U.S. Department of Agriculture 2002*a*).

- Monitor livestock. Regular human presence may discourage predators from stalking or hunting livestock. Livestock are more vulnerable to depredation during dawn, dusk and night; at small operations, corralling during these time periods may help decrease wolf-livestock conflicts.

- Avoid problem areas. When possible, avoid using pastures with a history of depredation and pastures next to dense cover or rough terrain. When possible, thin or clear a buffer around remote pastures.

- Keep records. Accurate, up-to-date record-keeping systems help to identify when and where depredation problems may occur (Kansas Extension 1980).

- Avoid feeding wildlife. Baiting and feeding can attract and concentrate natural prey and thus can attract wolves (Fritts 1982).

Fencing as Barriers against Depredation

Few fences are absolute predator barriers. Fencing effectiveness is determined by density and behavior of predators in the area, availability of prey, size of pasture, type of terrain, season, design of the fence, quality of construction, and maintenance (Gegner

2002). Fencing may be cost-effective when the potential for predation is high and fencing can be combined with other management techniques (e.g., fencing and guard dogs; USDA 2002*a, b*). Electric fences are more effective than non-electric fences (Green et al. 1994). Existing fences can be retrofitted with electric strands to help exclude wolves (Mason 2001). Fencing is most successful when it is strung before a wolf has established a pattern of movement (Gegner 2002).

Several limitations are associated with using fencing as a barrier to exclude wolves. Fencing is expensive and may be appropriate only for small areas, such as calving or breeding grounds. Some predators may attempt to dig or climb over a fence (USDA 2002*a*). Fences require regular maintenance because of rust, rot, frost heaves, and vegetation growing and falling onto them. Snow and frozen ground can greatly reduce the effectiveness of electric fencing (Gegner 2002).

Livestock-guarding Animals

Livestock-guarding animals may prevent isolated attacks and should be viewed as a supplement to other forms of predator control. It is not the guard animals' fighting ability that protects a flock or herd, but rather their interference with the normal predatory routine (Smith et al. 2000). Effective guarding animals may help livestock owners by (1) reducing depredation, (2) reducing labor (lessening the need for night corralling), (3) alerting owners to disturbances, and (4) allowing for more efficient use of pastures (USDA 2002*b*). Coppinger and Coppinger (1995) recommended guard dogs be established with livestock in possible conflict zones long before the wolves' arrival, giving the guard dogs time to establish their territories.

Several drawbacks are associated with the use of guard animals. Guard animals, including dogs, are vulnerable to wolf attacks (USDA 2002*b*). In some cases, they may be killed by wolves while protecting livestock. Also, guard animals do not guarantee positive results because they could roam away from livestock or injure livestock themselves (USDA 2002*b*). Guard animals may not be suitable in very large pastures (USDA 2002*b*). Finally, guard animals are expensive to purchase and some require extensive training.

The use of guard dogs to deter wolf depredation has been tried in Minnesota with limited success (Fritts et al. 1992). Research to test the effectiveness of guard dogs in Michigan is currently being conducted: a study of depredation rates at farms with and without guard dogs is currently underway (T. Gehring, Central Michigan University, personal communication).

Scare Tactics

Wolves can be frightened by strange odors, sights or sounds (USDA 2002*a*). Examples of scare devices include corral night-lighting, propane exploders, flagging (fladry) and movement-activated guard devices. Frightened wolves may leave an area without disturbing livestock. Scare devices have the best success when they are triggered by the problem behavior, rather than applied continuously. Wolves can become habituated

to these devices after repeated exposure. Varying the position, appearance, duration or frequency of the scare devices, or using the devices in various combinations, may increase effectiveness (Kansas Extension 1980).

Aversive Conditioning

An aversive stimulus causes discomfort, pain or an otherwise negative experience. Examples of aversive stimuli previously used on wolves include rubber bullets, cracker shells, and electronic dog-training collars (shock collars). Effectiveness of aversive conditioning is dependent on learning; wolves may not associate aversive stimuli with their problematic behavior. Research suggests depredation often continues despite the use of aversive stimuli; predators sometimes redirect attacks to avoid sites treated with high concentrations of repellents (Mason 2001).

Lethal Control

Killing wolves to reduce livestock depredations is generally tolerated by the public, but it is regularly scrutinized if non-lethal techniques are available (Fritts et al. 2003). Trapping and shooting are the most common methods used to kill depredating wolves. Poison can be effective for this purpose, but poor public perception, legal constraints (under both Michigan and Federal law), and the chance of killing non-target species make the use of poisons socially unacceptable.

Under State management authority, lethal control methods could be implemented either by government agents, licensed hunters and trappers, or livestock growers. The potential effectiveness of control by livestock growers is unknown.

Compensation Programs

Property damage by wildlife has been considered by some to be a natural risk in agricultural production. However, endangered-species status limits options for abating livestock losses due to wolves. Therefore, compensation programs were designed to assist livestock growers by reimbursing them for losses, with the intention of increasing overall public acceptance for wolf recovery programs. The expected success of compensation programs was based on the assumption that the problem is largely an economic one. Although livestock growers desire and have received economic relief through compensation programs, research has shown the programs have not substantially improved tolerance for wolves (Naughton-Treves et al. 2003, R. B. Peyton, MSU, personal communication).

Additional Considerations for Privately Owned Cervids

Legal Aspects

The Michigan Animal Industry Act (Public Act 466 of 1988) defines privately owned cervids (POC) as livestock, and all rules, procedures and compensation programs that apply to livestock also apply to POC. However, because cervid species are the natural

prey of wolves, wolf depredation of cervids living behind a fence at often unnaturally high densities may be considered a special case.

Compensation for depredation of POC presents another set of issues. Whereas average appraised values for common species of livestock such as cattle, sheep and swine are well documented, values for POC are more subjective and are often higher. Current law restricts compensation to no more than $4,000 per animal.

Practical Aspects

The Operational Standards for Registered Privately Owned Cervidae Facilities (OSRPOCF 2000) stipulate that fences for captive cervid enclosures "must be maintained in a condition to prevent ingress or egress of any cervidae species," and that "the ground edge of the fencing shall remain at or below ground level at all times." Further, openings in the fence are "not to exceed 6 inches square" and "gates must be adjusted seasonally, or more often if necessary, to ensure that the bottom of the gate extends no higher than 8 inches from the ground along the entire length." If a POC facility is in compliance with these fencing standards, it is unlikely an adult wolf could gain entry to a captive cervid enclosure to prey on the occupants. Although small pups could gain entry under a gate or through the mesh of fences, it is extremely unlikely such a small wolf could or would kill a captive cervid, even a fawn or calf.

If a wolf preys upon a captive cervid, some means of ingress into the enclosure must exist, and the fence may not be in compliance with operational standards. If a fence is not in compliance, an argument could be made that the grower should not be compensated for any depredation losses because biosecurity has been compromised and the facility is in violation. On the other hand, a fence may be breached in spite of the due diligence of the facility owner. For example, a tree blown down on a fence could create an unintended opening and allow a predator to enter before the owner finds it.

Wolf Depredation of Dogs in Michigan

Between 1996 and 2005, 31 wolf attacks on domestic dogs were verified in Michigan; 24 dogs were killed as a result of those attacks (Table 5.4). Yearly losses vary and can be disproportionately influenced by the actions of a single pack. Of the 24 wolf-related dog deaths verified since 1996, 50% involved hounds used to hunt bear. Some dogs were attacked in close proximity to their owners' residences.

Table 5.4. Verified wolf depredation of dogs by year in Michigan (B. Roell, Michigan DNR, unpublished data).

	Wolf Depredation	
Year	Dogs Killed	Dogs Injured
1996	1	0
1997	0	0
1998	0	0
1999	2	1
2000	0	0
2001	3	0
2002	4	1
2003	8	3
2004	4	1
2005	2	1
Total	24	7

Reasons Wolves Attack Domestic Dogs

There are several reasons why wolves sometimes attack dogs. Research in Minnesota indicates wolves may attack dogs because of interspecific aggression or because wolves view dogs as prey (Fritts and Paul 1989). Research suggests rural residents who live near the edge of small communities in areas with large wolf populations are more likely to experience wolf-dog conflicts (Fritts and Paul 1989). According to Fritts and Paul (1989), small- to medium-sized dogs, which may be particularly excitable and vocal, are more likely to provoke an attack by wolves. Evidence from some wolf attacks on dogs suggests that wolves may seek out dogs rather than encounter and attack dogs at random (Fritts and Paul 1989).

In Wisconsin, wolves killed 29 dogs and injured 15 others during 1976–2000 (Treves et al. 2002). The highest number of wolf attacks on dogs occurred in August, which coincides with the training season for hunting dogs and the time when wolf pups and adult wolf activity is centered on rendezvous sites.

Current Management Responses to Depredation of Dogs

Reports of wolf depredation of dogs are investigated with the same techniques used for livestock depredations. From 1996 to April 2003, when wolves were classified by the USFWS as an endangered species, the Michigan DNR and USDA Wildlife Services was limited to using non-lethal control techniques in response to wolf depredations of dogs. One wolf that attacked a dog was trapped and relocated in 1999. Authority to use lethal control in response to wolf depredation of dogs was temporarily provided under the 4(d) rule and a Section 10(a)(1)(A) sub-permit, and was subsequently provided under a Section 10(a)(1)(A) permit (Appendix XI). The permit and Michigan DNR guidelines (Appendix X) do not allow the use of lethal control when wolves kill dogs that are free-roaming on, hunting on, or training on public lands. Lethal control may be used when

wolves kill dogs that are leashed, confined, or under the owners' control on the owners' lands. To date, no wolves have been killed in response to depredation of dogs.

Options for Managing Wolf Depredation of Dogs

Perhaps the best approach to reduce the risk of a wolf-dog conflict when hunting with dogs is to avoid areas that are currently being used by wolves. Preventive methods have not been rigorously evaluated. However, the Wisconsin DNR, USDA Wildlife Services, Wisconsin Bear Hunters Association, National Wildlife Federation, Wisconsin Wildlife Federation, and the Timber Wolf Alliance have assembled the following recommendations (http://dnr.wi.gov/org/land/er/mammals/wolf/wolfhuntdog.htm):

- "Prior to hunting a new area with hounds, hunters should determine if wolf depredations have occurred on dogs within the area in previous years. Wolf packs that have killed dogs in one year are more likely to kill dogs the next year."

- "Contact the local DNR wildlife biologist to determine areas where problems have occurred in recent years. Place bells or beeper collars on your dogs to reduce risk of depredation by wolves. Only one dog with bells has been reported being attacked by wolves."

- "Be familiar with your own dog's tracks, so that you can distinguish [them] from any wolf tracks. Move 2 or 3 miles from any rendezvous site, if possible, before releasing dogs."

- "Avoid releasing dogs at baits recently visited by wolves. When looking for bear sign at bait, make sure to also look for wolf tracks."

- "If a specific bait site is receiving a lot of wolf use, discontinue using it until wolves have left, and concentrate on an alternative bait site."

- "Attempt to stay as close to your dogs as possible. In large blocks of remote land, it may be good to have someone on the ground with the dogs as much as possible."

- "Because wolves readily defend their kills, avoid releasing dogs near known deer kills, or vehicle killed deer that may be scavenged by wolves."

Occasionally a 'house' dog can come in contact with a wolf. The National Wildlife Federation (2003) makes the following recommendations to reduce the risk of a pet coming into contact with a wolf:

- "Never intentionally feed wolves."

- "Do not leave pet food outdoors where it may be accessible to a bold wolf. Wolves quickly become acclimated to a consistent food source such as this and may eventually injure or kill pets."

- "Using bait for deer hunting or viewing may attract wolves."

- "If wolves have been sighted near your home, confine pets in pens or move pets indoors for a few days to avoid possible conflicts."

- "Avoid any practice that acclimates wolves to people. Disposal of household refuse, especially meat scraps, may attract wolves. Wolves may become dependent on this food source and become acclimated to the presence of humans as a result."

Currently in Michigan, no programs provide compensation for hunting dogs or pets killed by wolves. Wisconsin is currently the only State to provide indemnification for loss of hunting dogs and pets. Establishing the value of a hunting dog is subjective, depending on the training effort invested and the skill demonstrated (A. P. Wydeven, Wisconsin DNR, personal communication). Wisconsin's compensation program is accompanied by a '5-mile rule.' The rule states that once the location of a dog depredation is publicized, any additional losses that occur within a 5-mile radius of the depredation site will not be compensated. Considerable effort is made to publicly identify areas of concern by using the Wisconsin DNR website and posting signs on the ground.

Attitudes of Michigan Residents

This section discusses relevant findings from the 2005 public-attitude study that surveyed a sample of more 8,000 Michigan driver's license holders statewide and 1,000 livestock growers in the UP and the NLP. Details of the study methods and additional results are presented elsewhere in this document (e.g., Chapter 2; Appendices I through IX).

Livestock Growers

Michigan livestock-grower experiences with depredation

Upper Peninsula and NLP respondents to the livestock-grower version of the public-attitude survey did not differ significantly on the number of years out of the past 5 that they had experienced losses to coyotes. Two-thirds of respondents reported no losses during the past 5 years, 12% reported losses in 1 year, 11% reported losses in 2 or 3 years, and 10% reported losses in 4 or 5 years. Upper Peninsula growers were more likely than NLP growers to know that a compensation program existed for coyote depredation in Michigan (31% versus 11% of UP and NLP growers, respectively).

Approximately 31% (n=69) of the UP livestock-survey respondents reported suspected losses to wolves at least 1 out of 5 years (this also included confirmed losses to wolves). Approximately 84% (n=217) of respondents reported they personally knew of at least one grower who allegedly lost livestock to wolves. Sixty-nine percent (n=173) of the UP livestock-survey respondents were aware of the State compensation program for losses to wolves.

Influence of potential economic loss on livestock-grower tolerance for wolves

When livestock growers were asked how various factors influenced their willingness to have wolves in their farming areas, two-thirds of the respondents indicated economic losses 'greatly' reduced their willingness and only 10% of respondents indicated economic losses were not a factor for them. The possibility of substantial costs to farming methods was ranked as the fourth most-important factor among the six offered (based on group means).

Livestock-grower attitudes about depredation-management approaches

Three strategies were presented in various combinations and livestock growers were asked how satisfied they would be with each combination. The first strategy involved compensating livestock growers for losses. The compensation option was limited to receiving market value at the time of loss versus the possibility of receiving a higher value at a more optimal marketing time. The second strategy involved empowering growers to remove problem wolves that threaten depredation. Under the third strategy, the Michigan DNR or a designated institution would remove problem wolves that have caused depredation problems.

Most growers in both the UP and NLP (84%) said they would 'strongly oppose' wolves in their area if none of these three management strategies were available. About one-half of the growers (52%) reported they would be more supportive of wolves if the management package they preferred most was in place. Of this group that would become more supportive, 83% indicated they would be strongly opposed if none of the options were available. Under a scenario where preferred management options were available, one-fourth of this strongly opposed group shifted to strongly supportive, 40% became somewhat supportive, 10% became neutral, and 20% became less (somewhat) opposed. The 45% of growers who said their tolerance for wolves would not change even if their preferred depredation-management option was available were almost all strongly opposed to the presence of wolves in their area (92%). Clearly, some strategy to manage depredation losses will be important to increase tolerance of livestock growers toward wolves. However, the presence of these strategies does not address all reasons for intolerance as evidenced by the 45% who would not be more supportive given their preferred management package. The distinction is clear: many growers may become 'satisfied' with a management approach to control depredation losses but still remain intolerant of wolves in their area for other reasons.

When given all three depredation-management strategies together, 78% of UP and NLP growers would be 'very' or 'somewhat satisfied' with the management package. In a series of questions, each strategy was alternately dropped from the package to assess how satisfied respondents would be with the remaining two. The least-valued strategy in the combination was a Michigan DNR program to remove problem wolves. When the DNR program strategy was removed, 57% of respondents remained very or somewhat satisfied with the remaining two strategies (empowerment and compensation). However, NLP respondents valued the DNR program significantly more than UP respondents. When compensation was dropped, only 28% of respondents remained

very or somewhat satisfied with the package that empowered them to remove problem wolves and provided a DNR wolf-removal program. More UP than NLP respondents (33% versus 21%) were very or somewhat satisfied with this combination. The most highly valued strategy appeared to be empowerment to control depredating wolves. Only 20% of respondents would be very or somewhat satisfied with a management package that did not empower livestock growers to remove problem wolves. There was no significant difference in opinion between UP and NLP respondents on this point.

The ability to have some control regarding wolves was important to livestock growers. Among six factors that might decrease respondent willingness to have wolves in their farming area, the three rated highest by respondents were each related to some aspect of control: (1) "if wolves are protected and not managed, their numbers may go beyond our ability to control them;" (2) "the law would prevent me from controlling or removing the wolves that pose a threat to my livestock on my own land;" and (3) "other people will decide whether there will be wolves in my region and around my farm and I have little say on the matter." These factors were more important in reducing acceptance of wolves than the concern for economic losses, changes in lifestyle to accommodate wolves, and threat to quality of deer hunting.

Livestock growers overwhelmingly supported the use of tax dollars to compensate for livestock depredation, but more UP than NLP growers strongly supported the idea (84% versus 65%). Upper Peninsula growers were also more likely to strongly or somewhat support tax-dollar compensation for privately own cervids than were NLP growers (69% versus 51%). Support was reduced regarding compensation for lost hunting dogs: 59% of UP growers and 46% of NLP growers strongly or somewhat supported use of tax dollars in that case. About the same support existed for using tax dollars to compensate for lost pets.

A majority of livestock growers also supported use of tax dollars to help farmers pay for methods to help prevent depredation. More UP growers than NLP growers strongly or somewhat supported this use of tax revenues (60% versus 53%), and 26% of NLP growers strongly opposed the idea compared to 17% of the UP growers.

Status of the wolf as a game or non-game species did not influence livestock growers' opinions about use of DNR funds for compensation. Three-fourths of livestock growers in the UP and NLP supported use of DNR funds from hunting and trapping licenses sales to compensate for lost livestock. Only about one-half was supportive of using those funds to compensate for lost hunting dogs or pets.

Influence of management on livestock-grower tolerance for wolves

Compensation and the empowerment to remove wolves that pose a threat to livestock were the two most-important options that produced grower satisfaction with the depredation-management program, but a Michigan DNR program to remove problem wolves was also important. All three options reviewed above appear to increase growers' satisfaction with a depredation program. A substantial number of respondents reported these management options would also make them more supportive of wolves

in their farming area and most of those respondents would be strongly opposed if depredation-management options were not available. As discussed above, even the preferred depredation management by itself did not make 45% of growers more supportive of wolves in their farming area, suggesting they are intolerant of wolves in their farming area for reasons in addition to depredation threats.

Other survey data can be used to make further inferences about whether removal of depredating wolves would increase the tolerance of livestock growers toward wolves. Growers were asked how much each of six wolf-related situations had affected their willingness to have wolves in their farming area. A strong theme of 'control' was found in three of the situations based on focus-group input used to design the survey. The response choices ranged from 'greatly decreased my willingness' to 'has not affected my willingness.' Being prevented from controlling or removing wolves that posed a threat to livestock had 'greatly decreased' tolerance for wolves among 85% of respondents. Concern that lack of management may allow numbers to exceed manageable levels 'greatly decreased' willingness among 83% of respondents. Having other people deciding whether wolves would occupy their farming area and having little say in the matter decreased willingness among three-fourths of the growers. These factors influenced the tolerance of more respondents than did the threat of economic losses due to wolves.

The 2005 public-attitude study suggests that, although removal of depredating wolves and compensation for losses will not make all livestock growers tolerant of wolves, substantially improving tolerance of this group is not possible without the contributions of these management options. The intolerance toward wolves is a complex of attitudes that emerge from other factors that will need to be addressed as well. For example, the perception that fearless wolves pose a serious threat to family and friends of many growers cannot be ignored. More than 60% of livestock-survey respondents said that concerns about lifestyle changes and reductions in freedom to enjoy their own property due to the presence of wolves had greatly reduced their willingness to tolerate wolves in the area.

Interested Citizens

Discussions of statewide results for interested citizens are based on weighted data. The special mailing of this survey to a subset of livestock growers was not included in this analysis. However, a representative portion of agricultural interests were included among the general-public respondents and their input is part of these results.

Importance of wolf depredation of livestock, hunting dogs and pets

A majority of interested citizens were concerned about livestock losses to wolves. One-half of respondents to the general-public survey agreed the number of farm animals actually lost to wolves was a very important consideration when deciding whether to reduce wolf numbers and another third viewed it as 'somewhat important.' Only 3% of respondents statewide described livestock depredation as 'not a consideration.' Importance was not significantly different among the regions in the State.

Fewer interested citizens believed depredation of hunting dogs should be a consideration when deciding whether to reduce the number of wolves in an area. Loss of hunting dogs was 'not a consideration' for 16% of interested citizens, 'very important' for 27%, and 'somewhat important' for 32%. Again, regional samples were not significantly different in their views.

Public acceptance of depredation-control strategies

Respondents were presented with a scenario in which yearly losses of livestock, hunting dogs and pets to wolf depredation were high enough that the Michigan DNR decided something had to be done. They were asked whether they supported or opposed five management options the DNR could implement:

- 'Leave the wolves alone' was opposed by 67% of interested citizens statewide. Support for this option did not differ among the regions.

- Selectively killing problem wolves was supported by 75% of interested citizens and support did not differ significantly among the regional samples.

- Live trapping and relocation of wolves was supported by 74% of interested citizens statewide. This strategy was supported more by southern Michigan respondents (72%) than by northern respondents (e.g., 53% of UP respondents).

- Killing and removing a portion of the regional wolf population to reduce depredation losses was supported by 54% of interested citizens statewide. Differences among regional samples were not statistically significant.

- Use of fertility control to limit a regional wolf population and reduce depredation was also supported by 53% of interested citizens statewide. Differences among the regional samples were not statistically significant.

Empowerment to remove wolves from their own property when their livestock were threatened was an important option for livestock growers who responded to the livestock survey. Among the 188 interested livestock growers who returned the general-public survey, 88% strongly approved of the empowerment strategy. Statewide, a strong majority (76%) of interested citizens also approved of this option. The tendency for more northern and SLP rural respondents to be more supportive was not statistically significant.

Public support for compensation

A majority (58%) of Michigan's interested citizens (excluding livestock growers) strongly or somewhat supported use of tax dollars as compensation for lost livestock but fewer supported use of that funding source for wolf depredation of hunting dogs (34%), pets (40%) or privately owned cervids (33%). Only 39% of respondents strongly or somewhat supported use of tax dollars to reimburse farmers for the expense of taking

measures to prevent wolf depredation (e.g., fences). Support for all of these tax-funded expenditures was slightly higher among UP residents than southern residents.

The general-public survey asked whether Michigan DNR revenues from the sale of hunting and trapping licenses should be used to compensate for these losses, assuming the wolf would remain a protected, non-game species. Statewide, 52% of interested citizens strongly or somewhat supported the idea of using these funds to compensate for livestock depredation. Support was similar in all five regional sample strata. Use of revenues from hunting and trapping licenses for other forms of compensation was less popular. Thirty-nine percent of Michigan's interested citizens supported use of this funding source to compensate for lost hunting dogs and slightly more supported its use to compensate for lost pets. Changing the status of the wolf to a game species did not influence support for use of these funds as compensation. A majority (53%) would still support use of revenues from hunting and trapping licenses to compensate for livestock depredation and one-third supported use of those funds to compensate for either lost hunting dogs or pets.

Attitudes of Hunters Who Use Dogs for Hunting

Because the dogs most commonly lost or attacked in the UP have been in pursuit of bear or furbearers (bobcat, coyote or raccoon), the 2005 survey was sent to 1,000 randomly selected licensed furtakers to obtain sufficient input from these stakeholders. There was a 68% response rate and 92% of respondents were interested in wolf issues. Dogs were used for some form of hunting by 70% of the interested furtakers. Furtakers that used dogs for hunting bear, coyotes, bobcats or raccoons (27%, n=237) are hereafter referred to as 'hound-hunters.' Dogs used by this group are often distant from the hunters while hunting and are more vulnerable to attack by wolves. Another 43% of the interested furtakers used dogs for hunting hare, upland birds, waterfowl or game other than bear or furbearers. This group is referred to as 'non-hound dog hunters.'

Concerns about wolf impacts

More than 80% of furtakers who used dogs for some type of hunting viewed each of the considerations for limiting wolf numbers as 'somewhat' or 'very' important. A loss of farm animals had the most support (90%) as a reason to limit the number of wolves in an area. All considerations were rated as somewhat or very important by more than 80% of the group (a wolf-induced decrease in deer harvest: 86%; a loss of pets: 85%; a loss of hunting dogs: 83%; and human safety concerns: 80%). Loss of hunting dogs was considered to be a 'somewhat' or 'very' important factor by 87% of hound-hunters, compared to 80% of non-hound dog hunters.

Acceptability of management options

Most (90%) furtakers who hunted with dogs opposed the option of 'leaving wolves alone' when livestock, hunting dogs or pets are lost to wolves. Fertility control and live trapping and relocating wolves were opposed by a majority of furtakers (65% and 58%, respectively). Most respondents supported killing a portion of wolves to reduce the

population size (92%) and selectively killing individual wolves causing the loss (83%). A greater percentage of hound-hunters (71%) than non-hound dog hunters (56%) 'strongly' supported the selective killing option.

Hound-hunters (64%) were more likely than non-hound dog hunters (49%) to support using Michigan tax dollars to compensate for hunting-dog loss. Similarly, more hound-hunters (60%) than non-hound dog hunters (43%) indicated that owners should be compensated with Michigan tax dollars for pets lost to wolves.

Forty-five percent of hound-hunters and 27% of non-hound dog hunters supported compensation for hunting dog losses with Michigan DNR revenues from hunting and trapping license sales, assuming the wolf would remain a protected, non-game species. If wolves were classified as a game species, 50% of both groups would support compensation from those funds.

Hound-hunters were twice as likely as non-hound dog hunters to support compensation for pets from those DNR hunting and trapping license revenues if wolves remained a non-game species (41% versus 20%). Approximately 45% of both groups supported compensation for pet loss from those funds if wolves were a game species.

CHAPTER 6: WOLF-PREY RELATIONSHIPS

Introduction

The influence of wolves on prey populations has been the topic of much research and debate. Ungulates are the primary prey of wolves, and the most common ungulate in Michigan is white-tailed deer. Results of public meetings, public surveys and focus groups indicate many Michigan residents are concerned about the extent to which wolves may be reducing deer numbers (R. B. Peyton, MSU, personal communication).

Prey Selection

Wolves prey on a variety of wildlife species, and predation on those species often changes seasonally and geographically (Voigt et al. 1976, Fritts and Mech 1981, Potvin et al. 1988, Fuller 1989, Mech and Peterson 2003). In general, prey abundance, distribution, vulnerability and behavior influence the importance of a particular prey species to wolves as a food source.

In Minnesota, white-tailed deer, moose and beaver make up the majority (>75%) of wolf diet year round (Van Ballenberghe et al. 1975). In that area, the predominance of deer remains in wolf scat indicates deer are the principal prey throughout the year despite relatively high densities of moose (Van Ballenberghe et al. 1975). Seasonal variation in prey selection, or prey switching, is known to occur in most wolf populations and is usually associated with changes in prey abundance or vulnerability. For example, during spring and early summer months, beaver become an important food source (Van Ballenberghe et al. 1975, Voigt et al. 1976, Fritts and Mech 1981, Potvin et al. 1988, Fuller 1989). In June and July, wolves are thought to prey heavily on deer fawns and moose calves when they are more vulnerable and occur in relatively high densities (Voigt et al. 1976, Fritts and Mech 1981, Fuller 1989). In the UP, white-tailed deer and moose are the ungulate prey available for wolves. However, moose are rarely preyed upon by wolves, probably due to the minimal overlap in distribution with wolf pack territories, the low abundance of moose in comparison to deer, and the greater difficulty in killing moose versus deer (D. E. Beyer, Michigan DNR, personal communication). Therefore, wolves in Michigan effectively function in a single-ungulate system. Research in Michigan indicates deer are the primary prey for wolves during winter, with smaller animals such as beaver, snowshoe hare and ruffed grouse comprising minimal percentages of wolf diet (Huntzinger et al. 2004).

Typically, in multiple-ungulate systems where several species are available, wolves can be maintained at higher densities than in single-ungulate systems (Fuller 1990, Kunkel and Mech 1994). In multiple-ungulate systems, the more-vulnerable species commonly predominates as the main food source for wolves (Van Ballenberghe et al. 1975, Fritts and Mech 1981). Prey can use various predator-avoidance strategies (e.g., distribution, behavioral traits, migration) to help them sustain predation losses to their populations and give them a limited temporal or spatial advantage over other species of prey (Seip 1995). For example, in Alaska, where moose, Dall sheep (*Ovis dalli*) and caribou are

available to wolves, moose are the most common prey consumed. Although smaller, Dall sheep and caribou use predator-avoidance strategies that reduce their risk of predation (Ballard et al. 1987). Annual productivity of prey species also affects their ability to sustain predation losses. Species with low productivity, such as caribou, moose and elk, are much more likely to be regulated by wolves or experience declines associated with wolf predation than are species with higher productivity, such as deer (Seip 1995). Existing data on wolf impacts to deer populations in single-ungulate systems are limited, and attempts to extrapolate wolf impacts on other ungulate species to deer can be problematic.

Prey Defenses

Prey and predators coevolved. As a result, prey possess physical and behavioral adaptations for avoiding predation; indeed, most wolf hunts are unsuccessful (Mech 1970). The effectiveness of these adaptations allows prey populations to be sustained, even in areas with robust predator populations. In deer, physical defensive traits include speed, agility, visual, olfactory and auditory acuity, cryptic coloration, antlers, and lack of scent in the very young (Mech and Peterson 2003). Behavioral defenses include vigilance, vocalizations, visual signals, synchronized birthing in local populations, and aggression (Mech and Peterson 2003). Deer also learn to change their behavior to avoid encounters with wolves: they may alter their use of an area, become more vigilant, or group together (Voigt et al. 1976, Mech and Peterson 2003). These changes in behavior may also affect deer sightability by humans and promote the assumption that deer populations have been heavily impacted by wolf predation.

Prey Vulnerability

Prey vulnerability influences predator selection. Selection of more-vulnerable prey is more apparent when prey are abundant (Potvin et al. 1988) or when environmental conditions (such as snow depth) create an advantage for predators by reducing the energy reserves of prey or decreasing their ability to escape (Mech et al. 1971, Nelson and Mech 1981). Selective predation of deer by wolves in winter varies in relation to deer nutritional condition, body size, and ability to cope with differing environmental conditions (Nelson and Mech 1986, Fuller 1991, Huntzinger et al. 2004). For example, fawns in Minnesota (Fuller 1991) and Michigan (Huntzinger et al. 2004) were preyed upon more often than adults during winter. Fawns tend to have lower fat reserves, decreased mobility in deep snow, and are more likely to suffer from the effects of starvation compared to adults and yearlings, all of which predisposes them to predation. Mech and Frenzel (1971) showed adult male deer in poor condition after the fall breeding season experienced increased wolf predation during winter in Minnesota. By contrast, Huntzinger et al. (2004) found wolves in the UP killed adult male deer in proportion to their availability. Studies in Minnesota showed adult deer killed by wolves were older and had more debilitating anomalies and pathological conditions than deer killed by hunters (Mech and Frenzel 1971, Fritts and Mech 1981). Similarly, adult deer killed by wolves in Michigan were generally older than deer killed by vehicles (Huntzinger et al. 2004). A study of wintering deer in Ontario (Kolenosky 1972) showed

no difference in the average age of wolf-killed deer versus human-killed deer, whereas a study in Quebec found that fawns and older deer were selected (Potvin et al. 1988).

Kill Rate

The kill rate of wolves is usually measured during winter months when wolves and their kills are easier to detect by researchers using aircraft. Extrapolating winter kill rates throughout the annual cycle is problematic because there is evidence of substantial seasonal variation in kill rates related to differences in prey vulnerability (Mech and Frenzel 1971, Kolenosky 1972, Nelson and Mech 1986, Huggard 1993, Huntzinger et al. 2004). Also, estimates of kill rates made from the air may be low because some kills may be missed when kills are made during the night, consumed quickly or located under thick conifer canopy. In Michigan, snow tracking of wolf packs has been used to estimate winter kill rates to avoid the potential biases of aerial counts. Kill rates of Michigan wolves have varied five-fold during winters of varying severity. Preliminary information indicates increasing snow depth and decreasing deer condition result in higher kill rates (Huntzinger et al. 2004). This finding is in agreement with other research that found higher kill rates in late winter (Mech 1977*b*, Fritts and Mech 1981, Dale et al. 1995).

The average number of deer killed per year by an individual wolf has been estimated by several studies. Fuller (1989) calculated average annual consumption was 18.8 deer per wolf. Mech (1971) estimated the average wolf killed approximately 15 deer per year. Based on three studies of winter kill rates, Keith (1983) estimated an average annual kill rate of 16.6 deer per wolf. Pimlott (1967) estimated an average annual kill rate of 36.7 deer per wolf. These estimates were generally biased because they were winter studies. Kill rates in winter may not be equivalent to those in other seasons. For example, summer kill rates of moose can be higher due to the vulnerability of calves (Johansson 2004). Summer kill rates of deer have not been assessed. Recent information from Michigan suggests these studies may underestimate actual winter kill rate (Huntzinger et al. 2004).

Wolves have been documented to occasionally kill more prey than they can consume at one time (Mech 1966, Pimlott et al. 1969, Mech and Frenzel 1971, DelGiudice 1998). This behavior, termed ‘surplus killing,’ is a rare occurrence that seems to be tied to unusually deep snow conditions (Fuller 1991, Mech and Peterson 2003). Wolves are an opportunistic predator and are accustomed to a feast-or-famine existence. It is suspected that when wolves encounter highly vulnerable prey, they take advantage of the opportunity to kill multiple animals. Although prey are not immediately fully consumed, wolves typically return and use cached carcasses (Mech et al. 1998).

Influence of Wolves on Ungulate Numbers

As previously discussed, ungulates are the primary prey of wolves. In some situations, wolves may significantly reduce local prey populations, whereas in others, the impact may be negligible (Mech and Peterson 2003). The wolf-prey relationship is complex and is influenced by many factors, including, but not limited to, the number of prey species in

a system, the relative densities of wolves and prey, the responses of both wolves and prey to fluctuations in prey densities, and the effects of environmental influences (e.g., winter severity and disease) on wolves and prey (Mech and Peterson 2003). Each of these factors varies geographically and temporally; thus, there is no general answer to the question of how wolves affect prey densities.

It is tempting to try to use estimates of kill rate to determine the effect of wolves on their prey. Unfortunately, this approach is problematic for at least two reasons. First, as discussed above, estimates of kill rate made during the winter should not be extrapolated to the snow-free periods of the year. Second, the extent to which mortality due to predation is additive or compensatory is unknown. Predation is compensatory when it substitutes for other forms of mortality prey would experience in the absence of predators (Ballard et al. 1987). If predation was completely compensatory, all prey killed by wolves would have otherwise soon died from other causes. Evidence showing wolves tend to kill less fit individuals supports the notion that wolf predation is at least partially compensatory. Predation is additive when it increases the overall mortality rate of prey.

Another factor that makes it difficult to determine whether wolves are limiting prey numbers is the presence of other predators capable of killing the same prey species. There is general agreement in the scientific literature that the presence of a second predator in the system increases the probability predators could limit prey numbers (Mech and Peterson 2003).

Influence of Wolves on Other Species

Wolves impact non-prey species in a variety of ways, often dictated by the degree of niche overlap and food abundance. Mid- and small-sized canids (coyotes and foxes) experience the most interference competition with wolves. This competition typically results in avoidance behavior, direct displacement, or killing of the subordinate species (Peterson 1995, Ballard et al. 2003). Of the canids, niche overlap is greatest between coyotes and wolves (Peterson 1977), but both species can co-exist at low densities or when spatially segregated (Peterson 1995*b*, Ballard et al. 2003). In Minnesota, coyotes were generally absent in wolf core areas (Berg and Chesness 1978). On Isle Royale, coyotes were extirpated shortly after the arrival and establishment of wolves (Peterson 1977). Wolves also limited coyote populations in Yellowstone National Park (Crabtree and Sheldon 1999). However, in other areas, coyotes maintain relatively high densities in areas with wolves (Ballard et al. 2003). Negative interactions between wolves and black bears (*Ursus americanus*) are rare, but a few have been reported at den or kill sites (Ballard et al. 2003). In general, small-mammal populations are not influenced greatly by wolf numbers, but beaver declines were documented on Isle Royale in the 1980s when the species was targeted heavily by wolves due to declines in the primary prey (Shelton and Peterson 1983). Importantly, wolves increase availability of food for scavengers (Mech 1970).

Ungulate Populations and Wolf-control Programs

The National Research Council (1997) conducted an extensive review of ten predator-control projects designed to increase the number of ungulates available for human harvest. Eight of these projects involved the use of aircraft to reduce wolf numbers and two projects involved ground-based wolf control. The Council concluded that problems in how these predator-control experiments were conducted limited how much could be learned from these efforts. Nevertheless, the Council found that "wolf control . . . resulted in prey increases only when wolves were seriously reduced over a large area for at least four years." It cautioned that the experiments that appeared to be successful used methods (e.g., aerial shooting) considered by many to be politically unacceptable. It is not known from these studies whether wolf numbers can be reduced sufficiently with less-controversial methods. Further, the Council found that wolf populations usually recovered to pre-control levels within 4 or 5 years after control efforts had stopped. The design of these experiments did not allow investigators to determine whether the control programs resulted in higher ungulate numbers that lasted long after predator control was stopped.

The studies reviewed by the National Research Council investigated the effects of wolf control on moose and caribou populations. Although these studies are informative, their applicability to wolves and deer in Michigan is uncertain. Interspecific differences in prey densities, population dynamics, and predator responses make direct comparison difficult.

Only one study has examined wolf control in an area where white-tailed deer are the primary prey. Potvin et al. (1992) evaluated the effect of reducing wolves in a reserve in Quebec on deer numbers, fawn survival and buck harvest. As in other wolf-control programs, wolf removal was conducted by aerial shooting. Because of heavy forest cover, wolves were captured and radio-collared during the summer to aid in locating packs during the winter control operations. The results of this study were at least partially confounded by a series of mild winters that allowed deer numbers to increase in the area where no wolf control was applied. Despite this problem, in the area where wolf numbers were reduced by an average of 71% for 3 years, the deer population increased at a rate 15% higher than in the area where no wolf control was applied. This increase in deer numbers did not result in a measurable increase in buck harvest.

Attitudes of Michigan Residents

The following section discusses relevant findings from the 2005 public-attitude study that surveyed a sample of more than 8,000 Michigan driver's license holders. Details of the study methods and additional results are presented elsewhere in this document (e.g., Chapter 2; Appendices I through IX).

Benefits of the Predatory Role of Wolves

The 2005 survey evaluated the importance of eight possible reasons for having wolves in Michigan. One of the proposed reasons was the ecological role of wolves in helping

to control other wildlife populations through predation. The predatory role of wolves was viewed as a benefit by most interested citizens statewide, but responses varied by region and between hunters and non-hunters. The role as predator was a 'somewhat important' or 'very important' reason to have wolves in Michigan for 72% of survey respondents; only 14% of respondents rejected this reason. It was rejected by 36% of UP respondents, but by only 20% of NLP and 11% of SLP respondents. It was a 'somewhat important' or 'very important' reason for having wolves in Michigan for most SLP (74%) and NLP (66%) respondents, but for only 49% of UP respondents. Hunters were more likely than non-hunters to reject this as a reason for having wolves in Michigan (25% versus 8%). Seventy-nine percent of non-hunters and 59% of hunters thought this was a 'somewhat important' or 'very important' reason. Hunters differed regionally: 51% of UP hunters, 29% of NLP hunters and 20% of SLP hunters rejected this as a reason. Non-hunters did not differ among regions.

Importance of Reduced Deer Harvest Due to Predation by Wolves

The 2005 survey assessed respondents' perceptions of wolf impacts on deer hunting by asking whether they agreed with the statement: "wherever wolves are plentiful in Michigan deer range, they will significantly lower the quality of deer hunting." Statewide, 44% of interested citizens agreed with that statement and 29% were undecided. Upper Peninsula respondents were more likely than NLP and SLP residents to agree (63%, 52% and 42%, respectively). Southern Lower Peninsula respondents were more likely to select 'neither agree nor disagree' (31% in SLP versus 17% in UP and 24% in NLP). Hunters were more likely to 'strongly agree' (36%) or 'somewhat agree' (28%) than non-hunters (11% 'strongly agreed' and 24% 'somewhat agreed'). A strong regional difference in hunter opinions was observed across the three regions, but non-hunter opinions did not differ regionally. Sixty percent of UP hunters 'strongly agreed' that when wolves were plentiful they would impact the quality of deer hunting. This dropped to 40% among NLP hunters and 32% among SLP hunters. When 'strongly agree' and 'somewhat agree' responses were combined, 76% of UP hunters, 65% of NLP hunters and 62% of SLP hunters believed 'plentiful' wolf abundance was related to deer-hunting quality. 'Plentiful' was not defined in the survey, but these results gave some indication that most hunters, especially in northern regions, expected an inverse relationship between wolf abundance and deer-hunting quality.

Survey respondents were presented with five possible wolf impacts and were asked how important each would be when considering whether to reduce wolf numbers in an area. One possible impact was "a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer." Four other items involved loss of farm animals, loss of hunting dogs, loss of other pets, and area-resident concerns for public safety. Statewide, lowered deer harvest would not have been a consideration of 26% of the interested citizens. About one-half of respondents described this situation as a 'very important' or a 'somewhat important' consideration (25% each) and 22% of respondents said it would be 'slightly important.' Lower deer-hunter harvest due to wolf predation on deer was the least-important problem, based on the percentage of respondents that would not consider it as a reason to reduce wolf numbers. Fourteen percent of

respondents rated loss of hunting dogs as 'not a consideration' and less than 5% of respondents gave this response for the other three potential impacts.

Statewide, the impact of wolves on quality of deer hunting is an important issue to hunters. Nearly one-half of the hunters described it as a 'very important' consideration and one-fourth rated it as 'somewhat important.' UP hunters were most likely (62%) and SLP hunters were least likely (44%) to rate it as 'very important.' Non-hunters were less likely to rate it as a 'very important' consideration (13%) but were equally likely to describe it as 'somewhat important.' One-third of non-hunters but only 10% of hunters viewed loss of deer numbers to wolf predation as 'not a consideration.'

Support for Managing Wolves to Alleviate Impacts on Deer Numbers

Respondents were asked their opinions about whether various management options were appropriate for each of three situations (loss of domestic animals, public concerns for safety, and lowered deer numbers available for hunter harvest). One management option was to 'leave the wolves alone.' Given a situation where wolf predation was significantly lowering the number of deer for harvest, 33% of respondents statewide supported leaving the wolves alone. Fewer respondents (20%) were supportive of leaving the wolves alone when domestic-animal depredation or public concerns for safety were involved. More than one-half (52%) of respondents considered the problem of lowered deer numbers to be severe enough to warrant managing the wolves and were opposed to the option of leaving the wolves alone. Respondents residing in the UP and NLP were more likely than SLP residents to oppose a passive-management approach to reduced deer numbers (64%, 63% and 49%, respectively). Hunters were more likely to oppose doing nothing than non-hunters (74% versus 42%) and were more likely to be opposed in the UP than in the SLP.

CHAPTER 7: WOLF HARVEST AS A RECREATIONAL OPPORTUNITY

Introduction

Recreational harvest of wolves is a controversial and contentious issue that often polarizes stakeholder groups interested in wolf conservation and management. In *Beyond Wolves*, Nie (2003: 59) wrote: "The issue of hunting and trapping wolves—a public take—after they become delisted is perhaps the most divisive and potentially explosive issue in the entire wolf debate. It engenders the type of emotions and deep core values that make conflict resolution nearly impossible to achieve." Recreational harvest of wolves is also biologically complex (Mech 2001). The amount of harvest a specific wolf population can endure is determined by a suite of factors, including population size, age and sex structure, immigration and emigration rates, birth rates, and natural and human-induced mortality rates.

Wolf Biology and Harvest

Mortality Rates and Population Trends

The growth of any population, including wolves, is dependant on the interaction of the rates of reproduction, mortality, immigration and emigration. From a wolf-management perspective, the rate of mortality is the factor over which managers can exert the most control.

Wolves are prolific, with litters averaging 4–7 pups across much of their range (Fuller et al. 2003). This reproductive capability is higher than that of most ungulates. As a result, wolf populations can remain stable or increase despite relatively high mortality rates (Fuller 1989, Mech 2001).

Annual mortality tends to fluctuate widely from year to year and is often compensatory (Mech 2001, Fuller et al. 2003). That is, human-induced mortality can sometimes replace mortality that would otherwise occur due to natural factors, such as starvation, disease or intraspecific aggression (Fuller et al. 2003).

Studies in Minnesota and Denali National Park, Alaska, where wolves are not harvested, reported that approximately 10% of the wolves in each population were killed by other wolves (Mech 1977*a*, Mech et al. 1998). By contrast, in areas of Alaska where wolves were legally harvested, mortality due to intraspecific aggression was much lower (Peterson et al. 1984, Ballard et al. 1987, Ballard et al. 1997). This comparison supports a conclusion that mortality caused by other wolves is compensatory to that caused by harvesting (Mech 2001).

While excluding mortality of pups from birth through autumn, Fuller et al. (2003) estimated that, on average, a wolf population can be expected to stabilize when the total annual mortality rate is approximately 34%, or when the human-induced annual mortality rate is approximately 22%. However, the effects of human-induced mortality

can vary substantially among populations (Peterson et al. 1984, Ballard et al. 1987, Fuller 1989, Lariviere et al. 2000, Hayes et al. 2003). In north-central Minnesota, a wolf population experiencing a human-induced mortality rate of 29% was found to be stable or increasing (Fuller 1989). In Alaska, a wolf population declined after harvests ranging from 42 to 61%, but increased by 58% following a take of 32% (Peterson et al. 1984). In Quebec, a population remained stable while facing a sustained harvest of 74%; this population was apparently maintained by immigration (Lariviere et al. 2000). Several other studies have shown that wolf populations can sustain annual winter harvests of 28–47% without permanent declines in their numbers (Mech 1970, Ballard et al. 1987, Ballard et al.1997). Sources of variation include the age and sex structure of the population, the degree of compensation among mortality factors, reproductive status of harvested animals, and the rates of reproduction, immigration and emigration (Fuller 1989, Fuller et al. 2003). In addition, some variation is the result of measurement error and/or the analysis technique used.

Annual mortality rates of radio-collared wolves in the UP averaged between 24% and 32% from 1999 through 2005 (Huntzinger et al. 2005). It is important to note that these mortality estimates are, to an unknown degree, biased because captured wolves were vaccinated for a variety of diseases and treated for mange prior to 2004. This practice may have reduced the amount of natural mortality observed in the Michigan sample.

Additional Impacts

Although wolf populations are able to recover numerically from human-induced reductions, harvest may impact wolves in ways that are less obvious than changes in population size. Wayne (1996) indicated kinship ties affect social stability and pack persistence. Lehman et al. (1992) found, compared to two protected populations, a heavily harvested population exhibited fewer kinship ties and showed a more rapid rate of genetic turnover. Harvest may also affect age structure of a wolf population. In Denali National Park, where the population is protected, wolves often live 7–10 years (Haber 1996). By contrast, wolves rarely live more than 5–7 years in harvested populations (Stephenson and Sexton 1974, Hayes et al. 1991).

Historic and Current Wolf Harvests

Prior to the 1970s, wolves in North America were hunted and trapped with few restrictions. Throughout much of their histories, some groups of Native Americans have hunted and trapped wolves over most of the continent (Nelson 1983). Some authors believe aboriginal peoples hunted wolves as a way to enhance ungulate populations (Berkes 1999). Following European settlement, year-round seasons and non-existent bag limits were typical in both Canada and the United States. Few Provinces, Territories or States required registration of wolf pelts, and numbers harvested were roughly estimated at best. Where recreational harvest figures are available, they typically do not include those animals taken by subsistence hunters in Alaska or First Nation members (aboriginal peoples) in Canada.

Since the 1970s, when wolves became legally protected in the lower 48 States, legal recreational harvest of wolves in North America has been restricted to Alaska and most provinces of Canada (Hayes and Gunson 1995, Musiani and Paquet 2004). Legal recreational harvest also continues in several Western Europe and Eurasian countries. The following text summarizes regulations, levels of take, and population impacts associated with recent recreational harvests of wolves in various parts of the world.

Canada

Throughout most of Canada, First Nations members may hunt and trap wolves without restriction. Other residents require licenses for hunting and trapping according to regulations set by individual Provinces and Territories. Depending on local regulations, wolves may be taken by foot-hold traps, snares or shooting.

In 1995, Hayes and Gunson (1995) reported hunters and trappers across Canada took approximately 4,000 wolves annually, representing an estimated 4–11% of the population. In most areas, trappers took more wolves than did hunters. Between 1983 and 1990, however, the number of wolves taken by trappers declined by 40% (Hayes and Gunson 1995).

In 1995, wolf population size in Canada was estimated to be 52,000–60,000 wolves (Hayes and Gunson 1995). Changes in local wolf densities appeared to be influenced primarily by prey availability (Hayes and Gunson 1995). Theberge (1991) indicated that, outside of extreme southern Canada where large human populations occurred and harvest effort was concentrated, recreational harvest did not appear to be limiting the wolf population. In the ten Territories or Provinces where the wolf was classified as a game species, six of the populations were considered stable whereas four were considered increasing in the year 2000 (Boitani 2003).

Alaska

In Alaska, permissible wolf-harvest methods have fluctuated since the 1970s (Alaska Department of Fish and Game 2005). Currently, wolves may be taken by recreational trappers during trapping seasons that average 8 months, with no bag limit. Snaring is allowed and is often the method preferred by trappers in many parts of Alaska (Scott and Kephart 2002). Wolves may be taken as trophy animals and are often harvested incidentally by hunters pursuing other species, such as moose and caribou. The hunting season for wolves is also roughly 8 months, with a bag limit of five animals per year in most units, and ten animals per day in units where wolf control has been approved.

Hunters and trappers take 1,200–1,700 wolves per year (Alaska Department of Fish and Game, unpublished data, 1999–2004). This level of take, which is low relative to the maximum legal harvest, may be due to the limited road access and extreme winter conditions throughout much of the State during the wolf season. At the current level, an estimated 17–28% of the population is harvested annually. In 2000, the wolf population,

which consisted of 6,000–7,000 animals, was considered to be stable or increasing (Boitani 2003).

Recently, the State of Alaska approved a liberalization of hunting methods, particularly for those management units selected for wolf control. Use of snowmobiles, land-and-shoot hunts, and aerial gunning are now allowed in some areas. Some biologists have expressed concern that these harvest methods can locally reduce wolf population densities (Van Ballenberghe 1991, Carbyn 2000). In Alaska, aerial gunning is used specifically in areas where the goal is to reduce wolf population size. Some sectors of the public oppose these techniques on ethical grounds (Stephenson et al. 1995, Musiani and Paquet 2004).

Other States

Minnesota has the largest wolf population of the Great Lakes States, estimated at approximately 3,000 wolves in 2003–2004 (Erb and Benson 2004). Despite the large population size, officials in Minnesota delayed official consideration of a public harvest until at least 5 years after Federal delisting. Other States, however, chose to address the issue during their efforts to develop wolf-management plans. For example, the Montana Wolf Management Advisory Council (2000) offered the following guiding principle with regard to recreational harvest: "Opportunities for regulated public take of wolves through hunting and trapping should be provided as wolf numbers increase, but opportunity should also be consistent with sustaining viable wolf populations into the future, thereby precluding reclassification under Federal law." Accordingly, the Montana Fish, Wildlife and Parks Department intends to provide opportunities for a regulated wolf harvest following Federal delisting of the species. The Idaho Wolf Conservation and Management Plan (Idaho Legislative Wolf Oversight Committee 2002) includes provisions for a regulated public harvest when the number of wolf packs exceeds a certain level. Under the current Wyoming Gray Wolf Management Plan (Wyoming Game and Fish Department 2003), wolves will be classified as either trophy game animals (regulated harvest) or predatory animals (unregulated harvest), depending on population levels and region of the State.

Spain, Poland and Russia

The wolf population in Spain, which included approximately 2,000 animals in the year 2000 (Boitani 2003), is classified as a game species throughout most of the country. In the six communities of northern Spain, where the average annual bag limit was 19% of the wolf population (Blanco 1992), wolves continued to expand into new areas and the population was considered to be stable or increasing in 2000 (Boitani 2003).

Until recently, wolves in Poland were classified as a game species. With an estimated population of 900 wolves, the annual bag limit was approximately 110 wolves, or 12% of the population (Bobeck et al. 1993). With this level of take, the population continued to expand. Today, wolves in Poland are officially protected.

The Russian wolf population does not receive any legal protection and is estimated to include approximately 25,000–30,000 animals. Despite the lack of regulation, the population was considered to be stable or increasing in 2000 (Boitani 2003). Similar to the situation in Alaska, limited road access and winter conditions may prevent higher levels of annual harvest.

Relevance to Michigan

Harvests currently occurring elsewhere in North America seem most relevant when considering a public take in Michigan. However, comparisons between wolf harvests in Alaska and Canada and a potential harvest in Michigan are problematic. Most areas in Alaska and Canada have fewer roads, less access, and far fewer hunters and trappers interested in harvesting wolves. Because of better access and other conditions, hunter and trapper success rates in Michigan could be higher than in these areas. However, many areas of Alaska and western Canada consist of vast open expanses, which make wolves vulnerable to hunters. In Michigan, most wolf habitat consists of dense forests, which provide defense against shooting and could help wolves elude hunters. Therefore, success rate of wolf hunting in Michigan compared to that in Alaska and Canada is difficult to predict. In general, trapping appears to have a higher success rate than hunting.

In Michigan, several steps would need to occur before a legal public harvest could take place. First, the gray wolf must be classified as a Game Animal. Game Animal status in Michigan may be designated only by the State Legislature. The State Legislature must also authorize the first harvest season. If such designation and authorization were conferred, the Natural Resources Commission could then enact regulations pertaining to the methods and manner of public harvest.

Attitudes of Michigan Residents

This section discusses relevant findings from the 2005 public-attitude study that surveyed a sample of more than 8,000 Michigan driver's license holders. Details of the study methods and additional results are presented elsewhere in this document (e.g., Chapter 2; Appendices I through IX).

To assess the utilitarian value placed on wolves as a potential game species, the public-attitude survey offered 'wolves could eventually become another game species for Michigan hunters' as one of eight possible reasons why respondents might want to have wolves in Michigan. More than one-half of all interested citizens (56%) rejected this item as a reason to have wolves in Michigan. One-quarter of respondents indicated that this would be a 'somewhat important' or a 'very important' reason. Non-hunters were almost twice as likely as hunters to indicate that the potential for wolves to become a game species was 'not a reason' for having wolves in Michigan (64% versus 36%). Hunters were more likely than non-hunters (41% versus 17%) to view this as a 'somewhat important' or 'very important' reason.

Regional differences did not exist among non-hunters, but hunter opinions were different across the UP, NLP and SLP samples. Fifty-eight percent of UP hunters compared to 44% of NLP hunters and 30% of SLP hunters rejected potential game status as a reason for having wolves in Michigan. Southern Lower Peninsula hunters were more likely than NLP and UP hunters to select this as a 'somewhat' or 'very important' reason to have wolves (44%, 37% and 24%, respectively). Responses to this item were probably influenced by two factors: (1) the value placed on hunting wolves and (2) the respondents' approval of wolves. A substantial portion of UP hunters approved of wolves less and attributed less importance to any of the eight possible reasons for having wolves than did respondents from other regions. The rejection by UP hunters of the potential game status as a reason for having wolves in Michigan may reflect their reluctance to support wolves for any reason rather than a disinterest in hunting wolves.

Two other surveys (Kellert 1990, Mertig 2004) explored the value placed on consumptive use of wolves. Both studies reported most respondents in the UP, NLP and SLP disagreed that consumptive uses were reasons to have wolves in Michigan ('to be able to hunt them' and 'to be able to harvest their pelts'). However, the overall level of disagreement with those reasons declined among UP residents between 1990 and 2002. These findings are consistent with the 2005 results.

The 2005 survey also explored respondent attitudes about a harvest of wolves for recreational purposes even when control of the population was not needed. Respondents were asked whether they agreed with creating a hunting or trapping season for wolves only to provide recreational benefits, assuming it could be done without endangering the wolf population. One-half of the interested citizens statewide agreed that a legal, controlled hunting season should be created if the wolf population could support it; about one-third of respondents disagreed (12% 'somewhat disagreed' and 21% 'strongly disagreed'). Statewide, interested citizens were more polarized on the question of a trapping season: 48% of respondents agreed and 41% of respondents disagreed that a legal, controlled trapping season should be created if the wolf population could support it.

Approximately two-thirds of respondents statewide supported use of licensed hunters as a means of controlling wolf populations. Of this supportive group, three-fourths also agreed with a hunt for recreational purposes, showing strong support among interested citizens for recreational wolf harvest under either condition. However, approximately 14% of those respondents who agreed with a hunt for population control opposed a hunt solely for recreational purposes. Similarly, among respondents who supported the use of licensed trappers to control the wolf population, 72% also agreed with and 17% opposed trapping exclusively for recreational purposes.

The greatest difference of opinion on a hunting or trapping season for wolves was between hunters and non-hunters. A hunting season for wolves was supported by 83% of hunters statewide. However, non-hunters were split: 43% supported a season and 42% opposed a season. Most hunters also supported a recreational trapping season for wolves (75%) but non-hunters were more likely to oppose (51%) than support (36%) a season.

Regionally, hunting wolves for recreational benefits was supported by fewer respondents in the SLP than in the two northern regions (one-half versus two-thirds). One-third of SLP respondents opposed a hunting season for wolves; less than one-fourth of respondents in the UP and NLP opposed a season. Most UP respondents supported a wolf trapping season for recreational benefits (70%), but support was weaker among respondents in the NLP (59%) and SLP (44%).

Support for recreational hunting or trapping seasons was strongly related to the overall tolerances and preferences for UP wolves (see Chapter 2 for a discussion of the tolerance groups). The greatest support for both recreational wolf hunting and trapping came from the intolerant group. Three-fourths of the intolerant group 'strongly agreed' with the idea of hunting wolves to provide recreational benefits, whereas roughly one-half (47%) of the most tolerant group 'strongly' or 'somewhat agreed.' More than one-half of the other two tolerance groups and the outlier group 'strongly agreed' or 'somewhat agreed' with recreational hunting of wolves. Support was also strong among the intolerant group for recreational trapping of wolves (72% 'strongly agreed'). Among the most tolerant group, only 39% of respondents agreed and 43% of respondents strongly disagreed with recreational trapping of wolves. The remaining groups were also slightly less agreeable to a recreational trapping season than to a hunting season, but nearly one-half of respondents in those groups supported a trapping season.

CHAPTER 8: HABITAT LINKAGES AND CORRIDORS

Wolf recovery in the UP began with immigration of wolves from Minnesota, Wisconsin and Ontario (Thiel 1988, Mech et al. 1995). Migration and gene flow among these jurisdictions help preserve or enhance genetic diversity within populations and helps mitigate the effects of detrimental demographic fluctuations due to environmental catastrophes (Simberloff and Cox 1987, Boitani 2000). Therefore, continued movement of wolves within and among jurisdictions is important for the long-term viability of the wolf population (Michigan DNR 1997, Wisconsin DNR 1999, Minnesota DNR 2001).

The wolf-management plans in Michigan (Michigan DNR 1997) and Wisconsin (Wisconsin DNR 1999) identify the need to cooperatively plan and manage habitat linkages to ensure continued wolf movements among the Great Lakes States. However, neither plan provides specific guidelines for maintaining linkages. The Minnesota plan (Minnesota DNR 2001) indicates there is currently no barrier to wolf dispersal between Minnesota and Wisconsin or Ontario, and does not identify a need to protect wolf dispersal corridors between Minnesota and Wisconsin in the future.

Wolves are effective dispersers (Forbes and Boyd 1997). Adequate linkages currently appear to exist among Michigan (UP), Wisconsin and Minnesota: since the early 1990s, movements of 24 marked wolves between the UP and either Minnesota or Wisconsin have been documented (Mech et al. 1995, D. Beyer, Michigan DNR, unpublished data). There is also evidence of wolves moving between the eastern UP and Ontario across Whitefish Bay and the St. Mary's River (Jensen et al. 1986, Thiel and Hammill 1988).

The types of landscape features that represent barriers to wolf movements are poorly understood. Long-distance movements of wolves through human-dominated landscapes in Minnesota and Wisconsin suggest highways and roads are not barriers (Mech et al. 1995, Merrill and Mech 2000). In Spain, wolves regularly crossed a fenced four-lane highway on bridges over the highway (Blanco et al. 2005). Wolves are also capable of traveling through crop and range land (Licht and Fritts 1994, Wydeven et al. 1998). Wolves can cross ice-covered lakes and rivers (Mech 1966) as well as unfrozen rivers during the summer (Van Camp and Gluckie 1979). However, a series of linear obstacles, such as a river flanked by roads, railways and disturbed habitat, may act synergistically and be more of a barrier to wolf movement (Blanco et al. 2005). Jensen et al. (1986) suggested human settlement along the St. Mary's River was a barrier to dispersing wolves, but some wolves have been able to obtain passage, apparently by avoiding urban areas (Mech et al. 1995).

No formal assessments of habitat linkages have been conducted in the Great Lakes region, but a University of Michigan study did evaluate whether there would be sufficient range to support a viable wolf population in Michigan and Wisconsin in 2020 (Hearne et al. 2003). This assessment focused on several factors, including land ownership and stability of protection, rates of land-use conversion, and changes in human and road density. The results of this study suggested the amount of suitable wolf habitat expected to be available in 2020 would be sufficient to maintain a viable wolf population.

In general, land owned by Federal, State, Provincial or local units of government receive a more-stable level of protection than does privately owned land. Despite the lack of formal assessment, the amount and distribution of government-controlled wild lands in Minnesota, Wisconsin, Michigan and Ontario (Figure 8.1) suggest habitat linkages in the region can be effectively conserved.

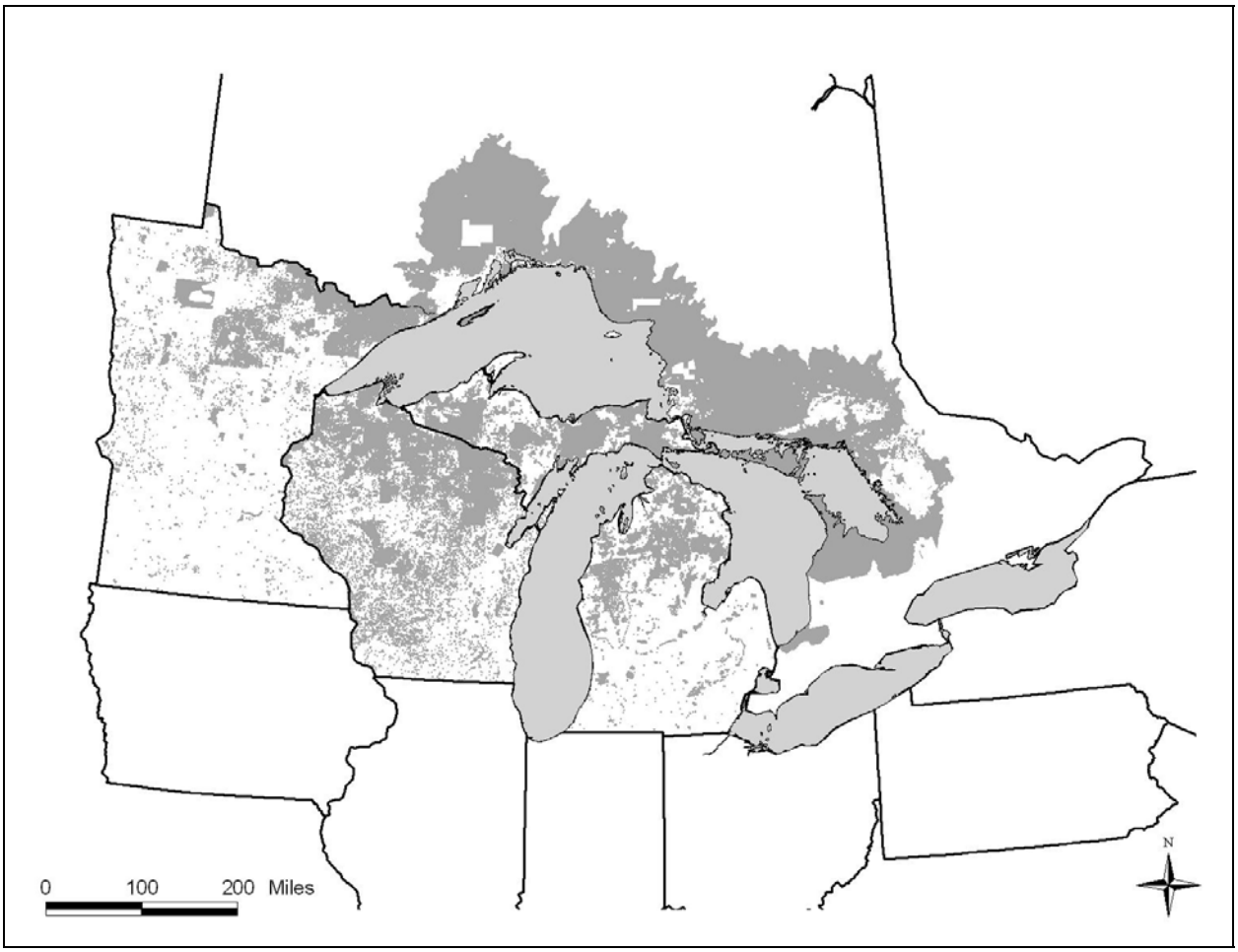


Figure 8.1. Distribution of public lands (shaded gray) in Michigan, Wisconsin, Minnesota and Ontario.

CHAPTER 9: INFORMATION AND EDUCATION

Introduction

During recent decades, much attention has been given to wolves through a variety of media. Publication of wolf-related research in scientific literature became increasingly common (Fritts et al. 2003). The reintroduction of wolves to Yellowstone National Park in the 1990s was preceded and followed by extensive public education (Fritts et al. 1995). Conservation organizations, such as Timber Wolf Alliance, have focused on educating the public about wolves. Centers dedicated to wolf education, such as the International Wolf Center in Ely, Minnesota, have become popular attractions. In 1990, the International Wolf Center began publishing *International Wolf* magazine. In addition, numerous websites, books, documentaries, magazines and other media reports have provided the public with information on wolves.

Increasing exposure to popular information, much of it portraying wolves favorably, has contributed to positive public attitudes that helped foster recovery of the species. Despite the great availability of wolf-related material, however, the general public still holds many misconceptions about wolves. Mertig (2004) found that Michigan-resident knowledge of wolves was generally poor, noting that public understanding had not improved significantly during the 12-year period following re-establishment of the wolf population in the UP.

Researchers, managers and stakeholder groups generally agree an informed public is important for wolf conservation and management (Fritts et al. 2003). The International Union for the Conservation of Nature and Natural Resources Manifesto on Wolf Conservation (Pimlott 1975) recommended the development of wolf education programs to help promote wolf conservation. State and Federal wolf plans (e.g., USFWS 1992, Wisconsin DNR 1999) frequently identify education and outreach as important components of recovery and management programs. The existing Michigan Wolf Recovery and Management Plan (Michigan DNR 1997) identifies education as a high priority. At a series of wolf-focused public meetings hosted by the Michigan Department of Natural Resources (DNR) in May 2005, a large proportion of public comments either addressed directly or otherwise underscored the need for an effective education program (T. Hogrefe, Michigan DNR, personal communication).

Challenges of Education as a Means for Managing Wolf Issues

The need for education is widely recognized, but development of an effective education program can be difficult. Strong public opinions and the controversial nature of many wolf-related issues present educators with several challenges.

Influence of Knowledge versus Values

Education is often expected to persuade stakeholders to modify their attitudes or to change certain behaviors by changing their knowledge of certain issues. Knowledge is

one determinant of attitudes and behaviors, but its influence is often weak (Olson and Zanna 1993, Meadow et al. 2005). What individuals consider to be important (i.e., values) often has a stronger influence. Education can ethically attempt to change what individuals know, but it is not always ethical or possible to influence what they value. Presenting information may induce a desired change in attitude or behavior for one group, but have no influence on another group with different values. To be effective, educators must understand the values of their target audiences and how educational strategies might influence a desired outcome.

Limited Effectiveness of Information

The availability and integration of accurate information is necessary for the public to develop educated opinions about wolves. However, information is only one of several factors that can influence public attitudes. Personal experience and the attitudes of others often affect personal opinions more than information, especially with regard to emotional and divisive issues (Boninger et al. 1995, Petty et al. 1997). Moreover, individuals tend to selectively accept and recall information that is consistent with their pre-existing attitudes (Olson and Zanna 1993, Petty et al. 1997). Similarly, people may interpret new information in ways that support their existing attitudes (Petty et al. 1997).

Wolves, perhaps more than any other wildlife species, tend to elicit strong emotions among stakeholder groups and the general public (Meadow et al. 2005). Personal views of wolves are often based on core beliefs, which are resistant to change (Fulton et al. 1996). In these cases, people are unlikely to change opinions regarding wolves based on the presentation of information alone.

As an illustration of this point, Meadow et al. (2005) assessed the influence of persuasive arguments on public attitudes regarding potential wolf restoration in the southern Rocky Mountains. They found that most people in a sample of registered Arizona, Colorado and New Mexico voters (N=1,300) did not change their positions after hearing arguments for and against wolf restoration. Those respondents who did change their positions generally adopted positions that were more extreme than those that were originally held (i.e., respondents who were initially opposed to restoration became more opposed and vice versa). Also, respondents tended to consider the arguments made in support of their own positions to be more persuasive than the arguments which opposed their positions.

The predisposition of people to accept or reject information based on pre-conceived notions and values, especially among people who already hold strong opinions (Meadow et al. 2005) presents significant challenges for a wolf education program.

Information Bias

Because wolves evoke a broad range of attitudes and opinions, some of which are directly opposed to each other, different groups may find difficulty agreeing on what the focus of an education program should be, or even on the facts to be presented. For this reason, another challenge of a wolf education program is to present information that is

not biased toward a particular point of view. Fritts et al. (2003: 297) noted that: "there are important and critical differences between objective wolf education and wolf advocacy or activism." Those authors (2003: 297) cautioned that, because ethical and subjective values are often involved, "an unbiased portrayal of wolf and wolf management issues may not be possible." This problem becomes important when education is to be used as a tool to help resolve wolf-related conflicts among stakeholders.

Media Coverage

A third challenge facing a wolf education program involves popular presentations of wolf-related issues. Controversy tends to receive media attention and the public may receive inaccurate or exaggerated impressions of the extent of wolf-related conflicts (Mech 1995, Bangs and Fritts 1996). Media coverage may focus on extreme positions held by opposing stakeholder groups, which may give the impression the general public is more divided than it actually is. A challenge for an education program is to achieve a balanced, accurate and objective public perspective in the face of any inaccurate impressions fostered by media, organizations or opinion leaders.

Recommended Approaches

Certain approaches can be used to help overcome the challenges described above. An early step is to define target audiences. Different audiences have different educational needs and will be receptive to different types of information and educational methods. For example, an educational program can target individuals who do not already hold strong opinions about wolves. Research has shown that such individuals are more receptive of new information (Petty et al. 1997, Williams et al. 2002).

Educational materials can be developed in partnership with multiple organizations and stakeholder groups. This approach can help ensure materials present unbiased, accurate information and it can also lend credibility to them. That is, if a person sees that materials have been developed in partnership with a group she/he trusts, that person may be more inclined to consider and accept the presented information.

Another approach is to coordinate educational programs with the media to foster the presentation of accurate information to broad audiences. This and the preceding approaches are merely a few examples of ways to increase the effectiveness of a wolf education program. The expertise of education and communication experts will be important for the development and implementation of these and other strategies.

Information Needs Identified at Public Meetings

Based on input received at the public meetings in May 2005, many Michigan residents want the Michigan DNR to provide information on several wolf-related topics. These topics include but are not necessarily limited to:

- wolf identification
- wolf biology
- number of wolves in Michigan
- location of wolf packs in Michigan
- methods used to monitor the wolf population in Michigan
- role of wolves in the ecosystem
- impacts of wolves on prey populations
- frequency of wolf depredation of livestock
- risks posed by wolves to human safety
- locations of wolf-related conflicts
- how to obtain assistance with wolf-related conflicts
- ways to prevent/minimize wolf-related conflicts

Public Access to Information

Once educational materials have been developed, they can be effective only if they reach and are considered by their target audiences. Therefore, an education and outreach program must use effective ways to present information to the public. Respondents to a recent statewide survey on wolves (Mertig 2004) indicated the sources they used to obtain information on Michigan wildlife. In descending order of importance, these sources (with percentage of respondents either sometimes or frequently using the source) were:

- magazines/books (81)
- television (77)
- newspapers (72)
- family, friends and neighbors (56)
- radio (46)
- DNR (37)
- internet (30)
- other government agencies (15)

The survey design did not allow determination of whether use of different sources was based on personal preferences versus the relative availability of information from each source. Other studies have shown that sources of news, such as newspapers and television, are used more frequently to obtain information on natural resources, but users acknowledge they are less accurate and credible than other, less-frequently used sources of information, such as State agencies (e.g., Gigliotti 1983). The expertise of communication scientists will be important for determining the best ways to present information to the public.

Michigan DNR Wolf Education Efforts

Although the need has been identified (Michigan DNR 1997), the Michigan DNR has not developed a comprehensive wolf information and education plan. However, the DNR does engage in wolf education and outreach activities:

- The DNR employs a full-time Wolf Coordinator (B. Roell). As part of his duties, he frequently gives presentations to inform stakeholder groups about wolf biology, distribution and status, and ways to avoid or minimize wolf-related conflicts. Other DNR employees also give presentations on theses topics. The Wolf Coordinator and other DNR staff regularly respond to inquiries from the media and the general public.

- The DNR distributes a Wolf Fact Sheet and bookmark. These materials provide information on wolf status, identification, regulations, biology, management, history in Michigan, and risks and benefits of wolves.

- The DNR, in cooperation with other State agencies, Federal agencies, and private organizations, promotes an annual Wolf Awareness Week as a way to encourage wolf education and to recognize the wolf as an important part of Michigan's natural heritage.

- In cooperation with several partners, the DNR recently developed two brochures that provide information on ways to identify and avoid livestock losses due to predators, including wolves. Partners in brochure development included MSU, MSU Extension, MDA, USDA Wildlife Services, Michigan Farm Bureau, and Michigan Cattlemen's Association. The first brochure is entitled 'Did a Predator Kill or Injure my Livestock?' and provides information on identifying predator depredation and steps to report a livestock kill. The second brochure, 'How to Minimize Livestock Losses to Predators,' suggests methods to avoid or minimize livestock depredation.

- The DNR is developing a third brochure with cooperation from partners. It is called 'Wolves and Humans' and provides information about the rare threat to human safety posed by wolves, and suggests ways to avoid wolf-human conflicts.

- The DNR website provides information about wolf life history, population size in Michigan, identification, recovery and legal status. However, the wolf web page has not been updated recently and some of the information on population size and legal status is not current.

- In the past, the DNR made available 'wolf education boxes' that contained basic wolf information, a wolf pelt, and a wolf track. These boxes were popular among educators but are no longer available.

- Some DNR interpretive centers and offices display interpretive signs that present information on wolf biology and recovery.

Attitudes of Michigan Residents

This section discusses relevant findings from the 2005 public-attitude study that surveyed a sample of more than 8,000 Michigan driver's license holders. Details of the

study methods and additional results are presented elsewhere in this document (e.g., Chapter 2; Appendices I through IX).

Questions 16a-e (see Appendix II) of the survey addressed beliefs relating to certain key aspects of wolf management. As discussed above, beliefs are not the only factor influencing attitudes and behaviors, and responses to a survey can not be used to show that certain beliefs 'cause' particular attitudes. However, beliefs are important factors and an assessment of beliefs related to problematic attitudes or social conflicts will be necessary for the development of an effective wolf education program.

Question 16a: "The Michigan DNR should let the wolves maintain their own population level in the UP without trying to manage them."

Thirty-one percent of UP respondents agreed with allowing wolves to maintain their own population levels. Agreement increased from north to south (e.g., 48% of interested citizens from the Detroit-area sample agreed). Statewide, 44% of respondents (weighted data) agreed with allowing natural regulation of the wolf population. The majority of hunters disagreed with this approach (56% disagreed, 35% agreed). Non-hunters were more evenly divided on the issue (40% disagreed, 48% agreed).

Some interested citizens who agreed with a passive-management approach may not have been aware of the costs and risks posed by wolves to some members of society or of the consequences when wolf populations exceed their carrying capacity. Additional information may help some individuals evaluate the consequences of a passive-management approach. Others may already understand those consequences but place more value on allowing wolves to be limited by biological rather than social factors. These latter individuals would probably not be influenced by more information about consequences of such an approach.

Question 16b: "Wherever wolves are plentiful in Michigan deer range, they will significantly lower the quality of deer hunting."

Current science does not support the statement addressed in question 16b; the impacts of wolves on deer in Michigan depend on many factors that vary both geographically and temporally. Wolves may have noticeable effects on the quality of deer hunting in some localized areas, but have no measurable effects in other areas. Much scientific uncertainty on this issue remains.

Compared to southern and urban respondents, northern and rural respondents were more likely to agree with the statement addressed in question 16b. Almost two-thirds of UP respondents compared to one-half of Detroit-area respondents agreed. Statewide, 44% of interested citizens agreed and 29% were undecided.

Degree of agreement with this statement is strongly related to issues regarding the impact of wolf predation on hunter opportunity to harvest deer. Two-thirds of hunter respondents versus one-third of non-hunter respondents statewide agreed that large numbers of wolves would reduce the quality of deer hunting. Hunters were three times

as likely as non-hunters to 'strongly agree.' Upper Peninsula hunters were more likely than SLP hunters to agree (76% versus 62%); however, a majority of hunters in all regions agreed. Upper Peninsula non-hunters were also more likely than SLP non-hunters to agree with the statement (46% versus 33%).

A theory of cognitive consistency suggests respondents who dislike wolves for any reason will tend to agree with any belief that supports their position. It cannot be inferred that intolerance of wolves is caused by a belief in the inevitable impact of wolf predation on deer hunting, or that providing information to the contrary will cause more tolerance. However, it is likely that many deer hunters in the UP will not tolerate wolves as long as they believe wolves have an adverse effect on the quality of deer hunting. Helping them gain a scientific understanding of the wolf-deer relationship may be a necessary but insufficient prerequisite to a shift in attitudes.

Question 16c: "The chance of a wild Michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in Michigan."

Statewide, one-half of interested citizens agreed with this statement. Northern respondents were more likely than southern respondents to agree (e.g., 59% of UP respondents agreed, whereas 39% of Detroit-area respondents agreed).

Responses to this question do not provide a straight-forward measure of a simple belief. Some individuals may believe the risk to humans posed by wolves is extremely small, but also value wolves in Michigan so little that they are not willing to accept any risk associated with their presence. Others may be more tolerant of wolves in Michigan if they believed the risk is small and that actions can be taken to further reduce the risks to themselves, their family and their property. Therefore, these results may be useful, but they do not necessarily predict that information will increase tolerance for wolves among all who agree with the statement addressed in question 16c.

Question 16d: "We already have practical and effective methods of reducing wolf fertility . . . that could be used to limit wolf numbers."

Although research is being conducted, methods of cost-effective fertility control for large-scale population management are not currently available. Further, potential risks and side-effects are associated with the use of fertility control (see Chapter 3 for a more-detailed discussion).

Statewide, 38% of respondents agreed with and 35% of respondents were undecided regarding the statement addressed in question 16d. Responses were generally similar across regions, but SLP respondents tended to be somewhat more undecided and UP respondents were slightly more likely to disagree.

Question 12e (see Appendix II) asked whether respondents supported use of fertility control when strong public concerns for public safety existed regarding wolves. A large portion (41%) of respondents who 'strongly supported' this option also 'strongly agreed'

that fertility-control measures already were available. This combination of support and perception may be a barrier to selecting means of effective control because a segment of stakeholders may pressure decision makers to use a technology that does not currently exist.

Question 16e: "The most effective way to avoid wolf problems is to educate the public on how to live with wolves."

Question 16e asked about the importance of education in managing wolf issues. Nearly 70% of interested citizens 'strongly agreed' (46%) or 'somewhat agreed' that "the most effective way to avoid wolf problems is to educate the public on how to live with wolves." To some extent, this attitude may reflect a naive assumption that education will resolve most problems, but it does suggest a strong public preference for investing in educational strategies where they can be shown to be effective.

CHAPTER 10: FUNDING FOR WOLF MANAGEMENT

The Michigan DNR is committed to the conservation, protection, management, use and enjoyment of the State's natural resources for current and future generations. Since wolves have become re-established in Michigan, they have once again become an integral part of the natural resources of the State. In the context of the Michigan DNR's mission and its implicit public trust responsibilities for the State's wildlife, wolves are a necessary focus of research and management activities.

As the wolf population has grown, research and management costs have also increased. Given the widespread population and diverse management needs, the wolf program has been expensive. Due to long-term commitments to conserve and manage the wolf population, the program will continue to be expensive into the foreseeable future. Costs associated with the Michigan DNR wolf program include expenses for salaries, wages, travel, equipment, facilities, livestock compensation, and information and education materials. In the future, additional expenses may be necessary; those additional costs will depend upon management decisions and direction.

Funding and personnel involved in wolf research and management in Michigan is provided by a variety of sources, agencies, non-governmental organizations and Tribes (Tables 10.1, 10.2). Funding sources used by the Michigan DNR for wolf management have included Section 6 Endangered Species funding, the Michigan Non-Game Trust Fund, Wildlife Restoration funds, Game and Fish Trust funds, and the Wildlife Conservation and Restoration and State Wildlife Grants programs.

Although Section 6 Endangered Species funding seems to be the most appropriate source for a federally listed endangered species program, funding from this source has not been available for wolf-related projects in Michigan for more than 10 years. This funding has been unavailable due to the small amounts of funding available for dispersal to the eight States within the USFWS Region 3 (approximately less than $400,000 per year) and the low ranking wolves have received in the internal USFWS Region 3 endangered species priority matrix (wolves generally ranked about 48 out of 80 species). By contrast, the USFWS has been the primary sponsor and source of money for on-the-ground operations for wolf recovery programs in western States. In 2004, more than 1.7 million dollars were earmarked for recovery efforts in the Western Distinct Population Segment, whereas no money was earmarked for research and management in the Great Lakes States. Although the USFWS has recorded expenditures on the wolf program in Minnesota, Wisconsin and Michigan, most of the effort has been administrative in nature. The majority of research and management activities in Michigan have been funded by the State, in some cases using Federal dollars earmarked exclusively for State-administered programs. A notable exception in Michigan has been the work conducted by USDA Wildlife Services. USDA Wildlife Services personnel have been involved with the wolf program in Michigan since 2000 and have played a key role in research trapping, the winter track survey, training of field staff, and program planning.

At all ten wolf-focused public meetings held across Michigan in May 2005, the public raised concerns pertaining to funding for wolf research and management. Citizens questioned whether stable and adequate funding would be available to effectively address future wolf-management needs. Concerns regarding funding were diverse, and ranged from the difficulties and expense of population monitoring to the maintenance of adequate staffing levels to ensure timely response to depredation complaints. Citizens also suggested numerous potential funding sources for continuing wolf management in Michigan.

Table 10.1. Funding sources for wolf research and management in Michigan.

Source	Type of Fund	Restricted?	Remarks
Section 6 Endangered Species	Federal, passed through to States in the eight-State USFWS Region 3	Yes: for federally listed species only	Wolves have not been a priority for these funds for USFWS Region 3; limited availability; competitive among States
Non-Game Trust Fund	State, formerly from income tax check-off; now from license plate sales	Yes: for non-game species and programs	Limited availability, especially since elimination of tax check-off; especially appropriate for education and outreach programs
Wildlife Restoration	Federal, Pittman-Robertson funds passed through to States	Yes: for birds or mammals	Traditionally used for game species only, yet not restricted to game species; available for some wolf-related work
Game and Fish	State, derived from hunting and fishing license sales	Yes: for wildlife restoration and associated activities	Traditionally used broadly for game species and related programs; available for wolf-related work, including education and outreach
General Fund	State, derived from general tax revenues	Yes: for indemnification payments	Administered through Michigan Department of Agriculture
Wildlife Conservation and Restoration and State Wildlife Grants	Federal, passed through to States	Yes: for species in greatest need of conservation, which include wolves	Currently cannot be used for substantive education and outreach programs

Table 10.2. Agencies and organizations involved with the Michigan wolf program.

Agency/Organization	Efforts	Remarks
Michigan Department of Agriculture	Livestock indemnification program	Also provides some technical support to livestock producers
Michigan DNR	All aspects of the wolf program	Primary agency responsible for all wolf-program activities
National Park Service	Logistical support, education and outreach, planning	Required by Federal Endangered Species Act to take actions to promote and enhance endangered species populations
Non-governmental Organizations	Education, outreach and advocacy efforts	
Safari Club International – Michigan Involvement Committee	Funding for specialized equipment and travel	Has provided direct funding for DNR-sponsored research projects on wolves
Tribes	Winter track surveys, education and outreach, planning	
Universities	Research, education and outreach	Now includes social research
USDA Forest Service	Logistical support, NEPA compliance for National Forest land, education and outreach, planning	Required by Federal Endangered Species Act to take actions to promote and enhance endangered species populations
USDA Wildlife Services	Research, track surveys, depredation trapping, training, planning	Designated as agents of the State
U.S. Fish and Wildlife Service	Administrative and logistical support, some funding for attitude survey pilot project and equipment, some funding oversight	Primary Federal agency responsible for endangered species management

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APPENDIX I:
METHODS USED IN THE 2005 SURVEYS REGARDING MICHIGAN ATTITUDES ABOUT WOLF-MANAGEMENT ISSUES

Previous studies have examined Michigan public attitudes regarding wolf issues. Those done before 2000 may no longer reflect current public opinions given the substantial change in wolf abundance and distribution in the UP. More recent surveys are restricted by low response rates or small sample sizes, but each contributes to our understanding of basic public attitudes regarding wolves. To ensure current social data were available during revision of the Michigan wolf-management plan, the MSU Department of Fisheries and Wildlife undertook fresh social inquiry that explored issues identified from sources such as public meetings held in 2005. The primary source of data came from three different questionnaires mailed in 2005. These questionnaires were designed to address specific management questions relevant to the current wolf-management planning process. A general-public version was sent to 8,500 members of the general public and a slightly modified version was sent to 1,000 licensed furtakers. Another modified version was sent to 1,000 livestock growers. The three versions of the questionnaire are provided in subsequent appendices.

As a precursor to the mail survey, nine focus-group meetings were held with two main purposes: (1) to refine understanding of the issues identified during ten wolf-focused public meeting held in the spring 2005; and (2) to test and improve questions being considered for the two statewide wolf mail questionnaires. Meetings were held with: (1) eastern UP livestock producers, (2) western UP livestock producers, (3) UP hunters who use dogs, (4) NLP hunters who use dogs, (5) UP deer hunters, (6) NLP deer hunters, (7) wolf conservationists, (8) wolf protectionists, and (9) Michigan trappers. All 78 participants in these meetings were provided opportunities to comment on later drafts of the questionnaires; 52 provided input on the revised items. This input led to several revisions before final versions were sent to samples of the Michigan public. A detailed report on these focus-group discussions is included among the appendices.

The questionnaire developed specifically for livestock growers contained many of the same questions as the general-public survey, but included others that addressed specific livestock-grower concerns for livestock depredation issues. This livestock-grower survey was sent to approximately 500 livestock growers in the UP and 500 livestock growers in the NLP. Names for these mailings were obtained from lists maintained by MSU Extension agents. All names on the UP list were used, but a random sample of 500 names was selected from the longer list of NLP growers.

To ensure sufficient responses from all regions of Michigan on the general-public survey, five stratified random samples, rather than a single statewide random sample, were obtained. For example, the less populated UP was over-sampled to ensure adequate numbers of responses and the Detroit-area population was under-sampled to avoid having this group dominate the final data set. Final samples drawn included: the UP (n=1,500), NLP (n=2,000), Detroit Tri-County area (n=1,500), SLP rural counties (n=2,000) and SLP metropolitan counties (n=1,500). The general-public questionnaire

was also sent to 200 UP livestock producers and 200 NLP producers to obtain their input on questions not included in the livestock-grower version. A sample of licensed Michigan furtakers (n=1,000) was also surveyed in an attempt to contact a sufficient number of hunters who use dogs vulnerable to wolf depredation and other furtakers who are directly affected by the presence of wolves. The furtaker survey version differed by only two questions from the general-public survey.

The stratified sample ensured that each region was sufficiently represented to allow detailed analysis. However, to draw conclusions regarding a statewide distribution of opinions, the data from these stratified samples were weighted so the contribution of each sample stratum (e.g., Detroit-area sample or UP sample) was adjusted to its representative proportion in the State. We developed weights for each region based on the known regional populations and the different response rates of interested citizens in those regions (i.e., those who returned a survey and indicated an interest by answering wolf-management questions). More details of how weights were calculated are presented in a later section of this appendix.

Weighting the data for analysis corrected for bias and did not compromise the accuracy of results. However, the more important policy question is whether priority in decision-making should be given to the statewide profile of opinions or to opinions of specific regional or interest groups. When making wolf-management decisions and setting policy, how should policy makers weight opinions from the more densely populated SLP and those from the UP, where the human population is less dense but directly affected by the presence of wolves?

One final caveat is in order. The survey results provide an understanding of the true range and distribution of opinions among Michigan citizens who are interested in wolf management. The results may be interpreted as reliable and valid measures of existing public opinion in 2005 regarding selected wolf-management issues. However, they cannot be interpreted as a 'vote' or necessarily as a mandate for policy. Non-respondents might have been more interested in responding if it had been posed as a 'vote' on options. Further, there is no way of knowing whether these public opinions were based on good information. Some opinions are no doubt based on incorrect perceptions of wolf-management issues. Some of our respondents have experienced the presence of wolves in their local environment. Most have not. When biological data contradict popular opinion, the decision makers will need to decide whether the appropriate management response is to conduct public education to shift opinion or to implement those measures desired by the majority of the public. At the very least, decision makers and policy makers are themselves obliged to become informed as they consider and use the findings of these surveys.

Pilot-testing the Survey

As a pilot-test, the general-public survey was mailed to a random sample of 100 Michigan residents in each of four regions of Michigan: (1) UP, (2) NLP, (3) SLP rural counties and (4) SLP metropolitan counties. The pilot mailing included a pre-notice letter (sent October 5, 2005) and the survey (sent October 11, 2005). When adjusted for

non-deliverables, the final response rate was 36%. This response rate was acceptable for a single mailing and predicted an adequate response to a three-wave mailing of the survey. No major problems with the survey were identified, and the survey design was deemed acceptable for the final mailing.

A pilot mailing of the livestock-grower survey was not conducted. In part, this was due to the small number of livestock growers in the sample available for the survey mailing. Also, most of the survey questions were being piloted with the general-public survey and only the questions unique to the livestock-grower survey needed to be tested. We mailed the survey to eight livestock focus-group members and four MSU Extension agents and contacted them by phone to discuss their responses and their interpretation of the questions. All of those individuals were able to interpret the intent of the questions accurately and provide responses. Minor revisions were made based on suggested wording changes.

Mailing Schedule and Sample Frame

The mailing followed a modified tailored design method (Dillman, D. A. 2000. Mail and internet surveys: the tailored design method. 2nd edition. New York, NY, USA). Table 1 presents the dates and components of each mailing for the different surveys. As an incentive to respond to the survey, all first mailings of the survey included three 37-cent first-class stamps for the personal use of the respondent. Response rates for the furtaker and livestock-grower surveys after two survey mailings were high enough to preclude additional mailings. This was not the case for the general-public survey, and a third copy of the survey was sent to non-respondents.

Table 1. Mailing dates for each survey version.

	General Public	Furtaker	Livestock Grower
Pre-notice Letter	Nov 1, 2005	Nov 1, 2005	Nov 8, 2005
First Survey Mailing	Nov 8, 2005	Nov 8, 2005	Nov 11, 2005
Thank You/Reminder Postcard	Nov 17, 2005	Nov 17, 2005	Nov 17, 2005
Second Survey Mailing	Dec 6, 2005	Dec 5, 2005	Dec 5, 2005
Third Survey Mailing	Jan 11, 2006		

A total of 8,877 people were sent the general-public survey (Table 2). The names and addresses of these people were provided by the Michigan Department of Motor Vehicles (MDMV), Commercial Services Section. The driver-license data base had been previously used for natural-resource surveys and this sample size was known to include an adequate number of deer hunters as well as non-hunters; therefore, a separate mailing for deer hunters was not undertaken. The MDMV selected a stratified random sample of adults at least 18 years of age from the following five strata:

UP: all UP counties.

NLP: counties in the LP north of and including: Mason, Lake, Osceola, Clare, Gladwin and Arenac.

Metro Detroit-area counties: Macomb, Oakland and Wayne.

SLP Metro: SLP metropolitan counties (i.e., those with large cities): Eaton, Clinton, Ingham, Washtenaw, Genesee, Kent, Ottawa, Calhoun, Jackson, Muskegon, Saginaw and Kalamazoo.

SLP Rural: SLP counties that did not have large metropolitan areas: Allegan, Barry, Bay, Berrien, Branch, Cass, Gratiot, Hillsdale, Huron, Ionia, Isabella, Lapper, Lenawee, Livingston, Mecosta, Midland, Monroe, Montcalm, Montmorency, Newaygo, Oceana, St. Clair, St. Joseph, Sanilac, Shiawassee, Tuscola and Van Buren.

The furtaker survey was sent to a total random sample of 992 UP and LP furtakers who bought a furtaker's license during the 2004–05 furtaking season. Names were provided by the Michigan DNR Wildlife Division. License data do not differentiate furtakers who use dogs from those who trap, so this sample was inflated to include sufficient numbers of furtakers using hounds to enable statistical analyses.

Mailing addresses and names of livestock growers for both the general-public survey and the livestock-grower survey were provided by MSU Extension agents. A list of 729 useable names was obtained for the UP survey and all of these individuals were sent one of the two surveys. Two hundred received the general-public survey and 529 were sent the livestock-grower version. From the MSU Extension lists of 1,650 NLP livestock growers, 500 were randomly selected to receive the livestock-grower version and 200 received the general-public survey.

For the general-public survey, response rates ranged from 78% of UP livestock growers to 38% of the Detroit-area recipients (Table 2). Both the furtaker survey (Table 3) and the livestock-grower survey (Table 4) had final response rates of 69% when adjusted for non-deliverables.

Table 2. Final rate of response to the general-public survey by mailing strata.

Mailing Strata	Surveys Mailed	Non-deliverable	Returned Surveys	Response Rate (adjusted for non-deliverables/non-usable surveys)
UP	1,491	208	729	60%
NLP	1,991	254	1,028	60%
SLP Rural	1,997	229	980	56%
SLP Metro	1,499	218	571	45%
Detroit Area	1,500	183	496	38%
UP Livestock Growers	200	1	154	78%
NLP Livestock Growers	199	3	138	70%
TOTAL	8,877	1,096	4,126	53%

Table 3. Final rate of response to the furtaker survey by mailing strata.

Mailing Strata	Surveys Mailed	Non-deliverable	Returned Surveys	Response Rate (adjusted for non-deliverables)
UP	480	13	340	73%
LP	507	19	340	67%
TOTAL	992	32	680	69%

Table 4. Final rate of response to the livestock-grower survey by mailing strata.

Mailing Strata	Surveys Mailed	Non-deliverable	Returned Surveys	Response Rate (adjusted for non-deliverables)
UP Livestock Growers	529	2	382	72%
NLP Livestock Growers	500	22	309	65%
TOTAL	1,030	24	691	69%

Assessment of Non-respondent Biases

Even though a third mailing of the general-public survey was conducted to increase response rates, the highest rate from the five regional strata was 60% and the lowest rate was 38%. This left from 40 to 62% of survey recipients who had not returned a survey and whose attitudes about wolf management issues were unknown. Survey non-respondents add uncertainty to results unless non-response biases can be identified. Some indication is needed to show whether the non-respondents would have answered surveys differently or the same as respondents. If non-respondents are simply not interested in the issue, this does not change the inferences or management implications of the results obtained from the interested respondents. However, if the non-respondents were interested stakeholders who withheld differing views on the issues, there are probable management implications that lessen the utility of the respondent data.

Different response rates among the five regions suggested that interest in wolves also differed among regions. Survey recipients in the UP, where wolves currently exist, and the NLP, where wolves could exist in the foreseeable future, were more likely to respond than recipients in southern Michigan, where wolves are not likely to exist in the near future. This difference suggests that non-response may have been tied to lack of interest and/or lack of saliency of the issues.

Question #1 on the general-public survey directly measured recipient interest in wolf issues. Table 5 shows the percentage of respondents who selected the response: “not interested in Michigan wolves.” The percentage of non-interested respondents in a region corresponds to the non-response rate for that region. This further supports an inference that non-respondents were not interested in wolf issues.

Table 5. Percent of non-interested respondents by mailing strata.

Mailing Strata	Percent of Regional Respondents who Were Not Interested
UP	21%
NLP	26%
SLP Rural	26%
SLP Metro	33%
Detroit Area	39%
UP Livestock General-public Survey	11%
NLP Livestock General-public Survey	19%
UP Furtakers	2%
LP Furtakers	6%
UP Livestock-grower Survey	9%
NLP Livestock-grower Survey	19%

Question #1 provided another indicator of non-respondent interest when returns from the sequential mailings were compared. The percentage of non-interested respondents increased among returns from the first to the last mailing (Table 6). Disinterested returns were enhanced by inviting disinterested recipients to simply return a blank survey to have their name removed from our mailing list. Increasing non-interest indicated the pool of interested respondents decreased with each mailing of the survey. This suggests the three survey mailings solicited responses from the majority of those who were interested in providing their opinion and the non-respondents were primarily disinterested citizens. Of course, some non-respondents had interest and were unable or chose to not respond for other reasons, but it is reasonable to assume they would not have caused a large change in the respondent data had they responded.

Table 6. Percent of non-interested respondents by survey mailing.

	UP	NLP	SLP
First Mailing	16%	19%	20%
Second Mailing	20%	29%	37%
Third Mailing	59%	69%	71%

Method of Weighting Data to Reflect Statewide Distribution of Opinions

Weighting was necessary to increase the contribution of each respondent from an under-sampled region with large population bases (e.g., Detroit area) and to decrease the contribution of a respondent from an over-sampled smaller population area (e.g., the UP). Most of the analysis in the report used weighted data to describe the response of interested Michigan citizens statewide and sub-groups. Non-weighted data were used rarely where necessary to analyze the responses of specific sample frames. Unless otherwise noted, results reflect weighted data.

Although weighting has the advantage of allowing inferences to be drawn about a statewide distribution from stratified samples with different response rates, the data can still be used to describe the results of each region and subgroup (e.g., hunters) by region. For example, the contribution of UP respondents to the overall statewide approval or disapproval of wolves in Michigan is small and weighting adjusts for that contribution in the statewide statistics. However, when the regional attitudes toward wolves are compared, the UP has a much higher proportion of respondents who do not approve of wolves than found in the other two regions. That difference is evident with weighted and non-weighted data.

The different response rates and the different percentages of non-interested survey recipients among regions were factored into the system used to weight data for representative statewide analyses. Most analyses that provided proportional results (i.e., percentages) did not consider respondents who indicated disinterest in Michigan's wolves by selecting "I am not interested in Michigan's wolves" or who returned a blank survey as instructed on the third mailing. The response rates presented in Tables 1, 2 and 3 include disinterested respondents. However, these were dropped from further analyses so that findings reflect proportions of interested respondents rather than all respondents. Table 5 shows the percentages of respondents in each sample that were disinterested. Under an assumption that most non-respondents were disinterested as well, the portion of interested citizens in each region can be inferred. The estimated portion of UP residents interested in wolf issues at the time of the survey was 45.6% (Table 7). Table 7 shows the final weights assigned to responses from each region and explains the calculations used to produce them. The weights are ultimately calculated as a ratio that corrects the contribution of the regional respondents. This is a ratio

between the region's contribution to the total interested respondents and its contributed portion of the (estimated) total interested population in the State. The assigned weight reduces the over-sampled contributions and increases under sampled contributions. For example, the UP responses were reduced by 0.24 and the Detroit-area responses were increased by 2.5 (Table 7). This corrects for both the stratified sample responses and the unequal response and interest rates to reflect the actual presence of regional attitudes among interested citizens statewide.

Table 7. Explanation of assumptions and calculations used to create data weights to adjust for stratified sampling by region.

Region	% of State Population Represented by the Region[a] (regional population)	Regional % of Total Interested Respondents (number of regional interested respondents)	Estimated % of Region Sample that Was Interested[b]	Extrapolated Region Population that Would have Been Interested[c] (% of total interested population in State)	Final Regional Weights (regional % of State interested population/ Regional % of total interested respondents[d])
UP	3.1% (315,085)	20.8% (593)	45.7%	143,993 (4.8%)	0.231 (4.8/20.8)
NLP	11.5% (1,166,880)	27.3% (780)	42.8%	499,423 (16.5%)	0.604 (16.5/27.3)
SLP Rural	15.5% (1,571,461)	26.2% (748)	40.0%	628584 (20.7%)	0.790 (20.7/26.2)
SLP Metro	29.8% (3,011543)	14.1% (404)	28.8%	867324 (28.6%)	2.028 (28.6/14.1)
Detroit Area	40.1% (4,052,201)	11.6% (331)	22.8%	891484 (29.4%)	2.534 (29.4/11.6)
TOTAL	10,117,170	(2,856)		2,898,488	

[a] (Regional population/State population) X 100

[b] Assumes the non-respondents were also disinterested at the time of the survey.

[c] Percentage interested in region X regional population

[d] This ratio corrects the contribution of the regional respondents. For example, the UP contributed 20.8% to the total interested respondents, but only comprised 4.8% of the (estimated) total interested population in the State. The weight reduces the over-sampled UP contribution to 0.231 when statewide patterns are produced. Similarly, the under-sampled Detroit-area responses are corrected by the 2.509 weight to reflect their actual presence among interested citizens statewide.

Appendix II:
General-public Version of the Opinion Survey Regarding Michigan Wolves

This survey was designed to address specific management questions posed by the current wolf-management planning process. This general-public version was sent to 8,500 members of the general public in the fall of 2005 (a slightly modified version of this was sent to 1,000 licensed furtakers, and another modified version was sent to 1,000 livestock growers). The survey questions and format have not been altered for this appendix.

November 2005

Dear Michigan Citizen,

In a recent letter about this survey, we explained that Michigan has a growing gray wolf population. Wolves now live in the Upper Peninsula and a few have recently been confirmed in the Lower Peninsula.

There are enough wolves in Minnesota, Wisconsin and Michigan to remove wolves from federal regulation as an endangered species and shift the responsibility for the management of wolves to the states. Michigan is preparing for that responsibility by revising their Wolf Management Plan to address how many wolves should be in Michigan, where they should live, and how they should be managed.

The Michigan Department of Natural Resources (Michigan DNR) is aware of a wide range of opinions about wolves in our state that must be considered in the management plan. We have involved many citizens in the design of this survey to ensure that it will NOT be a waste of your time. You have been randomly selected to receive the attached survey to help them consider those public views. This is your opportunity to provide input!

In our sample, you represent many other Michigan citizens who think like you but who did not get selected to receive one of our questionnaires. That makes your individual response to the survey very important. **As a token of our appreciation, the three first class stamps attached below are for your own use.**

IF YOU HAVE NO INTEREST IN WOLF ISSUES you can go directly to question 29 on the back of the survey and be finished in less than two minutes. It is just as important to know how many citizens have no interest in wolves as to learn the opinions of those who do!

IF WOLF ISSUES ARE IMPORTANT TO YOU it will take less than 15 minutes to complete the survey.

Please return the survey in the self-addressed, postage paid envelope provided.

You indicate your voluntary agreement to participate by completing and returning the survey. You can be assured that all data gathered will remain confidential and your privacy will be protected to the maximum extent allowable by law. If you have any questions about the survey, please call me at (517) 432-3636 or email me at "bullpe@msu.edu". Any questions concerning your rights as a survey respondent may be directed to Dr. Peter Vasilenko, Chairperson of the University Committee on Research Involving Human Subjects, at (517) 355-2180. **Thank you** in advance for helping develop Michigan's Wolf Management Plan.
Sincerely,

These stamps are our gift to you!

Peter Bull
Project Coordinator
Michigan State University
Department of Fisheries and Wildlife
(517) 432-3636
bullpe@msu.edu

II: General-public Survey

Before beginning the survey,
please review the history of wolves in Michigan listed below.

HISTORY OF WOLVES IN MICHIGAN

– Pre-European settlement: wolves were present in all 83 counties in Michigan.

– By 1840: wolves no longer were found in the southern portion of the Lower Peninsula.

– 1910-1935: wolves completely disappeared from the Lower Peninsula.

– By 1960: almost all wolves were gone from the Upper Peninsula.

– 1965: wolves were given full legal protection.

– 1974: the gray wolf was listed as endangered under the Federal Endangered Species Act (ESA).

– 1974: an attempt to release four Minnesota wolves in northern Marquette County failed. All four animals were killed before reproducing. No further attempts at reintroduction were made.

– 1991: Wolves that migrated from Wisconsin and Canada began to repopulate the Upper Peninsula.

– 2004-05: The winter wolf population in the Upper Peninsula (mainland) included at least 405 animals. Three wolves were confirmed to be in the Northern Lower Peninsula.

– Near Future: wolves could be taken off the federal list of threatened and endangered species and the state of Michigan would take responsibility for managing Michigan's wolves.

This map shows the <u>three regions of Michigan</u> that are referred to in some survey questions. Note the line that separates the northern and southern regions of the lower peninsula.

Your Opinions About Wolves in Michigan

1. How would you summarize your opinion about having wolves in Michigan? (Please check one)

___ I AM NOT INTERESTED IN MICHIGAN'S WOLVES **(Please go to question 29, page 11 if you don't want to answer this survey)**

___ I STRONGLY APPROVE
___ I SOMEWHAT APPROVE
___ I AM UNDECIDED
___ I SOMEWHAT DISAPPROVE
___ I STRONGLY DISAPPROVE

2. **In your opinion, how important are each of the statements below as a reason why we should have wolves in Michigan?**

	this is NOT a reason to have wolves	**slightly important reason**	**somewhat important reason**	**this is a very important reason to have wolves**	**undecided**
a) "AS PREDATORS, WOLVES COULD BENEFIT MICHIGAN'S ECOSYSTEM BY HELPING TO CONTROL SOME OTHER WILDLIFE POPULATIONS".	1	2	3	4	U
b) "THERE ARE PEOPLE WHO APPRECIATE WOLVES AND WANT TO KNOW THAT WOLVES EXIST IN MICHIGAN."	1	2	3	4	U
c) "FUTURE GENERATIONS OF CITIZENS COULD BENEFIT IF WE MAINTAIN WOLVES IN MICHIGAN."	1	2	3	4	U
d) "WOLVES HAD A HISTORIC PRESENCE IN MICHIGAN AND SHOULD BE HERE NOW".	1	2	3	4	U
e) "PEOPLE WANT TO VIEW, HEAR, PHOTOGRAPH OR STUDY WILD WOLVES IN MICHIGAN."	1	2	3	4	U
f) "WOLVES COULD EVENTUALLY BECOME ANOTHER GAME SPECIES FOR MICHIGAN HUNTERS."	1	2	3	4	U
g) "REGARDLESS OF OUR LAWS, WOLVES HAVE A RIGHT TO EXIST IN MICHIGAN."	1	2	3	4	U
h) "WOLVES COULD INCREASE TOURISM IN MICHIGAN AND PROVIDE ECONOMIC BENEFITS."	1	2	3	4	U

NOTE: ***You will need to read the information on this page before answering the questions on the next page.***

Facts About Wolves in Michigan

* The federal and Michigan Endangered Species Acts require that Michigan's population of wolves be protected and maintained.
* The original Michigan wolf plan set a minimum recovery goal of 200 wolves in Michigan.
* In winter 2004-05, the Michigan DNR count showed at least 405 wolves in the Upper Peninsula mainland.
* Currently, scientists estimate that 1200 wolves is the highest number that the Upper Peninsula habitat could support.
* At least three wolves were known to be in the Northern Lower Peninsula in 2004.
* Although more were reported by owners, the Michigan DNR confirmed that in 2004, wolves in the Upper Peninsula
  – killed four dogs; and,
  – killed livestock on 12 occasions

WOLF SITUATION TABLE: **Each situation below describes the impacts associated with a number and distribution of wolves in Michigan. Apply this information to the region being addressed when you answer questions 3, 4 and 5 that follow.**

SITUATION 1:	* No Wolves
SITUATION 2:	* Wolves in a few counties at **very low** numbers * Rare sightings * No loss of livestock to wolves in most years * Rare loss of pets or hunting dogs to wolves * The Michigan DNR finds no impact on hunter deer harvest due to wolves
SITUATION 3:	* Wolves in many counties but at **low** numbers * Occasionally seen near rural homes or roads in some areas * Less than 1% of farms per year lose livestock * Some loss of pets and hunting dogs likely – less than 10 per year * The Michigan DNR finds no impact on hunter deer harvest due to wolves
SITUATION 4:	* Wolves exist in **most** counties at **moderate** numbers * Often seen near rural homes or roads in many areas * About 1% of farms per year lose livestock (about 7 farms in the UP and 40 in the NLP) * Pets and/or hunting dogs known to be lost yearly to wolves averages 15 to 20 * The Michigan DNR finds a small decrease in hunter deer harvest is due to wolves
SITUATION 5:	* Wolves exist in **all** counties in the **highest** numbers that can be sustained by the habitat * Frequent, widespread sightings near rural homes and roads, occasional sightings near towns * About 2% of farms per year lose livestock (about 14 farms in the UP, 80 in the NLP) * Pets and/or hunting dogs known to be lost yearly to wolves averages 20 - 25 * The Michigan DNR finds a moderate decrease in hunter deer harvest due to wolves

3. Use the situations in the "Wolf Situation Table" to answer these questions about the Upper Peninsula (UP) of Michigan. Circle your answer for each question.

	SITUATION					undecided
a) THE SITUATION I **PREFER** FOR THE **UP** IS	1	2	3	4	5	U
b) THE SITUATION WITH **THE FEWEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR THE **UP** IS	1	2	3	4	5	U
c) THE SITUATION WITH **THE HIGHEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR THE **UP** IS	1	2	3	4	5	U

4. Use the situations in the "Wolf Situation Table" to answer these questions about the Northern Lower Peninsula (NLP) Region (See the map on page 1). Circle your answer for each question.

	SITUATION					undecided
a) THE SITUATION I **PREFER** FOR THE **NLP** IS	1	2	3	4	5	U
b) THE SITUATION WITH **THE FEWEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR THE **NLP** IS	1	2	3	4	5	U
c) THE SITUATION WITH **THE HIGHEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR THE **NLP** IS	1	2	3	4	5	U

5. The "Wolf Situation Table" does not describe impacts of increasing wolf numbers on Southern Lower Peninsula (SLP) livestock, pets or deer. Wildlife scientists cannot yet predict these relationships for the SLP. Despite this, please use the general trends of wolf numbers and sightings in the five situations to answer the questions below.

	SITUATION					undecided
a) THE SITUATION I **PREFER** FOR THE **SLP** IS	1	2	3	4	5	U
b) THE SITUATION WITH **THE FEWEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR THE **SLP** IS	1	2	3	4	5	U
c) THE SITUATION WITH **THE HIGHEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR THE **SLP** IS	1	2	3	4	5	U

6. If you were asked your opinion about whether wolf numbers should be reduced in an area, how important would each of these be to you in considering your position?

	this is NOT a consideration	slightly important	somewhat important	this is a very important consideration	I am undecided
a) THE NUMBER OF FARM ANIMALS ACTUALLY LOST TO WOLVES	1	2	3	4	U
b) A LOWER PERCENT OF DEER HUNTERS WHO HARVEST DEER IF IT IS ACTUALLY CAUSED BY WOLVES PREYING ON DEER	1	2	3	4	U
c) THE NUMBER OF HUNTING DOGS ACTUALLY LOST TO WOLVES IN THE FIELD	1	2	3	4	U
d) A CONCERN AMONG AREA RESIDENTS FOR HUMAN SAFETY CAUSED BY A HIGH NUMBER OF CONFIRMED WOLF SIGHTINGS NEAR HOMES	1	2	3	4	U
e) THE NUMBER OF PETS ACTUALLY ATTACKED BY WOLVES NEAR THE PETS' HOMES	1	2	3	4	U

Your Opinions About Compensation for Losses of Livestock or Pets to Wolves in Michigan

7. How strongly would you support or oppose using your Michigan tax dollars to compensate owners who have lost the following to wolves? Please assume the compensation program would be carefully administered.

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) LIVESTOCK (CATTLE, HORSES, SHEEP, GOATS, POULTRY, ETC.)	1	2	3	4	5
b) HUNTING DOGS (BEAGLES, BIRD DOGS, HOUNDS, ETC.)	1	2	3	4	5
c) PETS	1	2	3	4	5
d) PRIVATELY OWNED (FENCED) DEER AND ELK	1	2	3	4	5

8. How strongly would you support or oppose using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves? Check one answer below.

___STRONGLY SUPPORT ___ SOMEWHAT SUPPORT ___ NEITHER SUPPORT NOR OPPOSE ___ SOMEWHAT OPPOSE ___ STRONGLY OPPOSE

9. If wolves remain as a protected NONGAME species and can not be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping (e.g., license fees) to...

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) ...COMPENSATE FOR LIVESTOCK LOSSES TO WOLVES	1	2	3	4	5
b) ...COMPENSATE FOR HUNTING DOGS LOST TO WOLVES	1	2	3	4	5
c) ...COMPENSATE FOR OTHER PETS LOST TO WOLVES	1	2	3	4	5

10. If wolves are changed to a GAME species and can be hunted or trapped in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping license fees to...

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) ... COMPENSATE FOR LIVESTOCK LOSSES TO WOLVES	1	2	3	4	5
b) ...COMPENSATE FOR HUNTING DOGS LOST TO WOLVES	1	2	3	4	5
c) ...COMPENSATE FOR OTHER PETS LOST TO WOLVES	1	2	3	4	5

Your Opinions About How We Should Manage Wolves in Michigan

Please Note: These questions all pertain to when wolves are no longer listed as "endangered" or "threatened" in Michigan !

11. *If yearly losses of livestock, hunting dogs and pets* actually caused by wolves in a particular region reached such a high level that the Michigan DNR decided something had to be done, how strongly would you support or oppose each of the following management responses for that region?

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) LEAVE THE WOLVES ALONE.	1	2	3	4	5
b) SELECTIVELY KILL THE INDIVIDUAL WOLVES THAT ARE CAUSING THE LOSS.	1	2	3	4	5
c) REDUCE THE RISK OF LOSS BY KILLING A PORTION OF WOLVES TO LOWER THE WOLF POPULATION.	1	2	3	4	5
d) LIVE TRAP AND RELOCATE WOLVES TO REDUCE RISK OF LOSS.	1	2	3	4	5

e) USE FERTILITY CONTROL (e.g. CONTRACEPTIVES) TO LIMIT WOLF POPULATION SIZE AND REDUCE RISK OF LOSS.	1	2	3	4	5

12. ***If strong public concerns over human safety risks*** **posed by wolves in a particular region caused the Michigan DNR to decide that something must be done in that region, how strongly would you support or oppose each of the following management responses?**

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) LEAVE WOLVES ALONE.	1	2	3	4	5
b) SELECTIVELY KILL THE INDIVIDUAL WOLVES THAT ARE CREATING THE THREAT.	1	2	3	4	5
c) REDUCE THE THREAT BY KILLING A PORTION OF WOLVES TO LOWER THE WOLF POPULATION.	1	2	3	4	5
d) LIVE TRAP AND RELOCATE WOLVES TO REDUCE THE THREAT.	1	2	3	4	5
e) USE FERTILITY CONTROL (e.g. CONTRACEPTIVES) TO LIMIT WOLF POPULATION SIZE AND REDUCE THE THREAT.	1	2	3	4	5

13. ***If wolf predation significantly lowered the number of deer available*** **for hunting in a region and the Michigan DNR decided that something should be done, how strongly would you support or oppose each of the following management responses for that region?**

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) LEAVE WOLVES ALONE.	1	2	3	4	5
b) REDUCE THE LOSS OF DEER BY KILLING A PORTION OF WOLVES TO LOWER THE WOLF POPULATION.	1	2	3	4	5
c) REDUCE THE LOSS OF DEER BY LIVE TRAPPING AND RELOCATING A PORTION OF WOLVES TO LOWER THE WOLF POPULATION.	1	2	3	4	5
d) USE FERTILITY CONTROL (e.g. CONTRACEPTIVES) TO LIMIT WOLF POPULATION SIZE AND REDUCE RISK OF LOSS.	1	2	3	4	5

14. **IF the Michigan DNR decided that some wolves HAD to be removed in a region for some reason, how strongly would you support or oppose their use of each of the following methods?**

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) USE TRAINED, PAID PROFESSIONALS TO SHOOT WOLVES	1	2	3	4	5
b) PROVIDE A LIMITED NUMBER OF PERMITS TO LICENSED HUNTERS TO SHOOT WOLVES DURING A CONTROLLED HUNTING SEASON	1	2	3	4	5
c) KILL WOLVES THAT ARE TRAPPED BY TRAINED, PAID PROFESSIONALS	1	2	3	4	5

d) PROVIDE A LIMITED NUMBER OF PERMITS TO LICENSED FUR TRAPPERS FOR USE DURING A CONTROLLED WOLF TRAPPING SEASON	1	2	3	4	5

15. Currently, farmers can kill individual *coyotes* on their property anytime they are threatening or damaging livestock. How strongly would you approve or disapprove of allowing farmers to control wolf problems this way?

___ STRONGLY APPROVE ___ SOMEWHAT APPROVE ___ NEITHER APPROVE NOR DISAPPROVE ___ SOMEWHAT DISAPPROVE ___ STRONGLY DISAPPROVE

16. How strongly do you agree or disagree with each of the following statements?

	strongly agree	somewhat agree	neither agree nor disagree	somewhat disagree	strongly disagree
a) THE MICHIGAN DNR SHOULD LET THE WOLVES MAINTAIN THEIR OWN POPULATION LEVEL IN THE UPPER PENINSULA WITHOUT TRYING TO MANAGE THEM.	1	2	3	4	5
b) WHEREVER WOLVES ARE PLENTIFUL IN MICHIGAN DEER RANGE, THEY WILL SIGNIFICANTLY LOWER THE QUALITY OF DEER HUNTING.	1	2	3	4	5
c) THE CHANCE OF A WILD MICHIGAN GRAY WOLF HURTING OR KILLING A HUMAN IS GREAT ENOUGH THAT IT SHOULD BE AN IMPORTANT FACTOR IN DECIDING HOW MANY WOLVES ARE ALLOWED TO LIVE IN MICHIGAN.	1	2	3	4	5
d) WE ALREADY HAVE PRACTICAL AND EFFECTIVE METHODS OF REDUCING WOLF FERTILITY (e.g. CHEMICAL OR SURGICAL PROCEDURES) THAT COULD BE USED TO LIMIT WOLF NUMBERS.	1	2	3	4	5
e) THE MOST EFFECTIVE WAY TO AVOID WOLF PROBLEMS IS TO EDUCATE THE PUBLIC ON HOW TO LIVE WITH WOLVES.	1	2	3	4	5

17. How strongly do you agree or disagree with the following positions?

In those areas of Michigan where wolf populations could be hunted without endangering the population, we should make the wolf a game species and create a controlled, legal...	strongly agree	somewhat agree	neither agree nor disagree	somewhat disagree	strongly disagree
a) ...HUNTING SEASON FOR WOLVES.	1	2	3	4	5
b) ...TRAPPING SEASON FOR WOLVES.	1	2	3	4	5

18. How strongly do you agree or disagree that: "The Michigan Department of Natural Resources will make wolf management decisions ...

	strongly agree	somewhat agree	neither agree nor disagree	somewhat disagree	strongly disagree
a) ....THAT ARE ADEQUATELY BASED ON GOOD SCIENCE."	1	2	3	4	5

b) ....THAT FAIRLY CONSIDER THE OPINIONS OF ALL MICHIGAN CITIZENS."	1	2	3	4	5
c) ...USING PROCEDURES THAT ARE SUFFICIENTLY OPEN AND ACCESSIBLE TO THE PUBLIC."	1	2	3	4	5

19. What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey? (Please check one)

___ I STRONGLY APPROVE
___ I SOMEWHAT APPROVE
___ I AM UNDECIDED
___ I SOMEWHAT DISAPPROVE
___ I STRONGLY DISAPPROVE

Some General Questions About the Respondents to Our Survey

20. Do you do any of the following outdoor recreation activities in Michigan or elsewhere? (Please check all that apply)

___ BACK-PACK CAMPING
___ HIKING/WALKING
___ BICYCLING
___ CROSS-COUNTRY SKIING
___ CANOEING/KAYAKING
___ RIDING HORSES
___ HUNTING
___ FISHING
___ BERRY/MUSHROOM PICKING
___ TRAPPING
___ BIRD WATCHING
___ VIEWING WILDLIFE
___ WILDLIFE PHOTOGRAPHY
___ CAMPGROUND CAMPING
___ SNOWMOBILING
___ DRIVING OFF-ROAD VEHICLES
___ OTHER OUTDOOR RECREATION: _____

21. Do you do any of the activities in question 20 in any of the following areas of Michigan?

A) UPPER PENINSULA	___ YES	___ NO
B) NORTHERN LOWER PENINSULA	___ YES	___ NO
C) SOUTHERN LOWER PENINSULA	___ YES	___ NO

22. If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there? (Please check one)

___ I DEFINITELY WOULD VACATION THERE BECAUSE OF THE WOLVES.
___ I WOULD BE MORE LIKELY TO VACATION THERE BECAUSE OF THE WOLVES.
___ THE PRESENCE OF WOLVES WOULD NOT AFFECT MY CHOICE OF A VACATION AREA.
___ I WOULD BE LESS LIKELY TO VACATION THERE BECAUSE OF THE WOLVES.
___ I DEFINITELY WOULD NOT VACATION THERE BECAUSE OF THE WOLVES.
___ I AM UNDECIDED HOW IT WOULD AFFECT MY USE.

23. Have you belonged to any of the following types of organizations in the past three years?

a) A CONSERVATION ORGANIZATION WHICH IS HUNTING OR TRAPPING RELATED	___ YES	___ NO
b) A CONSERVATION OR ENVIRONMENTAL ORGANIZATION WHICH IS NOT HUNTING RELATED	___ YES	___ NO
c) AN ANIMAL WELFARE OR ANIMAL RIGHTS ORGANIZATION	___ YES	___ NO

24. Is any of your immediate family's income provided directly from farming?
___ NO ___ YES

If yes: does this farming involve livestock? ___ YES ___ NO

25. Do you have access to the Internet for personal use either at home or at work?
___YES ___NO (If "NO", skip to Question 26)

If yes, please answer the next two questions

	never	rarely	sometimes	frequently
a) HOW OFTEN DO YOU USE THE INTERNET FOR INFORMATION ABOUT WILDLIFE?	1	2	3	4
b) HOW OFTEN DO YOU USE THE INTERNET TO GET INFORMATION FROM THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES?	1	2	3	4

26. Please check the region where you currently live. (See map on page 1 for regions)

_____UPPER PENINSULA _____NORTHERN LOWER PENINSULA _____SOUTHERN LOWER PENINSULA

27. About how many years have you lived in that region? _____YEARS

28. Please check any regions where you or your immediate family own recreational property (such as a cottage or land for hunting, camping, etc.) other than in the region where you live. (Check all that apply)

_____NONE _____UPPER PENINSULA _____NORTHERN LOWER PENINSULA _____SOUTHERN LOWER PENINSULA

29. Which best describes you? (Check one)

___I AM A HUNTER. **(please go to question 30)**

___I AM A NON-HUNTER BUT NOT OPPOSED TO HUNTING. **(please go to question 31)**

___I AM OPPOSED TO ALL FORMS OF RECREATIONAL HUNTING. **(please go to question 31)**

___I AM UNDECIDED. **(please go to question 31)**

30. If you are a hunter, please indicate if and where you do the following activities. Circle all areas that apply for each activity.

	I don't do this activity	I do this in the Upper Peninsula	I do this in the Northern Lower Peninsula	I do this in the Southern Lower Peninsula
a) HUNT WITH DOGS	1	2	3	4
b) FUR TRAPPING	1	2	3	4
c) HUNT DEER	1	2	3	4

31. What year were you born? 19_____

32. Are you male or female? ___ MALE ___FEMALE

33. Please check your highest completed level of education. (check one)

___ LESS THAN HIGH SCHOOL

___ COMPLETED HIGH SCHOOL OR GED

___ VOCATIONAL OR TRADE SCHOOL

___ SOME COLLEGE

___ TWO-YEAR DEGREE

___ FOUR-YEAR DEGREE

___ GRADUATE SCHOOL (PhD, MBA, MSC, ETC.)

Thank you for completing this survey. Please return this survey to Peter Bull, Department of Fisheries and Wildlife, 13 Natural Resources Building, East Lansing, Michigan 48824. A postage paid, addressed envelope has been included for your convenience. If you have more concerns and comments on Michigan wolves and their management, please write those in the space below or send them by email to bullpe@msu.edu. When completed, a summary of results from this survey will be posted on the Michigan DNR website.

COMMENTS:

APPENDIX III:
WEIGHTED FREQUENCIES OF OVERALL PUBLIC RESPONSES TO THE GENERAL-PUBLIC SURVEY QUESTIONS BY ZONE

This appendix reports the frequency of responses by all interested respondents for each question on the 2005 general-public wolf survey. 'Interested respondents' were those individuals who provided an answer to Question 1 other than "I am not interested in Michigan's wolves."

Responses have been weighted based on the population levels for each region (see Appendix I). The 'total' column in each table thus represents the statewide total of interested responses. Weighting in this manner does not change the percentage values for responses within a region, but does recalculate an adjusted number of cases for that region. For ease of reading, sample size has been omitted from the tables. When weighted to reflect actual statewide distribution, the adjusted number of responses from each zone was: UP: 122; NLP: 419; SLP: 1,964. The actual number of interested respondents in each zone was: UP: 553; NLP: 702; SLP: 1,273.

Some of the question wording in the following analyses has been abbreviated. Actual wording and format can be referenced in Appendix II. Differences between zones were considered to be statistically significant if '*p*' was less than or equal to 0.05.

1. How would you summarize your opinion about having wolves in Michigan? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
1. How would you summarize your opinion about having wolves in Michigan?	strongly approve	28.3%	38.4%	42.3%	41.0%
	somewhat approve	23.6%	32.4%	31.9%	31.6%
	undecided	7.1%	10.4%	12.6%	11.9%
	somewhat disapprove	15.0%	7.4%	5.9%	6.6%
	strongly disapprove	26.0%	11.3%	7.3%	8.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=79.4, df=8, p<0.001

Question 2 was prefaced with the statement: “In your opinion, how important is each of the statements below as a reason why we should have wolves in Michigan?”

2a. As predators, wolves could benefit Michigan's ecosystem by helping to control some other wildlife populations * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2a. As predators, wolves could benefit Michigan's ecosystem by helping to control some other wildlife populations	NOT a reason	35.7%	19.8%	11.4%	14.0%
	slightly important	11.9%	12.6%	12.6%	12.6%
	somewhat important	23.0%	29.1%	30.9%	30.2%
	very important	26.2%	36.6%	43.3%	41.4%
	undecided	3.2%	1.9%	1.8%	1.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=77.7, df=8, p<0.001

2b. There are people who appreciate wolves and want to know that wolves exist in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2b. There are people who appreciate wolves and want to know that wolves exist in Michigan.	NOT a reason	38.4%	27.3%	20.1%	22.2%
	slightly important	21.6%	21.5%	21.8%	21.7%
	somewhat important	22.4%	26.2%	32.6%	31.1%
	very important	16.0%	23.6%	23.5%	23.2%
	undecided	1.6%	1.4%	1.9%	1.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=35.1, df=8, p<0.001

2c. Future generations of citizens could benefit if we maintain wolves in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2c. Future generations of citizens could benefit if we maintain wolves in Michigan.	NOT a reason	34.7%	18.3%	13.6%	15.4%
	slightly important	18.5%	19.9%	17.7%	18.1%
	somewhat important	20.2%	27.4%	33.1%	31.5%
	very important	21.8%	31.9%	30.6%	30.4%
	undecided	4.8%	2.6%	4.9%	4.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=53.8, df=8, p<0.001

2d. Wolves had a historic presence in Michigan and should be here now * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2d. Wolves had a historic presence in Michigan and should be here now	NOT a reason	34.4%	19.3%	14.7%	16.4%
	slightly important	18.4%	17.0%	16.2%	16.4%
	somewhat important	19.2%	23.3%	28.5%	27.2%
	very important	26.4%	38.9%	38.9%	38.3%
	undecided	1.6%	1.4%	1.8%	1.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=42.9, df=8, p<0.001

2e. People want to view, hear, photograph or study wild wolves in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2e. People want to view, hear, photograph or study wild wolves in Michigan.	NOT a reason	36.3%	22.3%	15.9%	17.9%
	slightly important	22.6%	20.7%	21.0%	21.0%
	somewhat important	22.6%	28.9%	34.1%	32.7%
	very important	17.7%	27.5%	27.3%	26.9%
	undecided	.8%	.7%	1.6%	1.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=46.2, df=8, p<0.001

2f. Wolves could eventually become another game species for Michigan hunters. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2f. Wolves could eventually become another game species for Michigan hunters.	NOT a reason	58.9%	54.4%	55.6%	55.6%
	slightly important	16.1%	14.9%	18.2%	17.5%
	somewhat important	12.9%	16.0%	14.0%	14.3%
	very important	8.9%	11.6%	10.1%	10.3%
	undecided	3.2%	3.0%	2.1%	2.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.9, df=8, p=0.571

2g. Regardless of our laws, wolves have a right to exist in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2g. Regardless of our laws, wolves have a right to exist in Michigan.	NOT a reason	37.1%	21.5%	16.9%	18.6%
	slightly important	13.7%	14.3%	12.3%	12.7%
	somewhat important	17.7%	16.8%	23.7%	22.3%
	very important	29.8%	45.3%	45.1%	44.4%
	undecided	1.6%	2.1%	2.0%	2.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=44.2, df=8, p<0.001

2h. Wolves could increase tourism in Michigan and provide economic benefits. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2h. Wolves could increase tourism in Michigan and provide economic benefits.	NOT a reason	52.8%	39.0%	28.6%	31.5%
	slightly important	19.2%	18.0%	24.8%	23.4%
	somewhat important	16.8%	24.1%	27.1%	26.1%
	very important	8.8%	15.7%	15.9%	15.5%
	undecided	2.4%	3.3%	3.7%	3.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=49.3, df=8, p<0.001

3a) the situation I prefer for the UP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
3a) the situation I prefer for the UP is	Situation 1	27.5%	10.7%	6.5%	8.2%
	Situation 2	20.0%	20.7%	15.7%	16.7%
	Situation 3	28.3%	33.7%	37.2%	36.2%
	Situation 4	15.0%	22.2%	26.9%	25.6%
	Situation 5	6.7%	7.8%	9.1%	8.7%
	undecided	2.5%	4.9%	4.7%	4.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=83.1, df=8, p<0.001

3b) the situation with the FEWEST number of wolves I can accept for the UP. is * Zone

% within Zone

		Zone			
		UP	NLP	SLP	Total
3b) the situation with the FEWEST number of wolves I can accept for the UP. is	Situation 1	32.5%	15.8%	9.9%	11.9%
	Situation 2	31.7%	33.6%	37.3%	36.5%
	Situation 3	23.3%	32.8%	35.0%	34.1%
	Situation 4	5.8%	9.1%	10.1%	9.7%
	Situation 5	2.5%	2.2%	2.4%	2.3%
	undecided	4.2%	6.4%	5.4%	5.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=65.2, df=10, p<0.001

3c) the situation with the HIGHEST number of wolves I can accept for the UP is * Zone

% within Zone

		Zone			
		UP	NLP	SLP	Total
3c) the situation with the HIGHEST number of wolves I can accept for the UP is	Situation 1	16.7%	7.1%	4.1%	5.2%
	Situation 2	19.2%	12.8%	9.6%	10.6%
	Situation 3	22.5%	25.1%	24.6%	24.6%
	Situation 4	24.2%	32.9%	37.3%	35.9%
	Situation 5	12.5%	16.2%	18.6%	17.9%
	undecided	5.0%	5.9%	5.8%	5.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=60.4, df=10, p<0.001

4a) the situation I prefer for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4a) the situation I prefer for the NLP is	Situation 1	24.8%	19.9%	11.8%	13.7%
	Situation 2	24.8%	26.9%	24.7%	25.1%
	Situation 3	23.9%	32.7%	37.5%	36.1%
	Situation 4	9.4%	12.8%	17.0%	16.0%
	Situation 5	5.1%	4.4%	4.6%	4.6%
	undecided	12.0%	3.4%	4.4%	4.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=42.9, df=8, p<0.001

4b) the situation with the fewest number of wolves I can accept for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4b) the situation with the fewest number of wolves I can accept for the NLP is	Situation 1	30.2%	25.2%	19.8%	21.2%
	Situation 2	34.5%	40.0%	43.4%	42.4%
	Situation 3	17.2%	23.8%	23.6%	23.3%
	Situation 4	2.6%	4.6%	6.2%	5.8%
	Situation 5	3.4%	2.2%	1.8%	1.9%
	undecided	12.1%	4.1%	5.2%	5.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.3, df=10, p=0.001

4c) the situation with the highest number of wolves I can accept for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4c) the situation with the highest number of wolves I can accept for the NLP is	Situation 1	15.5%	14.3%	8.7%	10.0%
	Situation 2	20.7%	18.2%	15.1%	15.8%
	Situation 3	23.3%	30.3%	32.6%	31.8%
	Situation 4	17.2%	25.5%	28.8%	27.8%
	Situation 5	10.3%	8.0%	9.4%	9.2%
	undecided	12.9%	3.6%	5.4%	5.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=43.2, df=10, p<0.001

5a) the situation I prefer for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5a) the situation I prefer for the SLP is	Situation 1	32.5%	32.3%	26.5%	27.7%
	Situation 2	24.8%	36.2%	32.9%	33.0%
	Situation 3	17.9%	17.6%	24.6%	23.2%
	Situation 4	4.3%	3.9%	8.6%	7.6%
	Situation 5	5.1%	3.4%	3.0%	3.2%
	undecided	15.4%	6.6%	4.5%	5.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.1, df=8, p<0.001

5b) the situation with the fewest number of wolves I can accept for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5b) the situation with the fewest number of wolves I can accept for the SLP is	Situation 1	40.5%	43.1%	39.7%	40.3%
	Situation 2	27.6%	34.8%	33.9%	33.8%
	Situation 3	11.2%	10.8%	16.3%	15.2%
	Situation 4	1.7%	2.0%	3.6%	3.2%
	Situation 5	3.4%	2.7%	1.3%	1.6%
	undecided	15.5%	6.6%	5.2%	5.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=40.7, df=10, p<0.001

5c) the situation with the highest number of wolves I can accept for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5c) the situation with the highest number of wolves I can accept for the SLP is	Situation 1	24.1%	24.3%	19.8%	20.8%
	Situation 2	21.6%	30.5%	24.4%	25.2%
	Situation 3	21.6%	24.6%	30.1%	28.8%
	Situation 4	9.5%	9.3%	14.9%	13.7%
	Situation 5	7.8%	5.2%	5.9%	5.8%
	undecided	15.5%	6.1%	4.9%	5.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=47.9, df=10, p<0.001

Question 6 was prefaced with the statement: "If you were asked your opinion about whether wolf numbers should be reduced in an area, how important would each of these be to you in considering your position?"

6a) the number of farm animals actually lost to wolves. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6a) the number of farm animals actually lost to wolves.	NOT a consideration	4.0%	3.8%	3.4%	3.5%
	slightly important	10.5%	10.4%	11.7%	11.4%
	somewhat important	23.4%	26.8%	33.8%	32.1%
	very important	61.3%	57.9%	49.9%	51.8%
	undecided	.8%	1.2%	1.2%	1.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.1, df=8, p=0.041

6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer.	NOT a consideration	16.1%	19.4%	27.4%	25.5%
	slightly important	15.3%	18.9%	23.2%	22.1%
	somewhat important	23.4%	26.2%	25.1%	25.2%
	very important	43.5%	34.0%	21.3%	24.5%
	undecided	1.6%	1.4%	2.9%	2.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=65.3, df=8, p<0.001

6c) the number of hunting dogs actually lost in the field to wolves * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6c) the number of hunting dogs actually lost in the field to wolves	NOT a consideration	14.6%	14.3%	14.4%	14.4%
	slightly important	19.5%	21.4%	24.2%	23.5%
	somewhat important	24.4%	28.6%	31.6%	30.8%
	very important	40.7%	34.0%	28.2%	29.8%
	undecided	.8%	1.6%	1.5%	1.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.4, df=8, p=0.072

6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes	NOT a consideration	5.6%	6.6%	4.0%	4.5%
	slightly important	8.9%	8.5%	7.4%	7.6%
	somewhat important	13.7%	16.0%	17.3%	16.9%
	very important	71.0%	68.1%	70.3%	70.0%
	undecided	.8%	.9%	1.0%	1.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.1, df=8, p=0.424

6e) the number of pets actually attacked by wolves near the pet's home. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6e) the number of pets actually attacked by wolves near the pet's home.	NOT a consideration	4.1%	5.2%	4.0%	4.2%
	slightly important	7.3%	10.6%	9.9%	9.9%
	somewhat important	22.8%	22.9%	24.0%	23.7%
	very important	65.9%	60.6%	61.4%	61.5%
	undecided	.0%	.7%	.8%	.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.0, df=8, p=0.860

7a) using your Michigan tax dollars to compensate owners who have lost livestock * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7a) using your Michigan tax dollars to compensate owners who have lost livestock	strongly support	40.0%	31.2%	25.3%	27.0%
	somewhat support	24.8%	26.3%	32.5%	31.1%
	neither support nor oppose	10.4%	16.3%	14.3%	14.5%
	somewhat oppose	7.2%	8.9%	12.5%	11.6%
	strongly oppose	17.6%	17.2%	15.3%	15.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=28.6, df=8, p<0.001

7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs	strongly support	24.4%	13.8%	11.2%	12.3%
	somewhat support	17.9%	22.6%	22.3%	22.2%
	neither support nor oppose	16.3%	21.2%	21.2%	21.0%
	somewhat oppose	11.4%	15.4%	20.5%	19.2%
	strongly oppose	30.1%	27.0%	24.7%	25.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.8, df=8, p<0.001

7c) using your Michigan tax dollars to compensate owners who have lost pets * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7c) using your Michigan tax dollars to compensate owners who have lost pets	strongly support	32.0%	19.6%	16.2%	17.5%
	somewhat support	18.9%	20.5%	23.4%	22.7%
	neither support nor oppose	15.6%	21.0%	21.5%	21.1%
	somewhat oppose	9.0%	13.4%	17.1%	16.1%
	strongly oppose	24.6%	25.5%	22.0%	22.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.8, df=8, p<0.001

7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk	strongly support	19.2%	15.0%	11.8%	12.7%
	somewhat support	20.0%	20.8%	20.2%	20.3%
	neither support nor oppose	17.6%	19.2%	22.6%	21.8%
	somewhat oppose	13.6%	15.9%	18.4%	17.8%
	strongly oppose	29.6%	29.2%	26.9%	27.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.8, df=8, p=0.086

8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ?	strongly support	12.2%	11.7%	10.0%	10.4%
	somewhat support	23.6%	23.4%	29.7%	28.3%
	neither support nor oppose	16.3%	15.7%	18.9%	18.2%
	somewhat oppose	13.0%	17.8%	17.9%	17.7%
	strongly oppose	35.0%	31.4%	23.5%	25.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=24.2, df=8, p=0.002

9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	28.2%	24.0%	23.1%	23.5%
	somewhat support	25.0%	27.7%	29.8%	29.2%
	neither support nor oppose	8.1%	14.9%	16.3%	15.7%
	somewhat oppose	12.1%	9.8%	11.6%	11.3%
	strongly oppose	26.6%	23.5%	19.2%	20.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.9, df=8, p=0.061

9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	20.2%	12.9%	11.6%	12.2%
	somewhat support	16.1%	21.3%	23.2%	22.6%
	neither support nor oppose	13.7%	19.4%	19.9%	19.5%
	somewhat oppose	13.7%	15.5%	18.5%	17.8%
	strongly oppose	36.3%	30.9%	26.8%	27.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=20.9, df=8, p=0.007

9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	23.6%	16.4%	15.7%	16.2%
	somewhat support	19.5%	20.6%	22.6%	22.1%
	neither support nor oppose	12.2%	17.8%	21.3%	20.3%
	somewhat oppose	12.2%	13.6%	15.5%	15.0%
	strongly oppose	32.5%	31.6%	24.9%	26.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=21.3, df=8, p=0.006

10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	30.1%	26.0%	21.4%	22.6%
	somewhat support	28.5%	28.3%	30.2%	29.8%
	neither support nor oppose	12.2%	14.3%	16.8%	16.2%
	somewhat oppose	8.9%	11.5%	14.3%	13.6%
	strongly oppose	20.3%	19.9%	17.3%	17.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=15.5, df=8, p=0.051

10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	22.0%	13.1%	11.8%	12.5%
	somewhat support	20.3%	22.7%	21.8%	21.9%
	neither support nor oppose	15.4%	20.6%	20.4%	20.2%
	somewhat oppose	12.2%	14.8%	18.8%	17.8%
	strongly oppose	30.1%	28.8%	27.2%	27.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.7, df=8, p=0.023

10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	26.8%	17.6%	14.7%	15.8%
	somewhat support	21.1%	21.4%	24.1%	23.5%
	neither support nor oppose	14.6%	18.8%	19.8%	19.4%
	somewhat oppose	12.2%	13.6%	17.7%	16.8%
	strongly oppose	25.2%	28.6%	23.6%	24.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=23.8, df=8, p=0.002

11a) Loss of domestic animals: leave wolves alone. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11a) Loss of domestic animals: leave wolves alone.	strongly support	6.5%	8.6%	10.5%	10.0%
	somewhat support	11.4%	12.4%	11.5%	11.6%
	neither support nor oppose	9.8%	9.8%	12.8%	12.2%
	somewhat oppose	17.1%	22.4%	26.4%	25.3%
	strongly oppose	55.3%	46.9%	38.8%	40.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=24.1, df=8, p=0.002

11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss.	strongly support	50.4%	45.4%	38.1%	39.9%
	somewhat support	30.1%	35.4%	35.6%	35.3%
	neither support nor oppose	5.7%	6.9%	9.3%	8.7%
	somewhat oppose	6.5%	5.5%	8.4%	7.8%
	strongly oppose	7.3%	6.9%	8.6%	8.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=18.2, df=8, p=0.020

11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population	strongly support	43.5%	31.8%	21.9%	24.6%
	somewhat support	23.4%	32.5%	29.3%	29.6%
	neither support nor oppose	10.5%	10.4%	15.6%	14.4%
	somewhat oppose	11.3%	13.0%	17.7%	16.6%
	strongly oppose	11.3%	12.3%	15.5%	14.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=54.2, df=8, p<0.001

11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss.	strongly support	31.4%	44.7%	47.5%	46.3%
	somewhat support	21.5%	24.9%	28.6%	27.6%
	neither support nor oppose	12.4%	11.4%	9.6%	10.0%
	somewhat oppose	9.1%	6.9%	6.6%	6.7%
	strongly oppose	25.6%	12.1%	7.8%	9.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=56.0, df=8, p<0.001

11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	22.8%	27.9%	27.1%	27.0%
	somewhat support	19.5%	22.0%	27.0%	25.8%
	neither support nor oppose	17.9%	19.1%	18.4%	18.5%
	somewhat oppose	9.8%	9.0%	9.3%	9.3%
	strongly oppose	30.1%	22.0%	18.2%	19.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.7, df=8, p=0.033

12a) Public concerns for human safety: leave wolves alone * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12a) Public concerns for human safety: leave wolves alone	strongly support	6.5%	8.2%	9.2%	8.9%
	somewhat support	9.8%	11.3%	12.0%	11.8%
	neither support nor oppose	10.6%	9.1%	11.4%	11.0%
	somewhat oppose	13.8%	17.5%	19.7%	19.1%
	strongly oppose	59.3%	53.8%	47.7%	49.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.4, df=8, p=0.181

12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat.	strongly support	55.4%	49.4%	42.3%	44.1%
	somewhat support	25.6%	30.8%	31.9%	31.4%
	neither support nor oppose	5.0%	6.9%	7.8%	7.5%
	somewhat oppose	5.0%	6.9%	8.2%	7.8%
	strongly oppose	9.1%	6.0%	9.9%	9.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=18.3, df=8, p=0.019

12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population.	strongly support	43.9%	37.1%	26.9%	29.4%
	somewhat support	22.8%	26.1%	30.3%	29.2%
	neither support nor oppose	9.8%	11.9%	11.7%	11.6%
	somewhat oppose	12.2%	13.3%	13.7%	13.5%
	strongly oppose	11.4%	11.6%	17.4%	16.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=35.1, df=8, p<0.001

12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat	strongly support	33.9%	46.6%	52.0%	50.2%
	somewhat support	21.5%	22.6%	25.9%	25.1%
	neither support nor oppose	9.1%	9.7%	6.8%	7.4%
	somewhat oppose	5.8%	7.6%	6.9%	7.0%
	strongly oppose	29.8%	13.5%	8.4%	10.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=71.9, df=8, p<0.001

12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat.	strongly support	27.0%	31.1%	31.8%	31.5%
	somewhat support	16.4%	20.2%	23.9%	22.9%
	neither support nor oppose	16.4%	16.2%	15.7%	15.8%
	somewhat oppose	8.2%	9.3%	7.8%	8.0%
	strongly oppose	32.0%	23.3%	20.8%	21.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.6, df=8, p=0.092

13a) Lower number of deer: leave wolves alone * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13a) Lower number of deer: leave wolves alone	strongly support	13.1%	12.5%	19.3%	17.9%
	somewhat support	12.3%	13.7%	14.9%	14.6%
	neither support nor oppose	10.7%	11.5%	17.1%	15.9%
	somewhat oppose	11.5%	19.2%	18.5%	18.3%
	strongly oppose	52.5%	43.0%	30.2%	33.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=54.7, df=8, p<0.001

13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population.	strongly support	43.1%	35.0%	20.8%	24.2%
	somewhat support	22.0%	26.2%	24.1%	24.4%
	neither support nor oppose	8.9%	12.4%	15.4%	14.6%
	somewhat oppose	12.2%	12.9%	17.7%	16.6%
	strongly oppose	13.8%	13.6%	21.9%	20.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=74.7, df=8, p<0.001

13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population.	strongly support	28.7%	37.3%	34.8%	34.9%
	somewhat support	22.1%	28.5%	30.5%	29.8%
	neither support nor oppose	11.5%	10.8%	13.0%	12.6%
	somewhat oppose	9.0%	9.3%	8.6%	8.7%
	strongly oppose	28.7%	14.1%	13.1%	14.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=26.7, df=8, p<0.001

13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	23.0%	27.8%	24.0%	24.6%
	somewhat support	16.4%	21.8%	24.3%	23.5%
	neither support nor oppose	15.6%	16.3%	17.8%	17.4%
	somewhat oppose	9.8%	9.1%	9.3%	9.3%
	strongly oppose	35.2%	25.1%	24.6%	25.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.8, df=8, p=0.161

Question 14 was prefaced with the statement: "If the Michigan DNR decided that some wolves HAD to be removed in a region for some reason, how strongly would you support or oppose their use of each of the following methods?"

14a) use trained, paid professionals to shoot wolves * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14a) use trained, paid professionals to shoot wolves	strongly support	23.8%	17.4%	16.7%	17.2%
	somewhat support	19.7%	21.2%	20.5%	20.5%
	neither support nor oppose	10.7%	12.4%	14.2%	13.7%
	somewhat oppose	15.6%	14.8%	17.1%	16.6%
	strongly oppose	30.3%	34.3%	31.6%	32.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.3, df=8, p=0.508

14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season	strongly support	55.3%	52.0%	37.5%	40.8%
	somewhat support	21.1%	22.2%	26.9%	25.9%
	neither support nor oppose	4.9%	7.2%	8.1%	7.8%
	somewhat oppose	6.5%	6.2%	9.6%	8.9%
	strongly oppose	12.2%	12.4%	17.9%	16.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=43.6, df=8, p<0.001

14c) kill wolves that are trapped by trained, paid professionals * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14c) kill wolves that are trapped by trained, paid professionals	strongly support	19.7%	14.6%	9.7%	11.0%
	somewhat support	14.8%	15.8%	15.1%	15.2%
	neither support nor oppose	13.1%	13.2%	15.2%	14.8%
	somewhat oppose	18.0%	17.5%	19.6%	19.2%
	strongly oppose	34.4%	38.8%	40.5%	39.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=19.8, df=8, p=0.011

14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season	strongly support	53.7%	46.8%	32.3%	35.7%
	somewhat support	21.1%	23.4%	25.2%	24.7%
	neither support nor oppose	5.7%	6.9%	9.7%	9.0%
	somewhat oppose	5.7%	5.5%	8.3%	7.7%
	strongly oppose	13.8%	17.4%	24.5%	22.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=53.9, df=8, p<0.001

15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way?	strongly approve	59.8%	50.1%	41.9%	44.1%
	somewhat approve	21.3%	28.1%	32.5%	31.2%
	neither approve nor disapprove	4.9%	6.1%	7.6%	7.2%
	somewhat disapprove	6.6%	7.3%	9.3%	8.9%
	strongly disapprove	7.4%	8.3%	8.7%	8.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=23.4, df=8, p=0.003

16a) the michigan DNR should let the wolves maintain their own population level in the UP without trying to manage them. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16a) the michigan DNR should let the wolves maintain their own population level in the UP without trying to manage them.	strongly agree	13.1%	14.2%	15.5%	15.2%
	somewhat agree	18.0%	27.3%	30.0%	28.9%
	neither agree nor disagree	5.7%	9.2%	11.1%	10.5%
	somewhat disagree	15.6%	23.7%	25.9%	25.0%
	strongly disagree	47.5%	25.6%	17.5%	20.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=74.2, df=8, p<0.001

16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting.	strongly agree	43.0%	25.5%	16.3%	19.1%
	somewhat agree	19.8%	26.0%	25.5%	25.3%
	neither agree nor disagree	16.5%	24.3%	30.9%	29.1%
	somewhat disagree	14.9%	16.5%	19.4%	18.7%
	strongly disagree	5.8%	7.6%	8.0%	7.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=70.5, df=8, p<0.001

16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan.	strongly agree	41.0%	31.5%	29.0%	30.0%
	somewhat agree	18.0%	23.9%	21.9%	22.1%
	neither agree nor disagree	11.5%	13.7%	14.7%	14.4%
	somewhat disagree	13.1%	15.2%	18.2%	17.5%
	strongly disagree	16.4%	15.6%	16.2%	16.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.9, df=8, p=0.157

16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers.	strongly agree	14.9%	17.3%	17.0%	16.9%
	somewhat agree	18.2%	21.6%	22.7%	22.3%
	neither agree nor disagree	29.8%	32.1%	35.5%	34.7%
	somewhat disagree	12.4%	12.8%	9.3%	10.0%
	strongly disagree	24.8%	16.2%	15.5%	16.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.8, df=8, p=0.063

16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves.	strongly agree	34.1%	45.7%	46.5%	45.8%
	somewhat agree	18.7%	24.4%	24.8%	24.4%
	neither agree nor disagree	8.9%	9.0%	9.0%	9.0%
	somewhat disagree	12.2%	7.8%	9.8%	9.6%
	strongly disagree	26.0%	13.0%	10.0%	11.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=36.0, df=8, p<0.001

17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season	strongly agree	48.4%	39.8%	29.9%	32.4%
	somewhat agree	19.7%	25.9%	22.6%	23.0%
	neither agree nor disagree	7.4%	9.2%	12.5%	11.7%
	somewhat disagree	10.7%	8.2%	12.6%	11.8%
	strongly disagree	13.9%	16.9%	22.4%	21.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=41.9, df=8, p<0.001

17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season	strongly agree	49.2%	36.0%	23.7%	27.0%
	somewhat agree	19.7%	22.9%	20.4%	20.8%
	neither agree nor disagree	7.4%	8.8%	12.5%	11.7%
	somewhat disagree	7.4%	8.8%	12.1%	11.3%
	strongly disagree	16.4%	23.4%	31.3%	29.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=69.6, df=8, p<0.001

18a) The MiDNR will make wolf management decisions that are adequately based on good science * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18a) The MiDNR will make wolf management decisions that are adequately based on good science	strongly agree	14.0%	26.2%	28.4%	27.3%
	somewhat agree	35.5%	36.9%	41.3%	40.3%
	neither agree nor disagree	14.9%	16.8%	18.0%	17.6%
	somewhat disagree	19.8%	12.1%	8.4%	9.6%
	strongly disagree	15.7%	8.0%	4.0%	5.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=68.5, df=8, p<0.001

18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens	strongly agree	15.6%	25.2%	26.5%	25.7%
	somewhat agree	30.3%	29.9%	38.3%	36.6%
	neither agree nor disagree	13.1%	17.8%	19.0%	18.5%
	somewhat disagree	22.1%	15.2%	11.3%	12.5%
	strongly disagree	18.9%	11.9%	4.9%	6.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=83.0, df=8, p<0.001

18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public	strongly agree	18.0%	27.1%	26.2%	25.9%
	somewhat agree	30.3%	29.0%	34.6%	33.5%
	neither agree nor disagree	19.7%	21.9%	25.3%	24.4%
	somewhat disagree	16.4%	12.1%	9.8%	10.5%
	strongly disagree	15.6%	10.0%	4.2%	5.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=58.5, df=8, p<0.001

19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey?	strongly approve	36.1%	44.1%	47.8%	46.6%
	somewhat approve	21.3%	30.9%	31.4%	30.9%
	undecided	5.7%	6.4%	7.8%	7.5%
	somewhat disapprove	11.5%	6.4%	5.4%	5.9%
	strongly disapprove	25.4%	12.3%	7.5%	9.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=62.2, df=8, p<0.001

20_c1) number of nonmotorized, non consumptive recreational activities * Zone

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c1) number of nonmotorized, non consumptive recreational activities	0	15.0%	20.1%	20.5%	20.2%
	1	24.4%	21.1%	23.6%	23.2%
	2	20.5%	23.4%	24.1%	23.8%
	3	18.9%	16.9%	17.6%	17.5%
	4	11.8%	10.9%	9.2%	9.6%
	5	7.9%	6.0%	3.9%	4.5%
	6	1.6%	1.6%	1.1%	1.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.6, df=12, p=0.330

20_c2) number of consumptive recreational activities * Zone

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c2) number of consumptive recreational activities	0	14.3%	16.9%	38.3%	33.6%
	1	20.6%	22.9%	26.6%	25.7%
	2	25.4%	23.4%	20.4%	21.1%
	3	32.5%	32.9%	13.6%	17.7%
	4	7.1%	3.9%	1.1%	1.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=197.0, df=8, p<0.001

20_c3) number of non-consumptive wildlife activities * Zone

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c3) number of non-consumptive wildlife activities	0	33.3%	34.7%	44.7%	42.5%
	1	31.7%	28.5%	26.1%	26.7%
	2	23.0%	24.8%	20.1%	21.0%
	3	11.9%	12.0%	9.1%	9.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=20.8, df=6, p=0.002

20_c4) number of mechanized recreational activities * Zone

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c4) number of mechanized recreational activities	0	27.0%	37.0%	39.5%	38.5%
	1	33.3%	32.4%	40.4%	38.8%
	2	25.4%	18.8%	13.8%	15.2%
	3	14.3%	11.8%	6.3%	7.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=49.0, df=6, p<0.001

21a) Do you do any of the activities in question 20 in the UP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21a) Do you do any of the activities in question 20 in the UP?	yes	96.8%	57.2%	43.1%	48.0%
	no	3.2%	42.8%	56.9%	52.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=154.7, df=2, p<0.001

21b) Do you do any of the activities in question 20 in the NLP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21b) Do you do any of the activities in question 20 in the NLP?	yes	23.0%	95.4%	72.2%	73.6%
	no	77.0%	4.6%	27.8%	26.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=273.4, df=2, p<0.001

21c) Do you do any of the activities in question 20 in the SLP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21c) Do you do any of the activities in question 20 in the SLP?	yes	8.7%	27.3%	82.5%	69.9%
	no	91.3%	72.7%	17.5%	30.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=752.5, df=2, p<0.001

22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there?	definitely would	4.1%	9.2%	8.4%	8.4%
	more likely	6.5%	7.8%	9.2%	8.8%
	would not affect my choice	50.4%	53.9%	52.1%	52.3%
	less likely	19.5%	12.7%	13.7%	13.8%
	definitely would not	12.2%	8.0%	8.1%	8.3%
	I am undecided how it would affect my use.	7.3%	8.5%	8.5%	8.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.8, df=10, p=0.373

23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related?	yes	16.7%	13.7%	9.8%	10.8%
	no	83.3%	86.3%	90.2%	89.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.3, df=2, p=0.006

23b) In the past three years have you belonged to a conservation or environmental organization which is not hunting related? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23b) In the past three years have you belonged to a conservation or environmental organization which is not hunting related?	yes	10.3%	11.6%	12.4%	12.2%
	no	89.7%	88.4%	87.6%	87.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.7, df=2, p=0.715

23c) In the past three years have you belonged to an animal welfare or animal rights organization? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23c) In the past three years have you belonged to an animal welfare or animal rights organization?	yes	4.8%	5.8%	7.6%	7.2%
	no	95.2%	94.2%	92.4%	92.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.0, df=2, p=0.223

24a) Is any of your immediate family's income provided directly from farming? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
24a) Is any of your immediate family's income provided directly from farming?	no	92.9%	87.0%	90.1%	89.7%
	yes	7.1%	13.0%	9.9%	10.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.0, df=2, p=0.081

24b) If yes: does this farming involve livestock * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
24b) If yes: does this farming involve livestock	yes	46.2%	63.6%	47.1%	50.3%
	no	53.8%	36.4%	52.9%	49.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.9, df=2, p=0.053

25) Do you have access to the Internet for personal use either at home or at work? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25) Do you have access to the Internet for personal use either at home or at work?	yes	70.6%	70.1%	78.4%	76.7%
	no	29.4%	29.9%	21.6%	23.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.3, df=2, p<0.001

25a) how often do you use the internet for information about wildlife? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25a) how often do you use the internet for information about wildlife?	never	18.9%	18.3%	19.5%	19.3%
	rarely	33.3%	31.2%	36.1%	35.2%
	sometimes	35.6%	41.2%	36.4%	37.1%
	fequently	12.2%	9.3%	8.0%	8.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.9, df=6, p=0.434

25b) how often do you use the internet to get information from the michigan department of natural resources? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25b) how often do you use the internet to get information from the michigan department of natural resources?	never	34.1%	32.5%	33.4%	33.3%
	rarely	30.8%	32.5%	34.9%	34.3%
	sometimes	28.6%	28.3%	25.6%	26.1%
	fequently	6.6%	6.8%	6.2%	6.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.0, df=6, p=0.924

26) Please check the region where you currently live * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
26) Please check the region where you currently live	UP	98.4%	.5%	.6%	5.3%
	NLP	.8%	97.4%	5.9%	20.7%
	SLP	.8%	2.1%	93.4%	74.0%
Total		100.0%	100.0%	100.0%	100.0%

Note: most differences here are attributed to respondents living in counties that bordered the NLP/SLP delineation on the survey map.

27) About how many years have you lived in that region?

27) About how many years have you lived in that region?

Zone	Mean	N	Std. Deviation
1 UP	38.17	123	19.853
2 NLP	28.61	424	18.796
3 SLP	39.04	2016	18.361
Total	37.27	2563	18.899

$F_{(2, 2560)}=55.8$, $p<0.001$

28a) DO not own recreational property other than in the region where you live. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28a) DO not own recreational property other than in the region where you live.	no	54.8%	47.2%	46.1%	46.7%
	yes	45.2%	52.8%	53.9%	53.3%
Total		100.0%	100.0%	100.0%	100.0%

$\chi^2=3.7$, df=2, $p=0.161$

28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP	no	57.9%	84.5%	91.5%	88.7%
	yes	42.1%	15.5%	8.5%	11.3%
Total		100.0%	100.0%	100.0%	100.0%

$\chi^2=143.1$, df=2, $p<0.001$

28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP	no	95.2%	74.5%	71.4%	73.1%
	yes	4.8%	25.5%	28.6%	26.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=34.8, df=2, p<0.001

28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP	no	96.8%	94.4%	89.9%	91.0%
	yes	3.2%	5.6%	10.1%	9.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.3, df=2, p=0.001

29) Which best describes you? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
29) Which best describes you?	hunter	54.5%	49.1%	27.8%	32.5%
	non-hunter but not opposed to hunting	42.3%	45.8%	58.6%	55.7%
	opposed to all forms of recreational hunting	1.6%	3.3%	9.8%	8.3%
	undecided	1.6%	1.9%	3.8%	3.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=112.8, df=6, p<0.001

31) Age of respondent.

31) Age of respondent

Zone	Mean	N	Std. Deviation
1 UP	50.98	124	15.879
2 NLP	51.96	428	15.827
3 SLP	48.56	2032	15.356
Total	49.24	2584	15.510

$F_{(2, 2581)}=9.4$, $p<0.001$

32) Are you male or female? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
32) Are you male or female?	male	62.1%	56.8%	52.6%	53.8%
	female	37.9%	43.2%	47.4%	46.2%
Total		100.0%	100.0%	100.0%	100.0%

$\chi^2=6.07$, df=2, $p=0.048$

33) Please check your highest completed level of education. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
33) Please check your highest completed level of education.	less than high school	3.2%	4.2%	2.7%	3.0%
	completed high school or ged	28.8%	26.9%	21.0%	22.4%
	vocational or trade school	7.2%	6.8%	5.9%	6.1%
	some college	22.4%	24.1%	24.5%	24.3%
	two year degree	10.4%	11.9%	10.5%	10.7%
	four year degree	18.4%	16.6%	21.0%	20.2%
	graduate school (phd, mba, msc, etc.)	9.6%	9.6%	14.3%	13.3%
Total		100.0%	100.0%	100.0%	100.0%

$\chi^2=22.8$, df=12, $p=0.029$

APPENDIX IV:
WEIGHTED FREQUENCIES OF HUNTER RESPONSES TO THE GENERAL-PUBLIC SURVEY QUESTIONS BY ZONE

This appendix reports the frequency of responses by all interested hunting respondents for each question on the 2005 general-public wolf survey. 'Interested respondents' were those individuals who provided an answer to Question 1 other than "I am not interested in Michigan's wolves."

Responses have been weighted based on the population levels for each region (see Appendix I). The 'total' column in each table thus represents the statewide total of interested hunting responses. Weighting in this manner does not change the percentage values for responses within a region, but does recalculate an adjusted number of cases for that region. For ease of reading, sample size has been omitted from the tables. When weighted to reflect actual statewide distribution, the adjusted number of hunter responses from each zone was: UP: 67; NLP: 209; SLP: 567. The actual number of interested hunting respondents in each zone was: UP: 304; NLP: 350; SLP: 417.

Some of the question wording in the following analyses has been abbreviated. Actual wording and format can be referenced in Appendix II. Differences between zones were considered to be statistically significant if '*p*' was less than or equal to 0.05.

1. How would you summarize your opinion about having wolves in Michigan? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
1. How would you summarize your opinion about having wolves in Michigan?	strongly approve	20.9%	35.7%	42.2%	38.9%
	somewhat approve	17.9%	30.5%	31.6%	30.2%
	undecided	6.0%	7.1%	7.1%	7.0%
	somewhat disapprove	17.9%	10.0%	8.8%	9.8%
	strongly disapprove	37.3%	16.7%	10.4%	14.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=48.6, df=8, p<0.001

Question 2 was prefaced with the statement: “In your opinion, how important is each of the statements below as a reason why we should have wolves in Michigan?”

2a. As predators, wolves could benefit Michigan's ecosystem by helping to control some other wildlife populations * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2a. As predators, wolves could benefit Michigan's ecosystem by helping to control some other wildlife populations	NOT a reason	50.7%	28.5%	20.0%	24.6%
	slightly important	13.4%	14.0%	16.9%	15.9%
	somewhat important	14.9%	24.6%	26.9%	25.4%
	very important	19.4%	30.9%	36.0%	33.4%
	undecided	1.5%	1.9%	.2%	.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=41.9, df=8, p<0.001

2b. There are people who appreciate wolves and want to know that wolves exist in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2b. There are people who appreciate wolves and want to know that wolves exist in Michigan.	NOT a reason	51.5%	33.2%	26.4%	30.1%
	slightly important	19.7%	21.2%	19.1%	19.6%
	somewhat important	16.7%	23.6%	33.7%	29.8%
	very important	10.6%	20.7%	19.6%	19.2%
	undecided	1.5%	1.4%	1.2%	1.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=25.9, df=8, p<0.001

2c. Future generations of citizens could benefit if we maintain wolves in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2c. Future generations of citizens could benefit if we maintain wolves in Michigan.	NOT a reason	46.3%	25.4%	18.7%	22.6%
	slightly important	19.4%	21.0%	17.4%	18.5%
	somewhat important	14.9%	24.9%	30.4%	27.8%
	very important	16.4%	26.8%	30.9%	28.7%
	undecided	3.0%	2.0%	2.5%	2.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=33.1, df=8, p<0.001

2d. Wolves had a historic presence in Michigan and should be here now * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2d. Wolves had a historic presence in Michigan and should be here now	NOT a reason	47.0%	23.9%	20.0%	23.1%
	slightly important	19.7%	17.6%	17.2%	17.5%
	somewhat important	13.6%	22.0%	25.9%	24.0%
	very important	18.2%	35.6%	35.6%	34.2%
	undecided	1.5%	1.0%	1.3%	1.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=28.5, df=8, p<0.001

2e. People want to view, hear, photograph or study wild wolves in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2e. People want to view, hear, photograph or study wild wolves in Michigan.	NOT a reason	47.7%	29.3%	19.4%	24.1%
	slightly important	23.1%	17.6%	19.2%	19.1%
	somewhat important	15.4%	26.3%	33.3%	30.1%
	very important	12.3%	25.9%	26.3%	25.1%
	undecided	1.5%	1.0%	1.8%	1.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=35.9, df=8, p<0.001

2f. Wolves could eventually become another game species for Michigan hunters. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2f. Wolves could eventually become another game species for Michigan hunters.	NOT a reason	57.6%	44.0%	29.9%	35.6%
	slightly important	15.2%	16.4%	24.2%	21.6%
	somewhat important	13.6%	19.8%	21.0%	20.1%
	very important	10.6%	17.4%	23.5%	21.0%
	undecided	3.0%	2.4%	1.2%	1.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=33.7, df=8, p<0.001

2g. Regardless of our laws, wolves have a right to exist in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2g. Regardless of our laws, wolves have a right to exist in Michigan.	NOT a reason	47.7%	26.0%	22.0%	25.0%
	slightly important	15.4%	16.8%	12.2%	13.6%
	somewhat important	13.8%	14.4%	22.6%	19.9%
	very important	21.5%	39.4%	41.6%	39.5%
	undecided	1.5%	3.4%	1.6%	2.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=32.6, df=8, p<0.001

2h. Wolves could increase tourism in Michigan and provide economic benefits. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2h. Wolves could increase tourism in Michigan and provide economic benefits.	NOT a reason	64.2%	44.0%	30.7%	36.7%
	slightly important	16.4%	19.8%	24.1%	22.4%
	somewhat important	11.9%	18.4%	25.2%	22.4%
	very important	6.0%	15.9%	17.9%	16.4%
	undecided	1.5%	1.9%	2.1%	2.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=36.7, df=8, p<0.001

3a) the situation I prefer for the UP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
3a) the situation I prefer for the UP is	Situation 1	37.9%	16.3%	9.0%	13.1%
	Situation 2	19.7%	23.2%	15.3%	17.6%
	Situation 3	22.7%	31.0%	38.8%	35.6%
	Situation 4	10.6%	18.7%	28.0%	24.3%
	Situation 5	7.6%	6.9%	5.8%	6.2%
	undecided	1.5%	3.9%	3.1%	3.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=62.9, df=10, p<0.001

3b) the situation with the FEWEST number of wolves I can accept for the UP. is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
3b) the situation with the FEWEST number of wolves I can accept for the UP. is	Situation 1	44.6%	20.7%	13.2%	17.5%
	Situation 2	27.7%	32.8%	33.8%	33.1%
	Situation 3	16.9%	29.8%	38.0%	34.3%
	Situation 4	4.6%	7.6%	9.6%	8.7%
	Situation 5	3.1%	2.0%	1.4%	1.7%
	undecided	3.1%	7.1%	4.0%	4.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=50.4, df=10, p<0.001

3c) the situation with the HIGHEST number of wolves I can accept for the UP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
3c) the situation with the HIGHEST number of wolves I can accept for the UP is	Situation 1	24.6%	11.6%	6.9%	9.4%
	Situation 2	20.0%	14.1%	11.2%	12.6%
	Situation 3	21.5%	24.1%	26.4%	25.5%
	Situation 4	18.5%	29.6%	37.1%	33.8%
	Situation 5	10.8%	15.1%	13.6%	13.7%
	undecided	4.6%	5.5%	4.9%	5.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=33.6, df=10, p<0.001

4a) the situation I prefer for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4a) the situation I prefer for the NLP is	Situation 1	32.8%	28.2%	16.1%	20.4%
	Situation 2	26.6%	24.3%	27.6%	26.7%
	Situation 3	18.8%	29.7%	34.5%	32.1%
	Situation 4	6.3%	9.9%	16.1%	13.8%
	Situation 5	4.7%	5.4%	2.7%	3.5%
	undecided	10.9%	2.5%	3.1%	3.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=42.7, df=10, p<0.001

4b) the situation with the fewest number of wolves I can accept for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4b) the situation with the fewest number of wolves I can accept for the NLP is	Situation 1	38.7%	33.7%	25.9%	28.7%
	Situation 2	32.3%	37.2%	42.1%	40.2%
	Situation 3	11.3%	18.6%	22.8%	20.9%
	Situation 4	3.2%	4.0%	4.7%	4.4%
	Situation 5	3.2%	2.5%	1.1%	1.6%
	undecided	11.3%	4.0%	3.4%	4.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=23.2, df=10, p=0.010

4c) the situation with the highest number of wolves I can accept for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4c) the situation with the highest number of wolves I can accept for the NLP is	Situation 1	22.6%	21.5%	12.8%	15.7%
	Situation 2	22.6%	18.5%	16.4%	17.4%
	Situation 3	19.4%	28.0%	36.6%	33.2%
	Situation 4	14.5%	21.0%	24.9%	23.2%
	Situation 5	9.7%	7.5%	5.2%	6.1%
	undecided	11.3%	3.5%	4.0%	4.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.7, df=10, p<0.001

5a) the situation I prefer for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5a) the situation I prefer for the SLP is	Situation 1	38.1%	38.5%	35.4%	36.4%
	Situation 2	25.4%	32.0%	30.3%	30.3%
	Situation 3	14.3%	16.5%	21.9%	20.0%
	Situation 4	3.2%	4.0%	7.8%	6.5%
	Situation 5	6.3%	4.0%	1.5%	2.5%
	undecided	12.7%	5.0%	3.1%	4.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=22.2, df=10, p<0.001

5b) the situation with the fewest number of wolves I can accept for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5b) the situation with the fewest number of wolves I can accept for the SLP is	Situation 1	45.2%	47.5%	48.5%	48.0%
	Situation 2	27.4%	31.5%	30.8%	30.7%
	Situation 3	8.1%	10.0%	12.9%	11.8%
	Situation 4	1.6%	2.0%	2.9%	2.6%
	Situation 5	4.8%	2.5%	.9%	1.6%
	undecided	12.9%	6.5%	4.0%	5.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=18.7, df=10, p=0.044

5c) the situation with the highest number of wolves I can accept for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5c) the situation with the highest number of wolves I can accept for the SLP is	Situation 1	29.0%	29.4%	27.7%	28.2%
	Situation 2	22.6%	28.9%	23.1%	24.5%
	Situation 3	17.7%	23.4%	29.7%	27.2%
	Situation 4	8.1%	7.6%	12.0%	10.6%
	Situation 5	8.1%	5.1%	3.1%	4.0%
	undecided	14.5%	5.6%	4.4%	5.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=24.5, df=10, p=0.006

Question 6 was prefaced with the statement: "If you were asked your opinion about whether wolf numbers should be reduced in an area, how important would each of these be to you in considering your position?"

6a) the number of farm animals actually lost to wolves. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6a) the number of farm animals actually lost to wolves.	NOT a consideration	4.5%	3.9%	2.7%	3.1%
	slightly important	7.6%	9.7%	11.2%	10.6%
	somewhat important	19.7%	24.3%	29.2%	27.3%
	very important	68.2%	61.7%	55.8%	58.2%
	undecided	.0%	.5%	1.1%	.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.3, df=8, p=0.405

6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer.	NOT a consideration	10.6%	9.3%	10.4%	10.1%
	slightly important	10.6%	14.7%	16.1%	15.3%
	somewhat important	16.7%	23.5%	28.1%	26.1%
	very important	62.1%	52.0%	44.4%	47.6%
	undecided	.0%	.5%	1.1%	.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.2, df=8, p=0.191

6c) the number of hunting dogs actually lost in the field to wolves * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6c) the number of hunting dogs actually lost in the field to wolves	NOT a consideration	13.8%	14.1%	10.6%	11.8%
	slightly important	13.8%	17.0%	23.3%	21.0%
	somewhat important	21.5%	27.7%	30.1%	28.8%
	very important	50.8%	39.3%	34.8%	37.2%
	undecided	.0%	1.9%	1.1%	1.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.0, df=8, p=0.082

6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes	NOT a consideration	4.5%	9.7%	3.9%	5.4%
	slightly important	7.6%	9.7%	10.5%	10.1%
	somewhat important	12.1%	14.0%	16.4%	15.5%
	very important	75.8%	66.2%	68.4%	68.4%
	undecided	.0%	.5%	.7%	.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.2, df=8, p=0.143

6e) the number of pets actually attacked by wolves near the pet's home. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6e) the number of pets actually attacked by wolves near the pet's home.	NOT a consideration	4.5%	6.8%	5.5%	5.8%
	slightly important	6.0%	11.7%	10.0%	10.1%
	somewhat important	17.9%	21.0%	26.9%	24.7%
	very important	71.6%	60.0%	56.9%	58.8%
	undecided		.5%	.7%	.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.7, df=8, p=0.370

7a) using your Michigan tax dollars to compensate owners who have lost livestock * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7a) using your Michigan tax dollars to compensate owners who have lost livestock	strongly support	42.4%	34.5%	29.4%	31.7%
	somewhat support	19.7%	22.3%	27.9%	25.9%
	neither support nor oppose	7.6%	12.6%	12.5%	12.1%
	somewhat oppose	9.1%	8.7%	11.7%	10.8%
	strongly oppose	21.2%	21.8%	18.5%	19.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.4, df=8, p=0.238

7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs	strongly support	30.3%	18.4%	13.2%	15.8%
	somewhat support	15.2%	19.4%	22.4%	21.1%
	neither support nor oppose	12.1%	18.4%	17.4%	17.3%
	somewhat oppose	10.6%	15.0%	19.9%	18.0%
	strongly oppose	31.8%	28.6%	27.0%	27.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=19.9, df=8, p=0.011

7c) using your Michigan tax dollars to compensate owners who have lost pets * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7c) using your Michigan tax dollars to compensate owners who have lost pets	strongly support	34.8%	20.2%	15.7%	18.3%
	somewhat support	19.7%	15.8%	20.5%	19.3%
	neither support nor oppose	12.1%	20.2%	19.8%	19.3%
	somewhat oppose	6.1%	15.8%	16.2%	15.3%
	strongly oppose	27.3%	28.1%	27.8%	27.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=20.1, df=8, p=0.010

7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk	strongly support	22.7%	17.0%	14.8%	16.0%
	somewhat support	18.2%	18.0%	17.0%	17.3%
	neither support nor oppose	15.2%	16.5%	19.9%	18.7%
	somewhat oppose	10.6%	13.6%	16.8%	15.5%
	strongly oppose	33.3%	35.0%	31.5%	32.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.6, df=8, p=0.576

8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ?	strongly support	10.6%	10.3%	9.1%	9.5%
	somewhat support	18.2%	17.6%	24.2%	22.1%
	neither support nor oppose	12.1%	12.7%	17.6%	16.0%
	somewhat oppose	12.1%	20.6%	18.0%	18.1%
	strongly oppose	47.0%	38.7%	31.1%	34.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.9, df=8, p=0.069

9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	27.3%	19.8%	18.2%	19.3%
	somewhat support	19.7%	18.8%	24.3%	22.6%
	neither support nor oppose	4.5%	12.6%	8.6%	9.2%
	somewhat oppose	12.1%	12.6%	14.3%	13.7%
	strongly oppose	36.4%	36.2%	34.6%	35.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.7, df=8, p=0.287

9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	22.7%	11.2%	8.5%	10.3%
	somewhat support	13.6%	16.1%	19.8%	18.4%
	neither support nor oppose	7.6%	16.1%	12.5%	13.0%
	somewhat oppose	12.1%	16.1%	19.2%	17.9%
	strongly oppose	43.9%	40.5%	40.0%	40.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=19.2, df=8, p=0.014

9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	24.6%	12.6%	9.8%	11.6%
	somewhat support	13.8%	14.1%	16.5%	15.7%
	neither support nor oppose	9.2%	17.0%	16.4%	16.0%
	somewhat oppose	12.3%	13.1%	16.9%	15.6%
	strongly oppose	40.0%	43.2%	40.4%	41.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.2, df=8, p=0.040

10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	28.8%	27.3%	23.3%	24.7%
	somewhat support	27.3%	27.3%	29.0%	28.5%
	neither support nor oppose	12.1%	10.2%	11.6%	11.3%
	somewhat oppose	7.6%	11.7%	15.3%	13.8%
	strongly oppose	24.2%	23.4%	20.8%	21.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.0, df=8, p=0.646

10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	25.8%	16.1%	12.6%	14.5%
	somewhat support	19.7%	23.9%	23.3%	23.2%
	neither support nor oppose	12.1%	14.6%	14.4%	14.3%
	somewhat oppose	9.1%	14.1%	18.3%	16.6%
	strongly oppose	33.3%	31.2%	31.3%	31.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.2, df=8, p=0.143

10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	28.8%	18.0%	14.6%	16.5%
	somewhat support	19.7%	19.5%	21.8%	21.1%
	neither support nor oppose	13.6%	15.6%	15.6%	15.5%
	somewhat oppose	9.1%	13.2%	17.9%	16.1%
	strongly oppose	28.8%	33.7%	30.0%	30.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.2, df=8, p=0.104

11a) Loss of domestic animals: leave wolves alone. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11a) Loss of domestic animals: leave wolves alone.	strongly support	6.1%	6.9%	6.8%	6.8%
	somewhat support	4.5%	8.9%	6.8%	7.1%
	neither support nor oppose	9.1%	7.4%	9.5%	8.9%
	somewhat oppose	10.6%	17.3%	23.6%	21.0%
	strongly oppose	69.7%	59.4%	53.4%	56.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.1, df=8, p=0.146

11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss.	strongly support	58.5%	51.2%	46.8%	48.8%
	somewhat support	26.2%	32.2%	33.9%	32.9%
	neither support nor oppose	4.6%	6.3%	7.0%	6.6%
	somewhat oppose	4.6%	3.4%	7.3%	6.1%
	strongly oppose	6.2%	6.8%	5.0%	5.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.5, df=8, p=0.383

11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population	strongly support	58.2%	44.4%	39.9%	42.5%
	somewhat support	20.9%	33.7%	32.0%	31.5%
	neither support nor oppose	7.5%	7.3%	11.3%	10.0%
	somewhat oppose	6.0%	7.3%	9.5%	8.7%
	strongly oppose	7.5%	7.3%	7.3%	7.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.9, df=8, p=0.154

11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss.	strongly support	25.8%	37.7%	35.2%	35.1%
	somewhat support	15.2%	21.1%	27.1%	24.7%
	neither support nor oppose	10.6%	12.7%	10.5%	11.1%
	somewhat oppose	10.6%	8.3%	10.7%	10.1%
	strongly oppose	37.9%	20.1%	16.4%	19.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=22.9, df=8, p=0.004

11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	16.9%	20.6%	17.5%	18.2%
	somewhat support	15.4%	17.2%	20.5%	19.3%
	neither support nor oppose	16.9%	19.6%	18.4%	18.6%
	somewhat oppose	10.8%	9.8%	12.1%	11.4%
	strongly oppose	40.0%	32.8%	31.6%	32.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.5, df=8, p=0.807

12a) Public concerns for human safety: leave wolves alone * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12a) Public concerns for human safety: leave wolves alone	strongly support	4.6%	6.5%	7.5%	7.0%
	somewhat support	4.6%	10.0%	9.4%	9.1%
	neither support nor oppose	7.7%	7.5%	7.3%	7.4%
	somewhat oppose	9.2%	14.0%	20.4%	17.9%
	strongly oppose	73.8%	62.0%	55.4%	58.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.7, df=8, p=0.124

12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat.	strongly support	61.5%	56.9%	44.6%	49.1%
	somewhat support	21.5%	27.2%	36.7%	33.1%
	neither support nor oppose	4.6%	5.9%	5.0%	5.2%
	somewhat oppose	3.1%	5.0%	6.5%	5.8%
	strongly oppose	9.2%	5.0%	7.2%	6.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.1, df=8, p=0.029

12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population.	strongly support	56.1%	49.3%	43.0%	45.6%
	somewhat support	18.2%	26.6%	31.5%	29.2%
	neither support nor oppose	9.1%	8.9%	8.1%	8.3%
	somewhat oppose	7.6%	8.4%	9.0%	8.7%
	strongly oppose	9.1%	6.9%	8.4%	8.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.0, df=8, p=0.432

12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat	strongly support	27.3%	39.1%	39.7%	38.5%
	somewhat support	16.7%	20.3%	25.6%	23.6%
	neither support nor oppose	9.1%	10.4%	7.9%	8.6%
	somewhat oppose	6.1%	8.9%	11.4%	10.4%
	strongly oppose	40.9%	21.3%	15.3%	18.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.1, df=8, p<0.001

12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat.	strongly support	19.7%	22.8%	19.9%	20.6%
	somewhat support	15.2%	16.8%	18.1%	17.5%
	neither support nor oppose	16.7%	15.8%	16.1%	16.1%
	somewhat oppose	7.6%	8.4%	11.2%	10.2%
	strongly oppose	40.9%	36.1%	34.7%	35.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.2, df=8, p=0.920

13a) Lower number of deer: leave wolves alone * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13a) Lower number of deer: leave wolves alone	strongly support	9.0%	7.5%	8.2%	8.1%
	somewhat support	4.5%	8.5%	10.8%	9.7%
	neither support nor oppose	9.0%	6.0%	8.8%	8.1%
	somewhat oppose	7.5%	14.5%	20.0%	17.6%
	strongly oppose	70.1%	63.5%	52.2%	56.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.0, df=8, p=0.030

13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population.	strongly support	60.6%	53.2%	44.2%	47.7%
	somewhat support	18.2%	26.6%	31.3%	29.1%
	neither support nor oppose	6.1%	8.4%	7.1%	7.3%
	somewhat oppose	6.1%	6.4%	8.4%	7.7%
	strongly oppose	9.1%	5.4%	9.1%	8.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.0, df=8, p=0.110

13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population.	strongly support	27.3%	37.3%	32.8%	33.5%
	somewhat support	16.7%	22.4%	30.5%	27.4%
	neither support nor oppose	9.1%	9.0%	10.2%	9.8%
	somewhat oppose	9.1%	10.0%	9.8%	9.8%
	strongly oppose	37.9%	21.4%	16.7%	19.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=22.5, df=8, p=0.004

13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	18.5%	24.4%	22.4%	22.6%
	somewhat support	12.3%	17.9%	16.8%	16.7%
	neither support nor oppose	16.9%	12.9%	14.8%	14.5%
	somewhat oppose	7.7%	8.0%	11.3%	10.2%
	strongly oppose	44.6%	36.8%	34.7%	36.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.0, df=8, p=0.642

14a) use trained, paid professionals to shoot wolves * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14a) use trained, paid professionals to shoot wolves	strongly support	25.8%	18.0%	15.1%	16.7%
	somewhat support	16.7%	20.0%	14.9%	16.3%
	neither support nor oppose	10.6%	11.5%	15.8%	14.3%
	somewhat oppose	13.6%	12.0%	18.7%	16.7%
	strongly oppose	33.3%	38.5%	35.5%	36.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.1, df=8, p=0.078

14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season	strongly support	72.7%	72.5%	70.0%	70.9%
	somewhat support	12.1%	17.2%	18.5%	17.7%
	neither support nor oppose	4.5%	2.0%	3.6%	3.3%
	somewhat oppose	3.0%	3.9%	1.6%	2.3%
	strongly oppose	7.6%	4.4%	6.2%	5.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.9, df=8, p=0.446

14c) kill wolves that are trapped by trained, paid professionals * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14c) kill wolves that are trapped by trained, paid professionals	strongly support	25.8%	18.8%	10.9%	14.1%
	somewhat support	15.2%	14.9%	11.3%	12.5%
	neither support nor oppose	10.6%	10.9%	16.2%	14.5%
	somewhat oppose	13.6%	14.9%	20.1%	18.3%
	strongly oppose	34.8%	40.6%	41.4%	40.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=22.6, df=8, p=0.004

14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season	strongly support	68.7%	64.5%	58.2%	60.6%
	somewhat support	16.4%	20.2%	22.7%	21.6%
	neither support nor oppose	4.5%	3.9%	6.4%	5.6%
	somewhat oppose	3.0%	3.4%	3.6%	3.5%
	strongly oppose	7.5%	7.9%	9.1%	8.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.3, df=8, p=0.728

15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way?	strongly approve	72.7%	60.6%	55.8%	58.3%
	somewhat approve	15.2%	23.2%	26.0%	24.4%
	neither approve nor disapprove	3.0%	3.9%	6.3%	5.5%
	somewhat disapprove	4.5%	5.4%	5.1%	5.1%
	strongly disapprove	4.5%	6.9%	6.9%	6.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.0, df=8, p=0.338

16a) the michigan DNR should let the wolves maintain their own population level in the UP without trying to manage them. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16a) the michigan DNR should let the wolves maintain their own population level in the UP without trying to manage them.	strongly agree	7.7%	13.8%	11.4%	11.7%
	somewhat agree	10.8%	22.2%	24.9%	23.1%
	neither agree nor disagree	4.6%	7.9%	9.7%	8.9%
	somewhat disagree	10.8%	21.7%	27.6%	24.8%
	strongly disagree	66.2%	34.5%	26.5%	31.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=46.2, df=8, p<0.001

16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting.	strongly agree	59.1%	39.7%	32.1%	36.2%
	somewhat agree	16.7%	25.0%	30.0%	27.7%
	neither agree nor disagree	7.6%	16.2%	17.2%	16.2%
	somewhat disagree	12.1%	12.3%	14.0%	13.4%
	strongly disagree	4.5%	6.9%	6.6%	6.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=21.6, df=8, p=0.006

16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan.	strongly agree	48.5%	36.3%	29.6%	32.8%
	somewhat agree	18.2%	21.6%	23.5%	22.6%
	neither agree nor disagree	10.6%	14.2%	13.4%	13.3%
	somewhat disagree	9.1%	12.3%	17.7%	15.7%
	strongly disagree	13.6%	15.7%	15.9%	15.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.8, df=8, p=0.089

16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers.	strongly agree	13.8%	15.8%	12.6%	13.5%
	somewhat agree	13.8%	18.7%	18.4%	18.1%
	neither agree nor disagree	24.6%	25.6%	27.9%	27.1%
	somewhat disagree	13.8%	16.3%	14.1%	14.6%
	strongly disagree	33.8%	23.6%	27.0%	26.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.8, df=8, p=0.783

16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves.	strongly agree	27.3%	43.6%	43.2%	42.0%
	somewhat agree	13.6%	21.6%	22.1%	21.3%
	neither agree nor disagree	9.1%	10.3%	10.1%	10.0%
	somewhat disagree	13.6%	7.8%	9.7%	9.6%
	strongly disagree	36.4%	16.7%	14.9%	17.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=23.5, df=8, p=0.003

17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season	strongly agree	63.6%	59.6%	60.1%	60.3%
	somewhat agree	16.7%	24.1%	23.1%	22.8%
	neither agree nor disagree	4.5%	4.9%	5.1%	5.0%
	somewhat disagree	6.1%	4.4%	6.1%	5.7%
	strongly disagree	9.1%	6.9%	5.6%	6.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.6, df=8, p=0.892

17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season	strongly agree	66.7%	55.2%	50.1%	52.7%
	somewhat agree	15.2%	20.9%	23.0%	21.9%
	neither agree nor disagree	4.5%	5.5%	8.5%	7.5%
	somewhat disagree	4.5%	7.0%	6.0%	6.1%
	strongly disagree	9.1%	11.4%	12.3%	11.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.9, df=8, p=0.347

18a) The MiDNR will make wolf management decisions that are adequately based on good science * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18a) The MiDNR will make wolf management decisions that are adequately based on good science	strongly agree	10.8%	22.7%	27.1%	24.7%
	somewhat agree	30.8%	34.5%	42.8%	39.8%
	neither agree nor disagree	13.8%	15.8%	14.1%	14.5%
	somewhat disagree	21.5%	14.3%	8.3%	10.8%
	strongly disagree	23.1%	12.8%	7.8%	10.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=38.5, df=8, p<0.001

18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens	strongly agree	13.8%	24.0%	27.8%	25.8%
	somewhat agree	23.1%	25.5%	37.2%	33.2%
	neither agree nor disagree	10.8%	16.2%	15.3%	15.1%
	somewhat disagree	26.2%	17.2%	11.1%	13.8%
	strongly disagree	26.2%	17.2%	8.6%	12.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=46.2, df=8, p<0.001

18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public	strongly agree	16.7%	28.2%	28.3%	27.3%
	somewhat agree	25.8%	23.8%	35.5%	31.8%
	neither agree nor disagree	16.7%	21.3%	18.2%	18.8%
	somewhat disagree	21.2%	13.4%	11.2%	12.5%
	strongly disagree	19.7%	13.4%	6.8%	9.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.6, df=8, p<0.001

19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey?	strongly approve	27.3%	42.0%	48.6%	45.2%
	somewhat approve	16.7%	27.8%	28.9%	27.7%
	undecided	6.1%	3.4%	4.5%	4.3%
	somewhat disapprove	13.6%	8.8%	7.3%	8.2%
	strongly disapprove	36.4%	18.0%	10.7%	14.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=42.6, df=8, p<0.001

20_c1) number of nonmotorized, non consumptive recreational activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c1) number of nonmotorized, non consumptive recreational activities	0	16.2%	21.1%	18.7%	19.1%
	1	22.1%	21.1%	21.0%	21.1%
	2	22.1%	21.5%	24.1%	23.3%
	3	19.1%	15.3%	17.8%	17.3%
	4	8.8%	11.5%	13.2%	12.4%
	5	10.3%	7.2%	4.0%	5.3%
	6	1.5%	2.4%	1.2%	1.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.7, df=12, p=0.555

20_c2) number of consumptive recreational activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c2) number of consumptive recreational activities	0	.0%	1.4%	.9%	.9%
	1	6.0%	5.3%	9.2%	7.9%
	2	26.9%	24.9%	43.0%	37.2%
	3	53.7%	60.3%	43.2%	48.3%
	4	13.4%	8.1%	3.7%	5.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=43.2, df=8, p<0.001

20_c3) number of non-consumptive wildlife activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c3) number of non-consumptive wildlife activities	0	32.4%	31.6%	40.2%	37.4%
	1	30.9%	33.5%	28.9%	30.2%
	2	23.5%	22.0%	19.6%	20.5%
	3	13.2%	12.9%	11.3%	11.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.9, df=6, p=0.440

20_c4) number of mechanized recreational activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c4) number of mechanized recreational activities	0	17.9%	26.8%	21.9%	22.8%
	1	29.9%	29.7%	37.3%	34.8%
	2	31.3%	23.9%	27.2%	26.7%
	3	20.9%	19.6%	13.6%	15.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.4, df=6, p=0.077

21a) Do you do any of the activities in question 20 in the UP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21a) Do you do any of the activities in question 20 in the UP?	yes	100.0%	64.9%	58.2%	63.1%
	no	.0%	35.1%	41.8%	36.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=44.8, df=2, p<0.001

21b) Do you do any of the activities in question 20 in the NLP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21b) Do you do any of the activities in question 20 in the NLP?	yes	20.9%	97.6%	85.9%	83.6%
	no	79.1%	2.4%	14.1%	16.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=224.1, df=2, p<0.001

21c) Do you do any of the activities in question 20 in the SLP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21c) Do you do any of the activities in question 20 in the SLP?	yes	7.5%	29.7%	89.8%	68.3%
	no	92.5%	70.3%	10.2%	31.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=379.5, df=2, p<0.001

22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there?	definitely would	1.5%	10.2%	9.0%	8.8%
	more likely	6.2%	6.3%	9.6%	8.5%
	would not affect my choice	47.7%	54.1%	58.7%	56.7%
	less likely	23.1%	14.6%	10.8%	12.7%
	definitely would not	13.8%	8.8%	6.9%	7.9%
	I am undecided how it would affect my use.	7.7%	5.9%	5.0%	5.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=20.7, df=10, p=0.023

23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related?	yes	28.4%	25.0%	28.0%	27.3%
	no	71.6%	75.0%	72.0%	72.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.8, df=2, p=0.688

23b) In the past three years have you belonged to a conservation or environmental organization which is not hunting related? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23b) In the past three years have you belonged to a conservation or environmental organization which is not hunting related?	yes	10.4%	12.0%	8.6%	9.6%
	no	89.6%	88.0%	91.4%	90.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.0, df=2, p=0.368

23c) In the past three years have you belonged to an animal welfare or animal rights organization? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23c) In the past three years have you belonged to an animal welfare or animal rights organization?	yes	1.5%	2.4%	2.1%	2.1%
	no	98.5%	97.6%	97.9%	97.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.2, df=2, p=0.905

24a) Is any of your immediate family's income provided directly from farming? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
24a) Is any of your immediate family's income provided directly from farming?	no	91.0%	80.9%	83.1%	83.2%
	yes	9.0%	19.1%	16.9%	16.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.8, df=2, p=0.152

24b) If yes: does this farming involve livestock * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
24b) If yes: does this farming involve livestock	yes	57.1%	64.4%	47.8%	52.7%
	no	42.9%	35.6%	52.2%	47.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.6, df=2, p=0.162

25) Do you have access to the Internet for personal use either at home or at work? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25) Do you have access to the Internet for personal use either at home or at work?	yes	74.6%	68.3%	77.6%	75.1%
	no	25.4%	31.7%	22.4%	24.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.1, df=2, p=0.029

25a) how often do you use the internet for information about wildlife? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25a) how often do you use the internet for information about wildlife?	never	13.7%	14.4%	10.9%	11.9%
	rarely	29.4%	27.4%	31.0%	30.1%
	sometimes	39.2%	43.8%	43.9%	43.5%
	fequently	17.6%	14.4%	14.2%	14.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.4, df=6, p=0.878

25b) how often do you use the internet to get information from the michigan department of natural resources? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25b) how often do you use the internet to get information from the michigan department of natural resources?	never	26.0%	22.1%	17.6%	19.2%
	rarely	28.0%	29.7%	30.2%	29.9%
	sometimes	36.0%	37.9%	39.1%	38.6%
	fequently	10.0%	10.3%	13.1%	12.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.6, df=6, p=0.733

26) Please check the region where you currently live * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
26) Please check the region where you currently live	UP	100.0%	.5%	1.1%	8.9%
	NLP		98.0%	8.3%	30.0%
	SLP		1.5%	90.6%	61.1%
Total		100.0%	100.0%	100.0%	100.0%

Note: most differences here are attributed to respondents living in counties that bordered the NLP/SLP delineation on the survey map.

27) About how manyyeas have you lived in that region?

27) About how many years have you lived in that region?

Zone	Mean	N	Std. Deviation
UP	40.11	66	18.616
NLP	30.77	206	19.160
SLP	40.93	557	16.369
Total	38.34	829	17.808

$F_{(2, 826)}$=26.4, p<0.001

28a) DO not own recreational property other than in the region where you live. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28a) DO not own recreational property other than in the region where you live.	no	55.2%	56.3%	57.5%	57.0%
	yes	44.8%	43.8%	42.5%	43.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.191, df=2, p=0.909

28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP	no	55.2%	77.9%	85.7%	81.4%
	yes	44.8%	22.1%	14.3%	18.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2 =38.9, df=2, p<0.001

28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP	no	94.0%	67.8%	60.5%	65.0%
	yes	6.0%	32.2%	39.5%	35.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.6, df=2, p<0.001

28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP	no	97.0%	93.3%	82.7%	86.5%
	yes	3.0%	6.7%	17.3%	13.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=21.4, df=2, p=0.001

29) Which best describes you? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
29) Which best describes you?	hunter	100.0%	100.0%	100.0%	100.0%
Total		100.0%	100.0%	100.0%	100.0%

31) Age of respondent

31) Age of respondent

Zone	Mean	N	Std. Deviation
UP	49.85	66	14.585
NLP	51.14	208	15.638
SLP	47.12	563	13.550
Total	48.33	837	14.271

$F_{(2, 834)}$=6.5, p=0.002

32) Are you male or female? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
32) Are you male or female?	male	82.1%	80.8%	86.1%	84.5%
	female	17.9%	19.2%	13.9%	15.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.6, df=2, p=0.163

33) Please check your highest completed level of education. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
33) Please check your highest completed level of education.	less than high school	3.0%	2.9%	3.0%	3.0%
	completed high school or ged	30.3%	30.9%	31.0%	30.9%
	vocational or trade school	10.6%	8.7%	11.0%	10.4%
	some college	22.7%	25.6%	20.9%	22.2%
	two year degree	9.1%	11.1%	11.7%	11.3%
	four year degree	15.2%	12.6%	17.9%	16.3%
	graduate school (phd, mba, msc, etc.)	9.1%	8.2%	4.6%	5.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.0, df=12, p=0.165

APPENDIX V:
WEIGHTED FREQUENCIES OF NON-HUNTER RESPONSES TO THE GENERAL-PUBLIC SURVEY QUESTIONS BY ZONE

This appendix reports the frequency of responses by all interested non-hunting respondents for each question on the 2005 general-public wolf survey. 'Interested respondents' were those individuals who provided an answer to Question 1 other than "I am not interested in Michigan's wolves."

Responses have been weighted based on the population levels for each region (see Appendix I). The 'total' column in each table thus represents the statewide total of interested non-hunting responses. Weighting in this manner does not change the percentage values for responses within a region, but does recalculate an adjusted number of cases for that region. For ease of reading, sample size has been omitted from the tables. When weighted to reflect actual statewide distribution, the adjusted number of non-hunting responses from each zone was: UP: 55; NLP: 210; SLP: 1,397. The actual number of interested non-hunting respondents in each zone was: UP: 249; NLP: 352; SLP: 856.

Some of the question wording in the following analyses has been abbreviated. Actual wording and format can be referenced in Appendix II. Differences between zones were considered to be statistically significant if '*p*' was less than or equal to 0.05.

1. How would you summarize your opinion about having wolves in Michigan? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
1. How would you summarize your opinion about having wolves in Michigan?	strongly approve	38.9%	41.9%	42.9%	42.7%
	somewhat approve	31.5%	33.3%	32.5%	32.6%
	undecided	7.4%	12.9%	14.6%	14.1%
	somewhat disapprove	9.3%	5.2%	4.5%	4.8%
	strongly disapprove	13.0%	6.7%	5.4%	5.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.4, df=8, p=0.239

Question 2 was prefaced with the statement: “In your opinion, how important is each of the statements below as a reason why we should have wolves in Michigan?”

2a. As predators, wolves could benefit Michigan's ecosystem by helping to control some other wildlife populations * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2a. As predators, wolves could benefit Michigan's ecosystem by helping to control some other wildlife populations	NOT a reason	17.0%	11.5%	7.4%	8.2%
	slightly important	11.3%	11.5%	11.1%	11.2%
	somewhat important	34.0%	33.2%	32.9%	32.9%
	very important	34.0%	41.3%	46.7%	45.6%
	undecided	3.8%	2.4%	2.0%	2.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.6, df=8, p=0.128

2b. There are people who appreciate wolves and want to know that wolves exist in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2b. There are people who appreciate wolves and want to know that wolves exist in Michigan.	NOT a reason	21.8%	23.0%	17.6%	18.4%
	slightly important	23.6%	21.5%	23.1%	22.9%
	somewhat important	29.1%	27.3%	31.4%	30.8%
	very important	23.6%	26.8%	25.7%	25.7%
	undecided	1.8%	1.4%	2.3%	2.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.4, df=8, p=0.718

2c. Future generations of citizens could benefit if we maintain wolves in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2c. Future generations of citizens could benefit if we maintain wolves in Michigan.	NOT a reason	18.9%	11.5%	11.2%	11.5%
	slightly important	17.0%	19.2%	18.6%	18.6%
	somewhat important	28.3%	29.8%	34.1%	33.4%
	very important	30.2%	36.1%	30.4%	31.1%
	undecided	5.7%	3.4%	5.8%	5.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.9, df=8, p=0.422

2d. Wolves had a historic presence in Michigan and should be here now * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2d. Wolves had a historic presence in Michigan and should be here now	NOT a reason	18.5%	15.8%	11.6%	12.4%
	slightly important	16.7%	16.7%	16.0%	16.1%
	somewhat important	27.8%	23.0%	30.0%	29.0%
	very important	37.0%	42.6%	40.3%	40.5%
	undecided	.0%	1.9%	2.1%	2.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.0, df=8, p=0.342

2e. People want to view, hear, photograph or study wild wolves in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2e. People want to view, hear, photograph or study wild wolves in Michigan.	NOT a reason	22.6%	16.4%	14.0%	14.6%
	slightly important	20.8%	23.2%	22.0%	22.1%
	somewhat important	32.1%	31.9%	33.6%	33.4%
	very important	24.5%	28.0%	28.7%	28.5%
	undecided	.0%	.5%	1.7%	1.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.4, df=8, p=0.599

2f. Wolves could eventually become another game species for Michigan hunters. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2f. Wolves could eventually become another game species for Michigan hunters.	NOT a reason	62.3%	64.1%	64.5%	64.4%
	slightly important	17.0%	14.4%	16.7%	16.4%
	somewhat important	9.4%	11.5%	11.5%	11.4%
	very important	7.5%	6.2%	4.8%	5.1%
	undecided	3.8%	3.8%	2.5%	2.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.7, df=8, p=0.884

2g. Regardless of our laws, wolves have a right to exist in Michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2g. Regardless of our laws, wolves have a right to exist in Michigan.	NOT a reason	24.5%	18.3%	13.9%	14.8%
	slightly important	11.3%	12.0%	12.6%	12.5%
	somewhat important	22.6%	18.8%	24.6%	23.8%
	very important	39.6%	50.0%	46.6%	46.8%
	undecided	1.9%	1.0%	2.3%	2.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.2, df=8, p=0.190

2h. Wolves could increase tourism in Michigan and provide economic benefits. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
2h. Wolves could increase tourism in Michigan and provide economic benefits.	NOT a reason	37.0%	34.0%	27.4%	28.6%
	slightly important	22.2%	15.8%	24.8%	23.5%
	somewhat important	24.1%	29.7%	28.0%	28.1%
	very important	13.0%	15.8%	15.6%	15.5%
	undecided	3.7%	4.8%	4.2%	4.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.3, df=8, p=0.187

3a) the situation I prefer for the UP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
3a) the situation I prefer for the UP is	Situation 1	13.5%	5.7%	5.4%	5.7%
	Situation 2	21.2%	18.6%	16.1%	16.5%
	Situation 3	34.6%	36.1%	35.8%	35.8%
	Situation 4	21.2%	25.8%	27.1%	26.8%
	Situation 5	5.8%	8.8%	10.7%	10.3%
	undecided	3.8%	5.2%	5.0%	4.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.6, df=10, p=0.477

3b) the situation with the FEWEST number of wolves I can accept for the UP. is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
3b) the situation with the FEWEST number of wolves I can accept for the UP. is	Situation 1	15.4%	11.3%	8.7%	9.3%
	Situation 2	38.5%	35.4%	38.7%	38.3%
	Situation 3	32.7%	35.4%	33.4%	33.6%
	Situation 4	7.7%	10.8%	10.7%	10.6%
	Situation 5	1.9%	2.1%	2.7%	2.6%
	undecided	3.8%	5.1%	5.9%	5.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.3, df=10, p=0.871

3c) the situation with the HIGHEST number of wolves I can accept for the UP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
3c) the situation with the HIGHEST number of wolves I can accept for the UP is	Situation 1	7.5%	3.6%	3.0%	3.2%
	Situation 2	17.0%	11.8%	9.1%	9.7%
	Situation 3	24.5%	26.2%	23.5%	23.9%
	Situation 4	30.2%	35.9%	37.6%	37.2%
	Situation 5	15.1%	17.4%	21.0%	20.3%
	undecided	5.7%	5.1%	5.8%	5.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.9, df=10, p=0.364

4a) the situation I prefer for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4a) the situation I prefer for the NLP is	Situation 1	16.0%	12.2%	9.6%	10.1%
	Situation 2	24.0%	28.9%	23.7%	24.4%
	Situation 3	30.0%	36.0%	39.0%	38.4%
	Situation 4	12.0%	15.2%	17.4%	17.0%
	Situation 5	6.0%	3.6%	5.5%	5.3%
	undecided	12.0%	4.1%	4.8%	4.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.2, df=10, p=0.165

4b) the situation with the fewest number of wolves I can accept for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4b) the situation with the fewest number of wolves I can accept for the NLP is	Situation 1	21.2%	18.0%	17.2%	17.5%
	Situation 2	38.5%	42.5%	44.0%	43.6%
	Situation 3	21.2%	29.0%	23.9%	24.5%
	Situation 4	3.8%	5.0%	7.1%	6.8%
	Situation 5	3.8%	2.0%	2.1%	2.1%
	undecided	11.5%	3.5%	5.6%	5.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.4, df=10, p=0.402

4c) the situation with the highest number of wolves I can accept for the NLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
4c) the situation with the highest number of wolves I can accept for the NLP is	Situation 1	7.7%	8.1%	6.9%	7.1%
	Situation 2	17.3%	17.7%	14.8%	15.2%
	Situation 3	28.8%	31.8%	30.9%	30.9%
	Situation 4	21.2%	30.3%	30.5%	30.2%
	Situation 5	11.5%	8.6%	11.0%	10.7%
	undecided	13.5%	3.5%	5.9%	5.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.0, df=10, p=0.361

5a) the situation I prefer for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5a) the situation I prefer for the SLP is	Situation 1	25.0%	26.0%	22.9%	23.3%
	Situation 2	25.0%	41.3%	33.7%	34.3%
	Situation 3	23.1%	18.4%	26.2%	25.2%
	Situation 4	5.8%	3.6%	8.7%	8.0%
	Situation 5	3.8%	3.1%	3.6%	3.6%
	undecided	17.3%	7.7%	4.9%	5.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=30.9, df=10, p=0.001

5b) the situation with the fewest number of wolves I can accept for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5b) the situation with the fewest number of wolves I can accept for the SLP is	Situation 1	36.0%	39.5%	36.3%	36.6%
	Situation 2	30.0%	37.4%	35.4%	35.5%
	Situation 3	14.0%	11.8%	17.8%	16.9%
	Situation 4	2.0%	2.1%	4.0%	3.7%
	Situation 5	2.0%	2.6%	1.4%	1.6%
	undecided	16.0%	6.7%	5.2%	5.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=19.0, df=10, p=0.040

5c) the situation with the highest number of wolves I can accept for the SLP is * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
5c) the situation with the highest number of wolves I can accept for the SLP is	Situation 1	17.6%	19.9%	16.4%	16.9%
	Situation 2	21.6%	32.1%	25.4%	26.1%
	Situation 3	25.5%	25.5%	30.6%	29.8%
	Situation 4	11.8%	10.7%	15.8%	15.0%
	Situation 5	7.8%	5.1%	7.0%	6.8%
	undecided	15.7%	6.6%	4.8%	5.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=23.4, df=10, p=0.00

Question 6 was prefaced with the statement: "If you were asked your opinion about whether wolf numbers should be reduced in an area, how important would each of these be to you in considering your position?"

6a) the number of farm animals actually lost to wolves. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6a) the number of farm animals actually lost to wolves.	NOT a consideration	3.7%	3.9%	3.4%	3.5%
	slightly important	14.8%	11.2%	11.9%	11.9%
	somewhat important	27.8%	29.1%	36.5%	35.3%
	very important	53.7%	54.9%	47.1%	48.3%
	undecided	.0%	1.0%	1.0%	1.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=22.2, df=8, p=0.014

6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer.	NOT a consideration	20.8%	29.3%	33.3%	32.4%
	slightly important	22.6%	22.4%	26.3%	25.6%
	somewhat important	32.1%	29.3%	24.7%	25.5%
	very important	22.6%	17.1%	12.1%	13.1%
	undecided	1.9%	2.0%	3.6%	3.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=15.7, df=8, p=0.047

6c) the number of hunting dogs actually lost in the field to wolves * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6c) the number of hunting dogs actually lost in the field to wolves	NOT a consideration	14.8%	14.5%	16.0%	15.8%
	slightly important	27.8%	25.1%	23.8%	24.1%
	somewhat important	29.6%	30.0%	32.5%	32.1%
	very important	27.8%	29.0%	26.0%	26.4%
	undecided		1.4%	1.7%	1.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.8, df=8, p=0.944

6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes	NOT a consideration	7.3%	3.4%	3.6%	3.7%
	slightly important	10.9%	6.8%	6.5%	6.6%
	somewhat important	16.4%	17.5%	17.6%	17.5%
	very important	65.5%	70.4%	71.2%	70.9%
	undecided	.0%	1.9%	1.2%	1.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.4, df=8, p=0.709

6e) the number of pets actually attacked by wolves near the pet's home. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
6e) the number of pets actually attacked by wolves near the pet's home.	NOT a consideration	3.7%	3.4%	2.9%	3.0%
	slightly important	11.1%	10.2%	10.4%	10.4%
	somewhat important	25.9%	23.9%	22.9%	23.1%
	very important	59.3%	61.5%	63.1%	62.7%
	undecided	.0%	1.0%	.8%	.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=1.3, df=8, p=0.996

7a) using your Michigan tax dollars to compensate owners who have lost livestock * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7a) using your Michigan tax dollars to compensate owners who have lost livestock	strongly support	37.7%	29.2%	24.6%	25.6%
	somewhat support	32.1%	28.7%	34.0%	33.3%
	neither support nor oppose	13.2%	20.1%	14.8%	15.5%
	somewhat oppose	5.7%	8.6%	12.7%	12.0%
	strongly oppose	11.3%	13.4%	13.9%	13.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.3, df=8, p=0.075

7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs	strongly support	16.7%	10.1%	10.5%	10.7%
	somewhat support	20.4%	25.1%	23.4%	23.5%
	neither support nor oppose	22.2%	24.2%	22.5%	22.7%
	somewhat oppose	13.0%	15.5%	20.2%	19.4%
	strongly oppose	27.8%	25.1%	23.4%	23.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.5, df=8, p=0.597

7c) using your Michigan tax dollars to compensate owners who have lost pets * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7c) using your Michigan tax dollars to compensate owners who have lost pets	strongly support	28.8%	20.0%	16.5%	17.3%
	somewhat support	19.2%	23.4%	24.9%	24.5%
	neither support nor oppose	21.2%	22.0%	21.5%	21.6%
	somewhat oppose	11.5%	11.2%	17.5%	16.5%
	strongly oppose	19.2%	23.4%	19.7%	20.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.5, df=8, p=0.129

7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk	strongly support	15.1%	13.9%	10.6%	11.2%
	somewhat support	22.6%	22.1%	21.8%	21.9%
	neither support nor oppose	20.8%	22.1%	23.2%	23.0%
	somewhat oppose	17.0%	17.3%	19.3%	18.9%
	strongly oppose	24.5%	24.5%	25.1%	25.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.3, df=8, p=0.917

8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ?	strongly support	14.8%	13.9%	10.6%	11.1%
	somewhat support	29.6%	27.8%	32.2%	31.5%
	neither support nor oppose	20.4%	18.2%	18.8%	18.8%
	somewhat oppose	13.0%	15.3%	17.8%	17.3%
	strongly oppose	22.2%	24.9%	20.7%	21.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.5, df=8, p=0.589

9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	27.8%	28.8%	25.1%	25.6%
	somewhat support	31.5%	35.6%	31.8%	32.3%
	neither support nor oppose	13.0%	17.3%	19.3%	18.9%
	somewhat oppose	11.1%	6.7%	10.5%	10.0%
	strongly oppose	16.7%	11.5%	13.2%	13.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.9, df=8, p=0.550

9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	16.4%	14.5%	13.0%	13.3%
	somewhat support	20.0%	25.6%	24.9%	24.9%
	neither support nor oppose	20.0%	22.7%	22.8%	22.7%
	somewhat oppose	14.5%	14.5%	17.9%	17.3%
	strongly oppose	29.1%	22.7%	21.4%	21.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.4, df=8, p=0.819

9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	22.2%	21.1%	18.0%	18.5%
	somewhat support	25.9%	25.4%	25.4%	25.4%
	neither support nor oppose	16.7%	18.2%	23.3%	22.4%
	somewhat oppose	11.1%	14.4%	14.7%	14.5%
	strongly oppose	24.1%	21.1%	18.6%	19.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.0, df=8, p=0.645

10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	30.9%	25.0%	20.7%	21.6%
	somewhat support	30.9%	29.3%	30.5%	30.4%
	neither support nor oppose	12.7%	18.3%	18.7%	18.4%
	somewhat oppose	10.9%	11.1%	14.1%	13.6%
	strongly oppose	14.5%	16.3%	16.0%	16.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.5, df=8, p=0.594

10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	17.0%	10.1%	11.4%	11.4%
	somewhat support	20.8%	21.6%	21.8%	21.7%
	neither support nor oppose	18.9%	26.0%	22.6%	22.9%
	somewhat oppose	17.0%	15.4%	18.9%	18.4%
	strongly oppose	26.4%	26.9%	25.3%	25.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.5, df=8, p=0.806

10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	24.5%	17.4%	14.5%	15.2%
	somewhat support	22.6%	22.2%	25.4%	24.9%
	neither support nor oppose	15.1%	21.7%	21.1%	21.0%
	somewhat oppose	17.0%	14.0%	17.7%	17.2%
	strongly oppose	20.8%	24.6%	21.3%	21.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.2, df=8, p=0.414

11a) Loss of domestic animals: leave wolves alone. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11a) Loss of domestic animals: leave wolves alone.	strongly support	7.5%	10.2%	11.4%	11.2%
	somewhat support	18.9%	14.6%	13.6%	13.9%
	neither support nor oppose	9.4%	11.2%	14.2%	13.6%
	somewhat oppose	26.4%	26.8%	27.9%	27.7%
	strongly oppose	37.7%	37.1%	32.9%	33.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.2, df=8, p=0.738

11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss.	strongly support	40.7%	40.5%	34.9%	35.8%
	somewhat support	35.2%	37.1%	36.7%	36.7%
	neither support nor oppose	7.4%	8.3%	9.8%	9.5%
	somewhat oppose	9.3%	7.3%	8.6%	8.5%
	strongly oppose	7.4%	6.8%	10.0%	9.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.2, df=8, p=0.734

11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population	strongly support	25.9%	20.8%	15.2%	16.3%
	somewhat support	25.9%	31.9%	28.7%	29.0%
	neither support nor oppose	13.0%	12.6%	16.4%	15.8%
	somewhat oppose	18.5%	17.4%	21.4%	20.8%
	strongly oppose	16.7%	17.4%	18.3%	18.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.1, df=8, p=0.198

11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss.	strongly support	35.2%	51.9%	51.7%	51.2%
	somewhat support	29.6%	27.7%	29.2%	29.0%
	neither support nor oppose	14.8%	10.2%	9.6%	9.9%
	somewhat oppose	9.3%	5.3%	4.9%	5.1%
	strongly oppose	11.1%	4.9%	4.5%	4.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.1, df=8, p=0.197

11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	29.6%	35.0%	30.1%	30.7%
	somewhat support	24.1%	26.7%	29.3%	28.8%
	neither support nor oppose	18.5%	18.9%	18.8%	18.8%
	somewhat oppose	9.3%	8.3%	8.6%	8.6%
	strongly oppose	18.5%	11.2%	13.2%	13.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.1, df=8, p=0.851

12a) Public concerns for human safety: leave wolves alone * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12a) Public concerns for human safety: leave wolves alone	strongly support	9.4%	9.4%	9.6%	9.6%
	somewhat support	17.0%	12.9%	12.9%	13.1%
	neither support nor oppose	11.3%	9.4%	12.6%	12.2%
	somewhat oppose	18.9%	20.8%	20.0%	20.1%
	strongly oppose	43.4%	47.5%	44.8%	45.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.6, df=8, p=0.957

12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat.	strongly support	45.3%	42.6%	41.1%	41.4%
	somewhat support	32.1%	33.8%	30.1%	30.6%
	neither support nor oppose	5.7%	7.4%	9.1%	8.8%
	somewhat oppose	7.5%	8.8%	8.8%	8.8%
	strongly oppose	9.4%	7.4%	10.9%	10.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.7, df=8, p=0.791

12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population.	strongly support	28.3%	26.8%	20.9%	21.9%
	somewhat support	28.3%	25.4%	30.4%	29.7%
	neither support nor oppose	11.3%	13.2%	12.7%	12.7%
	somewhat oppose	18.9%	18.5%	15.7%	16.2%
	strongly oppose	13.2%	16.1%	20.3%	19.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.3, df=8, p=0.315

12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat	strongly support	39.6%	53.4%	56.4%	55.5%
	somewhat support	28.3%	24.8%	26.4%	26.2%
	neither support nor oppose	11.3%	8.7%	6.6%	7.0%
	somewhat oppose	5.7%	6.3%	4.7%	5.0%
	strongly oppose	15.1%	6.8%	5.9%	6.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.5, df=8, p=0.094

12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat.	strongly support	36.5%	39.0%	35.1%	35.7%
	somewhat support	19.2%	22.9%	26.4%	25.8%
	neither support nor oppose	17.3%	16.6%	15.9%	16.1%
	somewhat oppose	7.7%	9.8%	6.9%	7.3%
	strongly oppose	19.2%	11.7%	15.6%	15.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.0, df=8, p=0.532

13a) Lower number of deer: leave wolves alone * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13a) Lower number of deer: leave wolves alone	strongly support	17.3%	17.1%	23.7%	22.7%
	somewhat support	21.2%	18.0%	16.2%	16.6%
	neither support nor oppose	13.5%	15.6%	19.8%	19.1%
	somewhat oppose	17.3%	23.9%	18.5%	19.1%
	strongly oppose	30.8%	25.4%	21.8%	22.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.2, df=8, p=0.107

13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population.	strongly support	22.6%	18.9%	12.3%	13.5%
	somewhat support	26.4%	25.2%	21.3%	22.0%
	neither support nor oppose	13.2%	15.5%	18.4%	17.9%
	somewhat oppose	18.9%	18.9%	21.1%	20.7%
	strongly oppose	18.9%	21.4%	27.0%	26.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.2, df=8, p=0.040

13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population.	strongly support	30.2%	38.5%	36.1%	36.2%
	somewhat support	28.3%	33.7%	30.6%	30.9%
	neither support nor oppose	15.1%	11.7%	14.1%	13.8%
	somewhat oppose	9.4%	8.8%	7.4%	7.7%
	strongly oppose	17.0%	7.3%	11.8%	11.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.6, df=8, p=0.476

13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	28.3%	31.4%	23.9%	25.0%
	somewhat support	22.6%	25.5%	27.7%	27.2%
	neither support nor oppose	15.1%	19.1%	18.9%	18.8%
	somewhat oppose	11.3%	10.3%	8.9%	9.1%
	strongly oppose	22.6%	13.7%	20.7%	19.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.6, df=8, p=0.224

14a) use trained, paid professionals to shoot wolves * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14a) use trained, paid professionals to shoot wolves	strongly support	20.8%	17.0%	17.6%	17.6%
	somewhat support	24.5%	21.4%	22.1%	22.1%
	neither support nor oppose	11.3%	13.6%	13.5%	13.4%
	somewhat oppose	17.0%	17.0%	16.7%	16.7%
	strongly oppose	26.4%	31.1%	30.1%	30.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=1.0, df=8, p=0.998

14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season	strongly support	34.0%	33.0%	25.8%	27.0%
	somewhat support	32.1%	27.6%	30.9%	30.5%
	neither support nor oppose	5.7%	11.3%	8.4%	8.7%
	somewhat oppose	11.3%	8.4%	12.2%	11.7%
	strongly oppose	17.0%	19.7%	22.7%	22.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.0, df=8, p=0.202

14c) kill wolves that are trapped by trained, paid professionals * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14c) kill wolves that are trapped by trained, paid professionals	strongly support	11.5%	11.3%	9.1%	9.4%
	somewhat support	15.4%	15.8%	17.1%	16.9%
	neither support nor oppose	15.4%	14.8%	14.6%	14.6%
	somewhat oppose	25.0%	20.2%	19.5%	19.8%
	strongly oppose	32.7%	37.9%	39.7%	39.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.0, df=8, p=0.935

14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season	strongly support	35.2%	30.4%	23.3%	24.6%
	somewhat support	25.9%	27.0%	26.7%	26.7%
	neither support nor oppose	7.4%	9.3%	10.3%	10.1%
	somewhat oppose	11.1%	7.4%	9.9%	9.6%
	strongly oppose	20.4%	26.0%	29.9%	29.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.5, df=8, p=0.234

15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way?	strongly approve	44.2%	42.0%	35.9%	37.0%
	somewhat approve	28.8%	31.9%	35.7%	35.0%
	neither approve nor disapprove	7.7%	8.2%	7.7%	7.7%
	somewhat disapprove	9.6%	8.7%	10.9%	10.6%
	strongly disapprove	9.6%	9.2%	9.8%	9.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.9, df=8, p=0.765

16a) the michigan DNR should let the wolves maintain their own population level in the UP without trying to manage them. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16a) the michigan DNR should let the wolves maintain their own population level in the UP without trying to manage them.	strongly agree	20.4%	14.1%	17.0%	16.7%
	somewhat agree	24.1%	31.6%	31.8%	31.5%
	neither agree nor disagree	7.4%	11.2%	12.1%	11.9%
	somewhat disagree	22.2%	25.2%	25.5%	25.4%
	strongly disagree	25.9%	18.0%	13.6%	14.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.8, df=8, p=0.211

16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting.	strongly agree	21.2%	12.6%	10.3%	10.9%
	somewhat agree	25.0%	27.7%	23.3%	23.9%
	neither agree nor disagree	26.9%	31.1%	36.0%	35.1%
	somewhat disagree	19.2%	20.4%	22.0%	21.7%
	strongly disagree	7.7%	8.3%	8.4%	8.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.2, df=8, p=0.249

16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan.	strongly agree	30.2%	27.2%	28.5%	28.4%
	somewhat agree	18.9%	24.8%	21.5%	21.8%
	neither agree nor disagree	13.2%	13.6%	14.6%	14.5%
	somewhat disagree	18.9%	18.4%	18.8%	18.7%
	strongly disagree	18.9%	16.0%	16.6%	16.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=1.7, df=8, p=0.989

16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers.	strongly agree	15.4%	18.4%	18.6%	18.5%
	somewhat agree	25.0%	25.1%	24.2%	24.4%
	neither agree nor disagree	36.5%	37.2%	38.3%	38.1%
	somewhat disagree	9.6%	9.7%	7.8%	8.1%
	strongly disagree	13.5%	9.7%	11.1%	11.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.0, df=8, p=0.981

16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves.	strongly agree	44.2%	47.1%	47.4%	47.2%
	somewhat agree	25.0%	26.7%	26.4%	26.4%
	neither agree nor disagree	7.7%	8.3%	8.4%	8.4%
	somewhat disagree	9.6%	8.3%	9.5%	9.4%
	strongly disagree	13.5%	9.7%	8.2%	8.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.5, df=8, p=0.963

17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season	strongly agree	29.6%	22.2%	18.8%	19.6%
	somewhat agree	24.1%	27.5%	23.2%	23.8%
	neither agree nor disagree	9.3%	13.0%	14.9%	14.5%
	somewhat disagree	16.7%	11.1%	15.0%	14.5%
	strongly disagree	20.4%	26.1%	28.1%	27.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.1, df=8, p=0.254

17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season	strongly agree	27.8%	18.9%	14.0%	15.1%
	somewhat agree	24.1%	24.8%	20.0%	20.7%
	neither agree nor disagree	11.1%	11.2%	13.8%	13.4%
	somewhat disagree	11.1%	10.2%	14.6%	13.9%
	strongly disagree	25.9%	35.0%	37.5%	36.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.2, df=8, p=0.028

18a) The MiDNR will make wolf management decisions that are adequately based on good science * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18a) The MiDNR will make wolf management decisions that are adequately based on good science	strongly agree	18.5%	30.4%	29.5%	29.3%
	somewhat agree	40.7%	38.6%	41.2%	40.8%
	neither agree nor disagree	16.7%	17.9%	18.2%	18.1%
	somewhat disagree	16.7%	9.7%	8.3%	8.8%
	strongly disagree	7.4%	3.4%	2.7%	3.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.9, df=8, p=0.208

18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens	strongly agree	19.2%	26.2%	26.2%	26.0%
	somewhat agree	38.5%	34.0%	39.1%	38.4%
	neither agree nor disagree	15.4%	18.4%	19.0%	18.9%
	somewhat disagree	17.3%	14.1%	12.0%	12.4%
	strongly disagree	9.6%	7.3%	3.7%	4.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.1, df=8, p=0.110

18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public	strongly agree	20.8%	27.2%	25.4%	25.5%
	somewhat agree	35.8%	32.0%	34.6%	34.3%
	neither agree nor disagree	22.6%	23.3%	27.0%	26.4%
	somewhat disagree	11.3%	10.7%	9.9%	10.1%
	strongly disagree	9.4%	6.8%	3.0%	3.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.1, df=8, p=0.080

19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey?	strongly approve	45.3%	45.9%	47.6%	47.3%
	somewhat approve	28.3%	32.4%	32.7%	32.5%
	undecided	5.7%	9.7%	9.1%	9.1%
	somewhat disapprove	7.5%	4.8%	4.8%	4.9%
	strongly disapprove	13.2%	7.2%	5.8%	6.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.9, df=8, p=0.548

20_c1) number of nonmotorized, non consumptive recreational activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c1) number of nonmotorized, non consumptive recreational activities	0	10.9%	19.0%	20.7%	20.2%
	1	29.1%	21.4%	24.7%	24.4%
	2	20.0%	25.7%	24.1%	24.2%
	3	18.2%	18.1%	17.9%	17.9%
	4	14.5%	10.0%	7.6%	8.1%
	5	5.5%	4.8%	3.9%	4.0%
	6	1.8%	1.0%	1.1%	1.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.7, df=12, p=0.642

20_c2) number of consumptive recreational activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c2) number of consumptive recreational activities	0	29.6%	31.4%	52.5%	49.1%
	1	38.9%	39.0%	32.9%	33.8%
	2	24.1%	21.9%	12.0%	13.6%
	3	7.4%	7.1%	2.6%	3.4%
	4	.0%	.5%	.1%	.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=57.2, df= 8, p<0.001

20_c3) number of non-consumptive wildlife activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c3) number of non-consumptive wildlife activities	0	32.7%	37.8%	44.9%	43.6%
	1	32.7%	23.4%	25.3%	25.3%
	2	23.6%	27.3%	21.0%	21.9%
	3	10.9%	11.5%	8.7%	9.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.2, df=8, p=0.118

20_c4) number of mechanized recreational activities * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
20_c4) number of mechanized recreational activities	0	36.4%	47.4%	45.6%	45.6%
	1	38.2%	33.6%	42.1%	40.9%
	2	18.2%	13.7%	8.6%	9.6%
	3	7.3%	5.2%	3.7%	4.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.5, df=8, p=0.011

21a) Do you do any of the activities in question 20 in the UP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21a) Do you do any of the activities in question 20 in the UP?	yes	94.5%	50.5%	38.4%	41.8%
	no	5.5%	49.5%	61.6%	58.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=76.2, df=2, p<0.001

21b) Do you do any of the activities in question 20 in the NLP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21b) Do you do any of the activities in question 20 in the NLP?	yes	25.9%	94.3%	68.1%	70.0%
	no	74.1%	5.7%	31.9%	30.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=111.4, df=2, p<0.001

21c) Do you do any of the activities in question 20 in the SLP? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
21c) Do you do any of the activities in question 20 in the SLP?	yes	10.9%	23.8%	80.9%	71.4%
	no	89.1%	76.2%	19.1%	28.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=392.7, df=2, p<0.001

22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there?	definitely would	7.4%	8.3%	8.5%	8.4%
	more likely	7.4%	9.7%	9.2%	9.2%
	would not affect my choice	55.6%	53.9%	49.8%	50.5%
	less likely	13.0%	11.2%	14.9%	14.3%
	definitely would not	9.3%	7.3%	8.2%	8.1%
	I am undecided how it would affect my use.	7.4%	9.7%	9.4%	9.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.5, df=10, p=0.968

23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related?	yes	3.6%	3.3%	3.1%	3.1%
	no	96.4%	96.7%	96.9%	96.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.09, df=2, p=0.957

23b) In the past three years have you belonged to a conservation or environmental organization which is not hunting related? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23b) In the past three years have you belonged to a conservation or environmental organization which is not hunting related?	yes	10.9%	11.4%	13.9%	13.5%
	no	89.1%	88.6%	86.1%	86.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=1.3, df=2, p=0.530

23c) In the past three years have you belonged to an animal welfare or animal rights organization? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
23c) In the past three years have you belonged to an animal welfare or animal rights organization?	yes	10.9%	9.5%	9.8%	9.8%
	no	89.1%	90.5%	90.2%	90.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.1, df=2, p=0.954

24a) Is any of your immediate family's income provided directly from farming? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
24a) Is any of your immediate family's income provided directly from farming?	no	94.5%	92.9%	92.8%	92.8%
	yes	5.5%	7.1%	7.2%	7.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.25, df=2, p=0.882

24b) If yes: does this farming involve livestock * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
24b) If yes: does this farming involve livestock	yes	40.0%	63.2%	46.3%	48.1%
	no	60.0%	36.8%	53.7%	51.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.1, df=2, p=0.263

25) Do you have access to the Internet for personal use either at home or at work? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25) Do you have access to the Internet for personal use either at home or at work?	yes	69.1%	72.9%	79.2%	78.1%
	no	30.9%	27.1%	20.8%	21.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.0, df=2, p=0.029

25a) how often do you use the internet for information about wildlife? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25a) how often do you use the internet for information about wildlife?	never	23.1%	21.0%	22.8%	22.6%
	rarely	38.5%	35.0%	37.1%	36.9%
	sometimes	30.8%	38.9%	34.2%	34.6%
	fequently	7.7%	5.1%	5.9%	5.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=1.8, df=8, p=0.936

25b) how often do you use the internet to get information from the michigan department of natural resources? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
25b) how often do you use the internet to get information from the michigan department of natural resources?	never	42.1%	40.8%	38.4%	38.8%
	rarely	34.2%	35.0%	37.3%	36.9%
	sometimes	21.1%	20.4%	20.5%	20.5%
	fequently	2.6%	3.8%	3.9%	3.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.747, df=8, p=0.993

26) Please check the region where you currently live * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
26) Please check the region where you currently live	UP	98.1%	.5%	.4%	3.6%
	NLP	1.9%	97.1%	5.1%	16.7%
	SLP	.0%	2.4%	94.4%	79.7%
Total		100.0%	100.0%	100.0%	100.0%

Note: most differences here are attributed to respondents living in counties that bordered the NLP/SLP delineation on the survey map.

27) About how many years have you lived in that region?

27) About how many years have you lived in that region?

Zone	Mean	N	Std. Deviation
UP	35.53	53	21.271
NLP	26.82	207	18.413
SLP	38.35	1367	19.089
Total	36.79	1627	19.450

$F_{(2, 1624)}$=32.9, p<0.001

28a) DO not own recreational property other than in the region where you live. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28a) DO not own recreational property other than in the region where you live.	no	53.7%	38.6%	40.9%	41.0%
	yes	46.3%	61.4%	59.1%	59.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.1, df=2, p=0.127

28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP	no	61.1%	90.5%	93.3%	91.9%
	yes	38.9%	9.5%	6.7%	8.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=72.7, df=2, p<0.001

28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP	no	94.5%	80.5%	75.4%	76.7%
	yes	5.5%	19.5%	24.6%	23.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.8, df=2, p=0.002

28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP	no	98.1%	95.2%	93.0%	93.4%
	yes	1.9%	4.8%	7.0%	6.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.5, df=2, p=0.172

29) Which best describes you? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
29) Which best describes you?	non-hunter but not opposed to hunting	96.3%	93.3%	85.7%	87.0%
	opposed to all forms of recreational hunting	3.7%	6.7%	14.3%	13.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.6, df=2, p<0.001

30) Non-applicable

31) Age of respondent

31) Age of respondent

Zone	Mean	N	Std. Deviation
UP	52.31	54	17.312
NLP	52.95	209	15.650
SLP	49.03	1381	15.866
Total	49.63	1644	15.939

$F_{(2, 1641)}$=6.3, p=0.002

32) Are you male or female? * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
32) Are you male or female?	male	37.0%	34.4%	40.8%	39.9%
	female	63.0%	65.6%	59.2%	60.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.2, df=2, p=0.196

33) Please check your highest completed level of education. * Zone Crosstabulation

% within Zone

		Zone			
		UP	NLP	SLP	Total
33) Please check your highest completed level of education.	less than high school	3.7%	5.2%	2.7%	3.0%
	completed high school or ged	24.1%	22.9%	17.3%	18.3%
	vocational or trade school	3.7%	5.2%	4.1%	4.2%
	some college	20.4%	22.9%	26.0%	25.4%
	two year degree	11.1%	12.4%	10.2%	10.5%
	four year degree	24.1%	21.0%	22.2%	22.1%
	graduate school (phd, mba, msc, etc.)	13.0%	10.5%	17.6%	16.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.0, df=12, p=0.149

Appendix VI:
Livestock-grower Survey with Frequencies of Responses by Upper Peninsula and northern Lower Peninsula Respondents

Mailing addresses and names of livestock growers for both the general-public and livestock-grower surveys were provided by MSU Extension. A list of 729 UP livestock growers was obtained, and all were sent one of the two surveys. Two hundred received the general-public survey and 529 were sent the livestock-grower version. From the MSU Extension lists of 1,650 NLP livestock growers, 500 were randomly selected to receive the livestock-grower version and 200 received the general-public survey. The responses to the livestock-grower version are reported here. An overall response rate of 69% was achieved (73% of UP growers and 67% of NLP growers). Statistical tests for significant differences are not reported in the appendix.

November 2005

Dear Michigan Farmer,

Michigan has a growing gray wolf population in the Upper Peninsula and a few have recently been confirmed in the Lower Peninsula. There are enough wolves in Minnesota, Wisconsin and Michigan to remove wolves from federal regulation as an endangered species and shift the responsibility for the management of wolves to the states. Michigan is preparing for that responsibility by revising their Wolf Management Plan to address how many wolves should be in Michigan, where they should live, and how they should be managed.

This "livestock producer survey" is one of two surveys designed for the Michigan Department of Natural Resources (Michigan DNR) to measure opinions about wolves in our state. We have involved many farmers and Michigan State University (MSU) Extension agents in developing this survey to ensure that it will NOT be a waste of your time. MSU Extension agents provided us with your name as well as other Michigan livestock producers who will receive this survey.

This is your opportunity to provide input! However, you also represent other Michigan livestock producers who think like you but who did not receive a questionnaire. That makes your individual response to the survey even more important. As a token of our appreciation, **the three first class stamps attached below are <u>for your own use</u>**.

<u>IF YOU HAVE NO INTEREST IN WOLF ISSUES</u> you can go directly to question 32 on the back of the survey and be finished in less than two minutes. It is just as important to know how many farmers have no interest in wolves as to learn the opinions of those who do!

<u>IF WOLF ISSUES ARE IMPORTANT TO YOU</u> it will take less than 15 minutes to complete the survey.

Please return the survey in the self-addressed, postage paid envelope.

You indicate your voluntary agreement to participate by completing and returning the survey. You can be assured that all data gathered will remain confidential and your privacy will be protected to the maximum extent allowable by law. If you have any questions about the survey, please call me at (517) 432-3636 or email me at "bullpe@msu.edu". Any questions concerning your rights as a survey respondent may be directed to Dr. Peter Vasilenko, Chairperson of the University Committee on Research Involving Human Subjects, at (517) 355-2180. **Thank you** in advance for helping develop Michigan's Wolf Management Plan.

Sincerely,

These stamps are our gift to you!

Peter Bull
Project Coordinator
Michigan State University
Department of Fisheries and Wildlife
(517) 432-3636
bullpe@msu.edu

Before beginning the survey,
please review the history of wolves in Michigan listed below.

HISTORY OF WOLVES IN MICHIGAN

– Pre-European settlement: wolves were present in all 83 counties in Michigan.

– By 1840: wolves no longer were found in the southern portion of the Lower Peninsula.

– 1910-1935: wolves completely disappeared from the Lower Peninsula.

– By 1960: almost all wolves were gone from the Upper Peninsula.

– 1965: wolves were given full legal protection.

– 1974: the gray wolf was listed as endangered under the Federal Endangered Species Act (ESA).

– 1974: an attempt to release four Minnesota wolves in northern Marquette County failed. All four animals were killed before reproducing. No further attempts at reintroduction were made.

– 1991: Wolves that migrated from Wisconsin and Canada began to repopulate the Upper Peninsula.

– 2004-05: The winter wolf population in the Upper Peninsula (mainland) included at least 405 animals. Three wolves were confirmed to be in the Northern Lower Peninsula.

– Near Future: wolves could be taken off the federal list of threatened and endangered species and the state of Michigan would take responsibility for managing Michigan's wolves.

This map shows the <u>three regions of Michigan</u> that are referred to in some survey questions. Note the line that separates the northern and southern regions of the lower peninsula.

1. Is anyone in your household actively engaged in farming for a living?

78 NO → **If "NO", please either continue and skip all farming questions or go to the last page (page 11) and answer those questions before sending this survey back.**

[NOTE: Pagination is not consistent in this appendix report]

528 YES **If "YES": does this farming involve livestock?** ***500*** YES ***28*** NO

Your Opinions About Wolves in Michigan

2. How would you summarize your opinion about having wolves in Michigan? (Please check one)

UP	LP	
8.8% (31)	19.8% (56)	I AM NOT INTERESTED IN MICHIGAN'S WOLVES
5.4% 19()	2.8% (8)	I STRONGLY APPROVE
18.2% (64)	15.9% (45)	I SOMEWHAT APPROVE
3.7% (13)	7.8% (22)	I AM UNDECIDED
24.1% (85)	14.5% (41)	I SOMEWHAT DISAPPROVE
39.8% (140)	39.2% (111)	I STRONGLY DISAPPROVE

3. In your opinion, how important are each of the of the statements below as a reason why we should have wolves in Michigan?

	this is NOT a reason to have wolves	slightly important reason	somewhat important reason	this is a very important reason to have wolves	undecided
	UP LP	UP LP	UP LP	UP LP	UP LP
a) "AS PREDATORS, WOLVES COULD BENEFIT MICHIGAN'S ECOSYSTEM BY HELPING TO CONTROL SOME OTHER WILDLIFE POPULATIONS"	53.1% (145) 54.6% (113)	19.8%(54) 18.8%(39)	15.0% (41) 12.1% (25)	12.1% (33) 10.6% (22)	0% (0) 3.9% (8)
b) "THERE ARE PEOPLE WHO APPRECIATE WOLVES AND WANT TO KNOW THAT WOLVES EXIST IN MICHIGAN."	68.1% (186) 65.6% (137)	19.8%(54) 16.7%(35)	8.8% (24) 11.5% (24)	2.9% (8) 3.3% (7)	0.4% (1) 6% (2.9)
c) "FUTURE GENERATIONS OF CITIZENS COULD BENEFIT IF WE MAINTAIN WOLVES IN MICHIGAN."	69.5% (189) 60.1% (125)	16.2%(44) 18.8%(39)	10.7% (29) 13.5% (28)	2.2% (6) 2.9% (6)	1.5% (4) 4.8% (10)
d) "WOLVES HAD A HISTORIC PRESENCE IN MICHIGAN AND SHOULD BE HERE NOW"	68.4% (186) 6.38% (132)	19.1%(52) 18.4%(38)	9.2% (25) 11.1% (23)	2.2% (6) 4.8% (10)	1.1% (3) 1.9% (4)
e) "PEOPLE WANT TO VIEW, HEAR, PHOTOGRAPH OR STUDY WILD WOLVES IN MICHIGAN."	70.5% (191) 61.4% (127)	17.7%(48) 21.3%(44)	9.6% (26) 11.6% (24)	1.5% (4) 2.9% (6)	0.7% (2) 2.9% (6)
f) "WOLVES COULD EVENTUALLY BECOME ANOTHER GAME SPECIES FOR MICHIGAN HUNTERS."	66.9% (182) 67.9% (142)	15.4%(42) 14.8%(31)	12.9% (35) 12.0% (25)	4.4% (12) 4.8% (10)	0.4% (1) 0.5% (1)
g) "REGARDLESS OF OUR LAWS, WOLVES HAVE A RIGHT TO EXIST IN MICHIGAN."	70.6% (190) 63.5% (132)	17.1%(46) 16.8%(35)	6.3% (17) 9.6% (20)	3.0% (8) 5.3% (11)	3.0% (8) 4.8% (10)
h) "WOLVES COULD INCREASE TOURISM IN MICHIGAN AND PROVIDE ECONOMIC BENEFITS."	79.1% (216) 76.9% (160)	13.9%(38) 13.5%(28)	4.8% (13) 4.8% (10)	1.1% (3) 1.9% (4)	1.1% (3) 2.9% (6)

NOTE: You will need to read the information on this page before answering the questions that follow on the next page.

Facts About Wolves in Michigan

* The Federal and Michigan Endangered Species Acts require that Michigan's population of wolves be protected and maintained.
* The original Michigan wolf plan set a recovery goal of 200 wolves in Michigan.
* In winter 2004-05, the Michigan DNR count showed at least 405 wolves in the Upper Peninsula mainland.
* Currently, scientists estimate that 1200 wolves is the highest number that the Upper Peninsula habitat could support.
* At least three wolves were known to be in the Northern Lower Peninsula in 2004.
* Although more were suspected, the Michigan DNR confirmed that in 2004, wolves in the Upper Peninsula
  – killed four dogs; and,
  – killed livestock on 12 occasions

WOLF SITUATION TABLE: **Each situation below describes the impacts associated with a number and distribution of wolves in Michigan. Apply this information to the region where you farm when answering question 5.**

SITUATION 1:	* No Wolves
SITUATION 2:	* Wolves in a few counties at **very low** numbers * Rare sightings * No loss of livestock to wolves in most years * Rare loss of pets or hunting dogs to wolves * The Michigan DNR detects no impact on the total deer harvested by hunters
SITUATION 3:	* Wolves in many counties but at **low** numbers * Occasionally seen near rural homes or roads in some areas * Less than 1% of farms per year lose livestock * Some loss of pets and hunting dogs likely – less than 10 per year * The Michigan DNR detects no impact on the total deer harvested by hunters
SITUATION 4:	* Wolves exist in **most** counties at **moderate** numbers * Often seen near rural homes or roads in many areas * About 1% of farms per year lose livestock (about 7 farms in the UP and 40 in the NLP) * Pets and/or hunting dogs known to be lost yearly to wolves averages 15 to 20. * The Michigan DNR detects a slight decrease in total deer harvested by hunters
SITUATION 5:	* Wolves exist in **all** counties in the **highest** numbers that can be healthfully sustained by the habitat * Frequent, widespread sightings near rural homes and roads, occasional sightings near towns * About 2% of farms per year lose livestock (about 14 farms in the UP, 80 in the NLP) * Pets and/or hunting dogs known to be lost yearly to wolves averages 20 - 25. * The Michigan DNR detects a moderate decrease in total deer harvested by hunters.

4. Please check the region of Michigan where you farm (see the map on page 1). (Please check one)

56% (268) UPPER PENINSULA **37% (176)** NORTHERN LOWER PENINSULA **7% (32)** SOUTHERN LOWER PENINSULA

5. Use the "Wolf Situation Table" on the opposite page to answer questions a, b and c that follow.

Circle one answer for each of these.	**SITUATION**					**undecided**
	1	2	3	4	5	
a) THE SITUATION I **PREFER** FOR MY FARMING REGION IS	49.4% (133) 64.4% (130)	30.9% (83) 24.8% (50)	10.8% (29) 8.9% (18)	5.2% (14) 1.5% (3)	3.7%(10) 0% (0)	0% (0) 0.5% (1)
b) THE SITUATION WITH **THE FEWEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR MY FARMING REGION IS	46.0% (122) 60.8% (121)	39.2%(104) 28.1% (56)	10.2% (27) 9.0% (18)	2.6% (7) 1.0% (2)	1.9% (5) 0% (0)	0% (0) 1.0% (2)
c) THE SITUATION WITH **THE HIGHEST NUMBER** OF WOLVES **I CAN ACCEPT** FOR MY FARMING REGION IS	32.7% (86) 46.3% (93)	34.2% (90) 20.9% (42)	20.9% (55) 21.9% (44)	7.2% (19) 6.5% (13)	4.6%(12) 3.5% (7)	0.4% (1) 1.0% (2)

6. If you were asked your opinion about whether wolf numbers should be reduced in an area, how important would each of these be to you in considering your position?

	this is NOT a consideration	**slightly important**	**somewhat important**	**this is a very important consideration**	**I am undecided**
a) THE NUMBER OF FARM ANIMALS ACTUALLY LOST TO WOLVES.	4.8% (13) 6.5% (13)	1.9% (5) 3.5% (7)	5.6% (15) 1.5% (3)	87.7% (236) 87.0% (174)	0% (0) 1.5% (3)
b) A LOWER PERCENT OF DEER HUNTERS WHO HARVEST DEER IF IT IS ACTUALLY CAUSED BY WOLVES PREYING ON DEER.	16.1% (43) 18.8% (37)	17.2% (46) 20.3% (40)	24.3% (65) 20.3% (40)	41.6% (111) 37.6% (74)	0.7% (2) 3.0% (6)
c) THE NUMBER OF HUNTING DOGS ACTUALLY LOST TO WOLVES IN THE FIELD	18.7% (50) 20.2% (40)	16.1% (43) 16.2% (32)	23.6% (63) 21.2% (42)	40.8% (109) 40.9% (81)	0.7% (2) 1.5% (3)
d) A CONCERN AMONG AREA RESIDENTS FOR HUMAN SAFETY CAUSED BY A HIGH NUMBER OF CONFIRMED WOLF SIGHTINGS NEAR HOMES	6.3% (17) 7.6% (15)	4.1% (11) 7.1% (14)	4.9% (13) 6.6% (13)	84.3% (226) 76.8% (152)	0.4% (1) 2.0% (4)
e) THE NUMBER OF PETS ACTUALLY ATTACKED BY WOLVES NEAR THE PETS' HOMES.	6.0% (16) 8.1% (16)	7.5% (20) 7.1% (14)	14.6% (39) 12.6% (25)	71.3% (191) 71.2% (141)	0.7% (2) 1.0% (2)

Your Opinions About Compensation for Losses of Livestock or Pets to Wolves in Michigan

7. How strongly would you support or oppose using <u>your Michigan tax dollars</u> to compensate owners who have lost the following to wolves? Assume the compensation program would be carefully administered.

	strongly support	somewhat support	neither support nor oppose	somewhat oppose	strongly oppose
a) LIVESTOCK (CATTLE, HORSES, SHEEP, GOATS, POULTRY, ETC.)	84.1% (228) 65.2% (135)	5.2% (14) 7.2% (15)	2.2% (6) 6.3% (13)	3.0% (8) 4.3% (9)	5.5% (15) 16.9% (35)
b) HUNTING DOGS (BEAGLES, BIRD DOGS, HOUNDS, ETC.)	40.9% (110) 30.4% (62)	19.0% (51) 16.2% (33)	18.2% (49) 20.6% (42)	7.4% (20) 9.8% (20)	14.5% (39) 23.0% (47)
c) PETS	47.0% (126) 31.8% (64)	18.7% (50) 15.9% (32)	17.5% (47) 19.4% (39)	5.2% (14) 8.0% (16)	11.6% (31) 24.9% (50)
d) PRIVATELY OWNED (FENCED) DEER AND ELK	54.5% (146) 36.1% (74)	14.6% (39) 15.1% (31)	10.8% (29) 17.6% (36)	4.5% (12) 6.8% (14)	15.7% (42) 24.4% (50)

8. How strongly would you support or oppose using <u>your Michigan tax dollars</u> to help farmers with fencing or other purchases that protect livestock from wolves? (Check one answer below.)

	STRONGLY SUPPORT	SOMEWHAT SUPPORT	NEITHER SUPPORT NOR OPPOSE	SOMEWHAT OPPOSE	STRONGLY OPPOSE
UP	48.1% (129)	17.5% (47)	10.4% (28)	6.0% (16)	17.9% (48)
LP	37.1% (75)	15.8% (32)	13.4% (27)	7.4% (15)	26.2% (53)

Your Opinions About How We Should Manage Wolves in Michigan

9. How strongly do you agree or disagree with each of the following statements?

	strongly agree	somewhat agree	neither agree nor disagree	somewhat disagree	strongly disagree
a) THE MICHIGAN DNR SHOULD LET THE WOLVES MAINTAIN THEIR OWN POPULATION LEVEL WITHOUT TRYING TO MANAGE THEM.	17.4%(47) 12.6%(25)	8.5% (23) 9.0% (18)	5.6% (15) 9.0% (18)	7.8% (21) 15.6%(31)	60.7% (164) 53.8% (107)
b) WHEREVER WOLVES ARE PLENTIFUL IN MICHIGAN DEER RANGE, THEY WILL SIGNIFICANTLY LOWER THE QUALITY OF DEER HUNTING.	59.8% (162) 48.3% (98)	21.4% (58) 22.7% (46)	7.0% (19) 15.8% (32)	7.4% (20) 9.4% (19)	4.4% (12) 3.9% (8)
c) THE CHANCE OF A WILD MICHIGAN GRAY WOLF HURTING OR KILLING A HUMAN IS GREAT ENOUGH THAT IT SHOULD BE AN IMPORTANT FACTOR IN DECIDING HOW MANY WOLVES ARE ALLOWED TO LIVE IN MICHIGAN.	62.7% (170) 49.3% (100)	18.1% (49) 19.7% (40)	6.6% (18) 9.9% (20)	6.3% (17) 12.8%(26)	6.3% (17) 8.4% (17)

d) WE ALREADY HAVE PRACTICAL AND EFFECTIVE METHODS OF REDUCING WOLF FERTILITY (E.G. CHEMICAL OR SURGICAL PROCEDURES) THAT COULD BE USED TO LIMIT WOLF NUMBERS.	17.9% (48) 15.0% (30)	16.4% (44) 13.0% (26)	23.1% (62) 33.5% (67)	9.0% (24) 9.5% (19)	33.6%(90) 29.0%(58)
e) THE MOST EFFECTIVE WAY TO AVOID WOLF PROBLEMS IS TO EDUCATE THE PUBLIC ON HOW TO LIVE WITH WOLVES.	7.0% (19) 13.7% (28)	15.4% (42) 14.2% (29)	8.8% (24) 13.2% (27)	17.3%(47) 15.7%(32)	51.5% (140) 43.1%(88)

MANAGING LOSSES FROM LIVESTOCK DEPREDATION

10. How supportive or opposed would you be of <u>having wolves in your farming area</u> IF: 1) 1% to 2% of farms in your region were expected to lose livestock to wolf depredation each year, (2) there was no compensation for losses, and (3) there was no legal authority for either the farmer or the Michigan DNR to remove problem wolves? (Please check one.)

	STRONGLY SUPPORTIVE	SOMEWHAT SUPPORTIVE	NEITHER SUPPORTIVE NOR OPPOSED	SOMEWHAT OPPOSED	STRONGLY OPPOSED
UP	2.6% (7)	3.4% (9)	2.6% (7)	7.5% (20)	84.0% (225)
LP	2.0% (4)	2.5% (5)	4.5% (9)	6.5% (13)	84.5% (169)

Below are six management packages to reduce or avoid economic losses from wolf attacks on livestock. Each package has a different combination of:

1. **compensation,**
2. **authority for farmers to remove wolves and**
3. **removal of problem wolves by the Michigan DNR.**

Please read them carefully and indicate your satisfaction with each combination.

11. *<u>MANAGEMENT PACKAGE 1:</u>*

If you were <u>NOT</u> COMPENSATED for losses;

but IT WAS LEGAL for <u>you</u> to remove (e.g., shoot or trap) any wolves from your own property,

and the Michigan DNR WOULD <u>NOT</u> remove individual wolves they know to be attacking livestock,

<u>how satisfied would you be with this package to reduce or avoid economic losses</u>? (Please check one.)

	VERY SATISFIED	SOMEWHAT SATISFIED	SLIGHTLY SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	SLIGHTLY DISSATISFIED	SOMEWHAT DISSATISFIED	VERY DISSATISFIED
UP	22.3% (60)	18.6% (50)	11.5% (31)	5.9% (16)	3.3% (9)	8.9% (24)	29.4% (79)
NLP	16.6% (34)	12.7% (26)	10.2% (21)	5.9% (12)	4.4% (9)	11.2% (23)	39.0% (80)

12. *MANAGEMENT PACKAGE 2:*

If you WERE COMPENSATED for livestock at 100% of the market value they had at time of loss;
but IT WAS NOT LEGAL for you to remove wolves from your own property,
and the Michigan DNR WOULD NOT remove individual wolves they know to be attacking livestock,
how satisfied would you be with this package to reduce or avoid economic losses? (Please check one.)

	VERY SATISFIED	SOMEWHAT SATISFIED	SLIGHTLY SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	SLIGHTLY DISSATISFIED	SOMEWHAT DISSATISFIED	VERY DISSATISFIED
UP	1.1% (3)	7.0% (19)	7.0% (19)	4.4% (12)	6.3% (17)	14.8% (40)	59.4% (161)
NLP	2.5% (5)	7.4% (15)	6.4% (13)	4.9% (10)	6.4% (13)	15.8% (32)	56.7% (115)

13. *MANAGEMENT PACKAGE 3:*

If you WERE COMPENSATED for livestock at 100% of the market value they had at time of loss;
and IT WAS LEGAL for you to remove (e.g., shoot or trap) any wolves from your own property,
and the Michigan DNR WOULD NOT remove individual wolves they know to be attacking livestock,
how satisfied would you be with this package to reduce or avoid economic losses? (Please check one.)

	VERY SATISFIED	SOMEWHAT SATISFIED	SLIGHTLY SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	SLIGHTLY DISSATISFIED	SOMEWHAT DISSATISFIED	VERY DISSATISFIED
UP	36.2% (97)	26.9% (72)	9.7% (26)	3.0% (8)	4.1% (11)	9.0% (24)	11.2% (30)
NLP	23.9% (49)	25.9% (53)	8.8% (18)	4.9% (10)	7.3% (15)	12.2% (25)	17.1% (35)

14. *MANAGEMENT PACKAGE 4:*

If you WERE COMPENSATED for livestock at 100% of the market value they had at time of loss;
and IT WAS LEGAL for you to remove (e.g., shoot or trap) any wolves from your own property,
and the Michigan DNR WOULD BE removing individual wolves they know to be attacking livestock,
how satisfied would you be with this package to reduce or avoid economic losses? (Please check one.)

	VERY SATISFIED	SOMEWHAT SATISFIED	SLIGHTLY SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	SLIGHTLY DISSATISFIED	SOMEWHAT DISSATISFIED	VERY DISSATISFIED
UP	67.2% (180)	15.3% (41)	7.1% (19)	1.5% (4)	2.2% (6)	1.9% (5)	4.9% (13)
NLP	52.2% (108)	19.8% (41)	10.1% (21)	2.4% (5)	1.9% (4)	5.8% (12)	7.7% (16)

15. ***MANAGEMENT PACKAGE 5:***

If you were NOT COMPENSATED for losses;

but IT WAS LEGAL for you to remove (e.g., shoot or trap) any wolves from your own property,

and the Michigan DNR WOULD BE removing individual wolves they know to be attacking livestock,

how satisfied would you be with this package to reduce or avoid economic losses? (Please check one.)

	VERY SATISFIED	SOMEWHAT SATISFIED	SLIGHTLY SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	SLIGHTLY DISSATISFIED	SOMEWHAT DISSATISFIED	VERY DISSATISFIED
UP	13.3% (36)	20.4% (55)	13.7% (37)	3.0% (8)	7.0% (19)	10.4% (28)	32.2% (87)
NLP	7.8% (16)	12.7% (26)	14.2% (29)	6.9% (14)	5.4% (11)	13.2% (27)	39.7% (81)

16. ***MANAGEMENT PACKAGE 6:***

If you WERE COMPENSATED for livestock at 100% of the market value they had at time of loss;

but IT WAS NOT LEGAL for you to remove wolves from your own property,

and the Michigan DNR WOULD BE removing individual wolves they know to be attacking livestock,

how satisfied would you be with this package to reduce or avoid economic losses? (Please check one.)

	VERY SATISFIED	SOMEWHAT SATISFIED	SLIGHTLY SATISFIED	NEITHER SATISFIED NOR DISSATISFIED	SLIGHTLY DISSATISFIED	SOMEWHAT DISSATISFIED	VERY DISSATISFIED
UP	5.9% (16)	14.8% (40)	18.1% (49)	4.4% (12)	3.7% (10)	18.1% (49)	34.8% (94)
NLP	5.8% (12)	11.7% (24)	9.7% (20)	4.9% (10)	7.3% (15)	21.4% (44)	39.3% (81)

17. How supportive or opposed would you be of having wolves in your farming area IF you could have whichever management package above (i.e. packages 1 - 6) that you would be most satisfied with, and if 1% to 2% of farms in wolf areas are expected to lose livestock each year? (Please check one.)

	STRONGLY SUPPORTIVE	SOMEWHAT SUPPORTIVE	NEITHER SUPPORTIVE NOR OPPOSED	SOMEWHAT OPPOSED	STRONGLY OPPOSED
UP	16.2% (43)	25.9% (69)	7.5% (20)	10.2% (27)	40.2% (107)
NLP	13.8% (28)	18.7% (38)	5.4% (11)	15.8% (32)	46.3% (94)

PLEASE PROVIDE YOUR COMMENTS REGARDING QUESTIONS 10-17:

YOUR ATTITUDES ABOUT THE EXISTENCE OF WOLVES IN YOUR FARMING AREA

18. To the best of your knowledge, are there wolves inhabiting the county where you farm livestock? (Please check one.)

	YES	NO	UNSURE
UP	95.3% (261)	0.7% (2)	4.0% (11)
NLP	16.9% (35)	49.3% (102)	33.8% (70)

19. How much – if any – have the following ideas affected your willingness to have wolves in your farming area?

	This idea has...				
	...greatly decreased my willingness	*...somewhat* decreased my willingness	*...slightly* decreased my willingness	*... not* affected my willingness	I am undecided about this idea
A) WOLVES LIVING NEAR MY FARM COULD ADD SUBSTANTIAL COSTS TO MY FARMING LIVELIHOOD (E.G., CHANGING FARMING PRACTICES, LOST OR DAMAGED LIVESTOCK, ETC.)	65.6% (177) 61.2% (123)	17.4% (47) 16.9% (34)	3.7% (10) 7.5% (15)	10.4% (28) 10.0% (20)	3.0% (8) 4.5% (9)
B) WOLVES NEAR MY FARM CAN FORCE CHANGES IN LIFESTYLE FOR MYSELF AND MY FAMILY SUCH AS REDUCING OUR FREEDOM TO ENJOY OUR PROPERTY AND ROAM IT AT WILL.	63.3% (171) 62.6% (127)	15.6% (42) 9.9% (20)	5.2% (14) 10.3% (21)	14.1% (38) 13.3% (27)	1.9% (5) 3.9% (8)
C) OTHER PEOPLE WILL DECIDE WHETHER THERE WILL BE WOLVES IN MY REGION AND AROUND MY FARM AND I HAVE LITTLE SAY ON THE MATTER.	78.8% (212) 75.2% (152)	9.3% (25) 6.9% (14)	3.3% (9) 5.0% (10)	5.2% (14) 7.4% (15)	3.3% (9) 5.4% (11)
D) WOLVES WOULD REDUCE MY ENJOYMENT OF HUNTING DEER AROUND MY FARM.	48.1% (129) 43.1% (87)	14.9% (40) 12.4% (25)	10.8% (29) 9.9% (20)	25.4% (68) 27.7% (56)	0.7% (2) 6.9% (14)
E) THE LAW WOULD PREVENT ME FROM CONTROLLING OR REMOVING THE WOLVES THAT POSE A THREAT TO MY LIVESTOCK ON MY OWN LAND.	86.3% (233) 83.5% (167)	7.4% (20) 6.5% (13)	2.6% (7) 3.0% (6)	2.6% (7) 4.0% (8)	1.1% (3) 3.0% (6)
F) IF WOLVES ARE PROTECTED AND NOT MANAGED, THEIR NUMBERS MAY GO BEYOND OUR ABILITY TO CONTROL THEM.	84.4% (228) 81.8% (166)	7.0% (19) 5.9% (12)	2.2% (6) 3.4% (7)	3.7% (10) 6.4% (13)	2.6% (7) 2.5% (5)

YOUR EXPERIENCE WITH WOLVES AND COYOTES IN YOUR AREA

20. Please indicate the number of years from 2001 through 2005 that you experienced some damage or loss of farm animals suspected or known to be caused by coyotes.

	0 YEARS	1 YEAR	2 YEARS	3 YEARS	4 YEARS	5 YEARS
UP	67.5% (168)	13.3% (33)	6.8% (17)	4.4% (11)	3.2% (8)	4.4% (11)
NLP	65.6% (122)	10.2% (19)	6.5% (12)	5.4% (10)	3.2% (6)	8.6% (16)

21. Were you aware that a state compensation program exists for producers who lose farm animals to coyote depredation?

	YES	NO
UP	31.3% (85)	68.8% (187)
NLP	11.3% (23)	88.7% (180)

If you do NOT farm in the Upper Peninsula, please skip to question 24.

22. Please indicate the number of years from 2001 through 2005 that you experienced some damage or loss of farm animals suspected or known to be caused by wolves?

	0 YEARS	1 years	2 YEARS	3 YEARS	4 YEARS	5 YEARS
UP	69.5% (157)	14.2% (32)	6.2% (14)	4.0% (9)	3.1% (7)	3.1% (7)
NLP	96.3% (26)	3.7% (1)	0% (0)	0% (0)	0% (0)	0% (0)

23. Were you aware of the existing state compensation program for producers who lose farm animals to wolf depredation?

	YES	NO
UP	68.4% (173)	31.6% (80)
NLP	16.1% (5)	83.9% (26)

24. How many livestock producers do you know who have personally told you they had farm animals damaged or killed that were suspected or known to be caused by wolves?

	0 PRODUCERS	MEAN	RANGE
UP	16.3% (31)	3.2	0- 25
NLP	79.4% (100)	0.48	0-5

25. Please check which types of livestock you typically raise on your farm. (Check all that apply)

	UP	NLP
BEEF CATTLE: COW/ CALF	62.5% (173)	36.1% (79)
BEEF CATTLE: FEEDER CALVES AND/OR FEEDLOT	24.9% (69)	28.3% (62)
DAIRY CATTLE	31.0% (86)	55.7% (122)
SHEEP AND/OR GOATS	17.0% (47)	10.0% (22)
HORSES	29.6% (82)	33.8% (74)
SWINE	13.0% (36)	16.9% (37)
POULTRY	19.9% (55)	30.1% (66)

26. Please circle the one livestock type in question 25 that you consider to be your main livestock enterprise.

	UP	NLP
BEEF CATTLE: COW/ CALF	51.9% (112)	29.2% (49)
BEEF CATTLE: FEEDER CALVES AND/OR FEEDLOT	8.3% (18)	7.7% (13)
DAIRY CATTLE	26.9% (58)	60.1% (101)
SHEEP AND/OR GOATS	5.6% (12)	1.2% (2)
HORSES	5.1% (11)	1.2% (2)
SWINE	0.5% (1)	0.6% (1)
POULTRY	0.5% (1)	0% (0)
OTHER	1.4% (3)	0% (0)

27. About how many total acres do you manage in your farming operation (including owned, leased, share-cropped, etc.)?

	RANGE	MEAN	MEDIAN	MODES
UP	5 - 2000	481	350	500
NLP	35 - 3000	417	300	300

28. Do you agree or disagree that: "The Michigan Department of Natural Resources will make wolf management decisions ...

	strongly agree	somewhat agree	neither agree nor disagree	somewhat disagree	strongly disagree
a) ....THAT ARE ADEQUATELY BASED ON GOOD SCIENCE."	8.9% (24) 5.5% (11)	21.6% (58) 28.4% (57)	14.5% (39) 16.4% (33)	23.4%(63) 22.9%(46)	31.6%(85) 26.9%(54)
b) ....THAT FAIRLY CONSIDER THE OPINIONS OF ALL MICHIGAN CITIZENS."	7.5% (20) 8.5% (17)	18.0% (48) 21.9% (44)	15.4% (41) 22.9% (46)	24.8%(66) 19.9%(40)	34.2%(91) 26.9%(54)
c) ...USING PROCEDURES THAT ARE SUFFICIENTLY OPEN AND ACCESSIBLE TO THE PUBLIC."	9.1% (24) 8.1% (16)	16.7% (44) 22.7% (45)	19.0% (50) 26.3% (52)	20.5%(54) 18.2%(36)	34.6%(91) 24.7%(49)

Some General Questions About the Respondents to Our Survey

29. Do you have access to the Internet <u>for personal use</u> either at home or at work?

	YES	NO
UP	60.5% (161)	39.5% (105)
NLP	49.5% (97)	50.5% (99)

If yes, please answer the next two questions

	never	rarely	sometimes	frequently
a) HOW OFTEN DO YOU USE THE INTERNET FOR INFORMATION ABOUT WILDLIFE?	30.0%(48) 23.5%(23)	35.0%(56) 50.0%(49)	29.4% (47) 22.4% (22)	5.6% (9) 4.1% (4)
b) HOW OFTEN DO YOU USE THE INTERNET TO GET INFORMATION FROM THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES?	43.4%(69) 35.7%(35)	34.0%(54) 37.8%(37)	18.9% (30) 23.5% (23)	3.8% (6) 3.1% (3)

30. About how many years have you lived in the region of Michigan (i.e., Upper Peninsula, Northern Lower or Southern Lower Peninsula) where you currently live?

	RANGE	MEAN	MEDIAN
UP	7 - 85	46.3	48
NLP	5 - 80	43.5	46

31. How likely is it that you will lease your farm land to deer hunters in the next five years?

	VERY LIKELY	SOMEWHAT LIKELY	UNDECIDED	SOMEWHAT UNLIKELY	VERY UNLIKELY
UP	20.1% (54)	8.9% (24)	10.0% (27)	8.6% (23)	52.4% (141)
LP	13.7% (28)	10.8% (22)	6.9% (14)	11.3% (23)	57.4% (117)

32. Which best describes you? (Check one)

	UP	NLP
I AM A HUNTER	72.8% (201)	71.5% (153)
I AM A NON-HUNTER BUT NOT OPPOSED TO HUNTING	26.4% (73)	28.0% (60)
I AM OPPOSED TO ALL FORMS OF RECREATIONAL HUNTING	0.7% (2)	0.5% (1)
I AM UNDECIDED	0% (0)	0% (0)

33. If you are a hunter, please check which of the following you do. (Check all that apply.)

	HUNT WITH DOGS	TRAP FURBEARERS	HUNT DEER	I DO NONE OF THESE
UP	19.2% (38)	21.2% (39)	86.4% (171)	0.5% (1)
LP	19.7% (30)	13.1% (20)	93.3% (142)	0% (0)

34. What year were you born? 19_____ **UP mean age = 55.9 years (sd 11.5); NLP mean age = 52.5 (sd 13.1)**

35. Are you male or female?

	UP	NLP
MALE	95.6% (263)	94.8% (201)
FEMALE	4.4% (12)	5.2% (11)

36. Please check your highest completed level of education. (check one)

	UP	NLP
LESS THAN HIGH SCHOOL	2.9% (8)	19.0% (40)
COMPLETED HIGH SCHOOL OR GED	34.2% (94)	38.6% (81)
VOCATIONAL OR TRADE SCHOOL	8.7% (24)	5.7% (12)
SOME COLLEGE	22.2% (61)	18.6% (39)
TWO YEAR DEGREE	12.7% (35)	6.2% (13)
FOUR YEAR DEGREE	13.5% (37)	9.0% (19)
GRADUATE SCHOOL (PHD, MBA, MSC, ETC.)	5.8% (16)	2.9% (6)

Thank you for completing this survey. Please return this survey to Peter Bull, Department of Fisheries and Wildlife, 13 Natural Resources Building, East Lansing, Michigan 48824. A postage-paid and addressed envelope has been included for your convenience. If you have more concerns and comments on Michigan wolves and their management, please write those in the space below or send them by email to bullpe@msu.edu. When completed, a summary of results from this survey will be posted on the Michigan DNR website.

COMMENTS:

[Comments were not prepared for inclusion in this appendix.]

APPENDIX VII:
FREQUENCIES OF RESPONSES TO FURTAKER SURVEY BY HUNTING-DOG USE

This appendix contains the frequencies of responses to all questions on the furtaker survey. Because the most commonly lost or attacked dogs in the UP were in pursuit of bear or furbearers (bobcat, coyote or raccoon), the 2005 survey was sent to 1,000 randomly selected licensed furtakers to obtain sufficient input from these stakeholders. We received a response rate of 68%; most (92%) respondents indicated interest in wolf issues.

Dogs were used for some form of hunting by 70% of the interested furtakers. Furtakers that used dogs for hunting bear, coyotes, bobcats or raccoons (27%, *n*=151) are referred to here as hound-hunters. Dogs used by this group are often distant from the hunters and are more vulnerable to attack by wolves. Another 43% (*n*=237) of the interested furtakers used dogs for hunting hare, upland birds, waterfowl or game other than bear or furbearers. This group is referred to as non-hound dog hunters. The remaining interested furtakers (30%, *n*=167) did not indicate any type of hunting involving dogs. Differences between dog-use types were considered to be statistically significant if '*p*' was less than or equal to 0.05.

1. How would you summarize your opinion about having wolves in Michigan? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
1. How would you summarize your opinion about having wolves in Michigan?	strongly approve	18.6%	11.3%	26.3%	18.9%
	somewhat approve	25.3%	23.8%	25.1%	24.9%
	undecided	5.9%	7.3%	4.8%	5.9%
	somewhat disapprove	22.8%	17.2%	21.0%	20.7%
	strongly disapprove	27.4%	40.4%	22.8%	29.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=20.9, df=8, p=0.008

Question 2 was prefaced with the statement: "In your opinion, how important is each of the statements below as a reason why we should have wolves in Michigan?"

2a. As predators, wolves could benefit michigan's ecosystem by helping to control some other wildlife populations * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2a. As predators, wolves could benefit michigan's ecosystem by helping to control some other wildlife populations	this is NOT a reason to have wolves	50.8%	63.8%	52.7%	54.9%
	slightly important reason	16.5%	12.8%	16.2%	15.4%
	somewhat important reason	18.2%	12.8%	14.4%	15.6%
	very important reason to have wolves	13.6%	8.7%	16.8%	13.2%
	undecided	.8%	2.0%		.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.3, df=8, p=0.101

2b. There are people who appreciate wolves and want to know that wolves exist in michigan. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2b. There are people who appreciate wolves and want to know that wolves exist in michigan.	this is NOT a reason to have wolves	50.8%	51.0%	37.6%	46.9%
	slightly important reason	22.0%	17.4%	28.5%	22.7%
	somewhat important reason	17.8%	20.8%	21.8%	19.8%
	very important reason to have wolves	8.9%	9.4%	12.1%	10.0%
	undecided	.4%	1.3%		.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.3, df=8, p=0.101

2c. Future generations of citizens could benefit if we maintain wolves in michigan. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2c. Future generations of citizens could benefit if we maintain wolves in michigan.	this is NOT a reason to have wolves	44.5%	45.6%	41.1%	43.8%
	slightly important reason	20.3%	23.1%	20.2%	21.1%
	somewhat important reason	15.7%	15.0%	16.6%	15.8%
	very important reason to have wolves	16.1%	13.6%	20.2%	16.7%
	undecided	3.4%	2.7%	1.8%	2.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.9, df=8, p=0.866

2d. Wolves had a historic presence in michigan and should be here now * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2d. Wolves had a historic presence in michigan and should be here now	this is NOT a reason to have wolves	41.0%	51.7%	38.2%	43.1%
	slightly important reason	22.2%	12.8%	28.5%	21.5%
	somewhat important reason	22.6%	20.8%	11.5%	18.8%
	very important reason to have wolves	13.7%	14.1%	20.0%	15.7%
	undecided	.4%	.7%	1.8%	.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=24.6, df=8, p=0.002

2e. People want to view, hear, photograph or study wild wolves in michigan. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2e. People want to view, hear, photograph or study wild wolves in michigan.	this is NOT a reason to have wolves	42.4%	48.6%	38.6%	42.9%
	slightly important reason	27.5%	20.9%	25.9%	25.3%
	somewhat important reason	18.6%	18.2%	23.5%	20.0%
	very important reason to have wolves	10.2%	12.2%	11.4%	11.1%
	undecided	1.3%		.6%	.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.4, df=8, p=0.497

2f. Wolves could eventually become another game species for michigan hunters. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2f. Wolves could eventually become another game species for michigan hunters.	this is NOT a reason to have wolves	33.9%	36.2%	27.7%	32.7%
	slightly important reason	16.9%	12.8%	18.7%	16.3%
	somewhat important reason	24.2%	18.8%	18.1%	20.9%
	very important reason to have wolves	23.7%	28.9%	33.1%	27.9%
	undecided	1.3%	3.4%	2.4%	2.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.9, df=8, p=0.208

2g. Regardless of our laws, wolves have a right to exist in michigan. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2g. Regardless of our laws, wolves have a right to exist in michigan.	this is NOT a reason to have wolves	44.3%	51.7%	42.7%	45.8%
	slightly important reason	18.3%	13.4%	23.8%	18.6%
	somewhat important reason	20.0%	15.4%	12.2%	16.4%
	very important reason to have wolves	15.3%	16.1%	20.1%	17.0%
	undecided	2.1%	3.4%	1.2%	2.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.9, df=8, p=0.117

2h. Wolves could increase tourism in michigan and provide economic benefits. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
2h. Wolves could increase tourism in michigan and provide economic benefits.	this is NOT a reason to have wolves	64.0%	65.1%	61.4%	63.5%
	slightly important reason	20.3%	14.8%	19.3%	18.5%
	somewhat important reason	10.2%	10.7%	11.4%	10.7%
	very important reason to have wolves	4.2%	8.1%	7.8%	6.4%
	undecided	1.3%	1.3%		.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.0, df=8, p=0.536

3a) the situation I prefer for the UP is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
3a) the situation I prefer for the UP is	Situation 1	27.8%	35.7%	23.4%	28.6%
	Situation 2	29.1%	25.2%	27.2%	27.5%
	Situation 3	22.6%	23.1%	27.8%	24.3%
	Situation 4	14.8%	11.9%	15.8%	14.3%
	Situation 5	5.7%	4.2%	5.7%	5.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.0, df=8, p=0.535

3b) the situation with the FEWEST number of wolves I can accept for the UP is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
3b) the situation with the FEWEST number of wolves I can accept for the UP is	Situation 1	36.1%	42.7%	31.6%	36.6%
	Situation 2	40.4%	32.9%	39.4%	38.1%
	Situation 3	18.3%	19.6%	22.6%	19.9%
	Situation 4	3.9%	2.8%	5.2%	4.0%
	Situation 5	1.3%	2.1%	1.3%	1.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.3, df=8, p=0.614

3c) the situation with the HIGHEST number of wolves I can accept for the UP is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
3c) the situation with the HIGHEST number of wolves I can accept for the UP is	Situation 1	18.4%	29.2%	16.7%	20.8%
	Situation 2	22.8%	22.9%	23.7%	23.1%
	Situation 3	26.8%	18.1%	25.0%	23.9%
	Situation 4	21.9%	21.5%	24.4%	22.5%
	Situation 5	10.1%	8.3%	10.3%	9.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.4, df=8, p=0.239

4a) the situation I prefer for the NLPlp is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
4a) the situation I prefer for the NLPlp is	Situation 1	31.1%	50.4%	30.7%	36.4%
	Situation 2	33.0%	19.3%	32.8%	29.1%
	Situation 3	22.2%	17.8%	21.9%	20.9%
	Situation 4	9.4%	8.9%	10.9%	9.7%
	Situation 5	4.2%	3.7%	3.6%	3.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.7, df=8, p=0.024

4b) the situation with the fewest number of wolves I can accept for the NLPis * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
4b) the situation with the fewest number of wolves I can accept for the NLPis	Situation 1	42.1%	56.3%	41.9%	46.0%
	Situation 2	39.2%	25.2%	34.6%	34.0%
	Situation 3	12.9%	12.6%	19.1%	14.6%
	Situation 4	3.8%	2.2%	1.5%	2.7%
	Situation 5	1.9%	3.7%	2.9%	2.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.6, df=8, p=0.067

4c) the situation with the highest number of wolves I can accept for the NLP is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
4c) the situation with the highest number of wolves I can accept for the NLP is	Situation 1	22.9%	41.5%	26.4%	29.1%
	Situation 2	30.5%	21.5%	26.4%	26.8%
	Situation 3	24.8%	14.1%	25.0%	21.9%
	Situation 4	15.7%	14.8%	15.0%	15.3%
	Situation 5	6.2%	8.1%	7.1%	7.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=18.5, df=8, p=0.018

5a) the situation I prefer for the SLP is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
5a) the situation I prefer for the SLP is	Situation 1	45.0%	57.0%	45.0%	48.4%
	Situation 2	29.4%	20.7%	32.9%	28.0%
	Situation 3	11.8%	11.9%	12.1%	11.9%
	Situation 4	5.2%	6.7%	5.0%	5.6%
	Situation 5	8.5%	3.7%	5.0%	6.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.8, df=8, p=0.216

5b) the situation with the fewest number of wolves I can accept for the SLP is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
5b) the situation with the fewest number of wolves I can accept for the SLP is	Situation 1	58.2%	66.7%	58.8%	60.8%
	Situation 2	26.0%	20.7%	28.7%	25.3%
	Situation 3	7.7%	7.4%	7.4%	7.5%
	Situation 4	1.9%	2.2%	1.5%	1.9%
	Situation 5	6.3%	3.0%	3.7%	4.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.3, df=8, p=0.720

5c) the situation with the highest number of wolves I can accept for the SLP is * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
5c) the situation with the highest number of wolves I can accept for the SLP is	Situation 1	37.0%	50.0%	37.0%	40.7%
	Situation 2	30.8%	22.1%	29.7%	28.0%
	Situation 3	13.0%	10.3%	18.1%	13.7%
	Situation 4	9.1%	10.3%	8.0%	9.1%
	Situation 5	10.1%	7.4%	7.2%	8.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.2, df=8, p=0.192

6a) the number of farm animals actually lost to wolves. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
6a) the number of farm animals actually lost to wolves.	this is NOT a consideration	3.8%	4.1%	3.0%	3.6%
	slightly important	6.4%	6.8%	9.6%	7.5%
	somewhat important	26.4%	15.0%	21.1%	21.7%
	this is a very important consideration	63.4%	74.1%	66.3%	67.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.8, df=8, p=0.183

6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
6b) a lower percent of deer hunters who harvest deer if it is actually caused by wolves preying on deer.	this is NOT a consideration	5.5%	8.9%	9.6%	7.7%
	slightly important	5.5%	8.9%	10.2%	7.9%
	somewhat important	22.1%	15.8%	18.7%	19.4%
	this is a very important consideration	66.8%	65.8%	60.8%	64.7%
	undecided		.7%	.6%	.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.6, df=8, p=0.295

6c) the number of hunting dogs actually lost in the field to wolves * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
6c) the number of hunting dogs actually lost in the field to wolves	this is NOT a consideration	9.8%	4.8%	17.5%	10.8%
	slightly important	9.4%	8.2%	14.5%	10.6%
	somewhat important	23.4%	11.6%	27.7%	21.5%
	this is a very important consideration	57.0%	75.5%	39.2%	56.6%
	undecided	.4%		1.2%	.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=46.1, df=8, p<0.001

6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
6d) a concern among area residents for human safety caused by a high number of confirmed wolf sightings near homes	this is NOT a consideration	8.9%	11.6%	9.6%	9.9%
	slightly important	10.2%	9.5%	10.8%	10.2%
	somewhat important	11.5%	10.9%	9.0%	10.6%
	this is a very important consideration	69.4%	68.0%	70.5%	69.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=1.4, df=8, p=0.965

6e) the number of pets actually attacked by wolves near the pet's home. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
6e) the number of pets actually attacked by wolves near the pet's home.	this is NOT a consideration	5.1%	3.4%	7.2%	5.3%
	slightly important	8.5%	12.3%	12.0%	10.6%
	somewhat important	19.6%	11.6%	21.1%	17.9%
	this is a very important consideration	66.4%	71.9%	59.6%	65.8%
	undecided	.4%	.7%		.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.2, df=8, p=0.191

7a) using your Michigan tax dollars to compensate owners who have lost livestock * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
7a) using your Michigan tax dollars to compensate owners who have lost livestock	strongly support	39.1%	51.4%	43.9%	43.9%
	somewhat support	22.6%	16.2%	21.3%	20.5%
	neither support nor oppose	9.4%	7.4%	3.7%	7.1%
	somewhat oppose	6.8%	6.8%	9.8%	7.7%
	strongly oppose	22.1%	18.2%	21.3%	20.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.4, df=8, p=0.181

7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
7b) using your Michigan tax dollars to compensate owners who have lost hunting dogs	strongly support	32.8%	51.4%	21.8%	34.5%
	somewhat support	16.6%	12.8%	12.1%	14.2%
	neither support nor oppose	10.6%	7.4%	12.7%	10.4%
	somewhat oppose	10.6%	10.1%	16.4%	12.2%
	strongly oppose	29.4%	18.2%	37.0%	28.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=36.8, df=8, p<0.001

7c) using your Michigan tax dollars to compensate owners who have lost pets * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
7c) using your Michigan tax dollars to compensate owners who have lost pets	strongly support	27.7%	46.9%	24.8%	32.0%
	somewhat support	15.2%	13.1%	15.2%	14.6%
	neither support nor oppose	15.6%	9.7%	9.7%	12.2%
	somewhat oppose	10.4%	9.0%	13.3%	10.9%
	strongly oppose	31.2%	21.4%	37.0%	30.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=25.9, df=8, p=0.001

7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
7d) using your Michigan tax dollars to compensate owners who have lost privately ownd (fenced) deer and elk	strongly support	16.1%	34.5%	18.3%	21.7%
	somewhat support	14.0%	13.5%	16.5%	14.6%
	neither support nor oppose	16.5%	17.6%	10.4%	15.0%
	somewhat oppose	12.3%	6.8%	14.6%	11.5%
	strongly oppose	41.1%	27.7%	40.2%	37.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=28.7, df=8, p<0.001

8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
8) using your Michigan tax dollars to help farmers with fencing or other purchases that protect livestock from wolves ?	strongly support	4.3%	11.0%	11.5%	8.2%
	somewhat support	14.0%	11.6%	12.7%	13.0%
	neither support nor oppose	12.8%	12.3%	10.9%	12.1%
	somewhat oppose	17.4%	14.4%	15.2%	15.9%
	strongly oppose	51.5%	50.7%	49.7%	50.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.4, df=8, p=0.312

9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
9a) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	13.6%	27.7%	21.0%	19.6%
	somewhat support	7.2%	14.2%	12.6%	10.7%
	neither support nor oppose	8.9%	7.4%	6.6%	7.8%
	somewhat oppose	15.3%	4.1%	9.0%	10.4%
	strongly oppose	54.9%	46.6%	50.9%	51.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=27.8, df=8, p=0.001

9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
9b) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	15.4%	29.7%	15.0%	19.1%
	somewhat support	12.0%	14.9%	6.0%	10.9%
	neither support nor oppose	7.7%	7.4%	9.6%	8.2%
	somewhat oppose	11.1%	5.4%	10.2%	9.3%
	strongly oppose	53.8%	42.6%	59.3%	52.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=26.3, df=8, p=0.001

9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
9c) If wolves remain as a protected NONGAME species and can not hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	11.5%	29.7%	17.4%	18.2%
	somewhat support	8.1%	11.5%	7.2%	8.7%
	neither support nor oppose	11.5%	10.8%	9.6%	10.7%
	somewhat oppose	13.2%	4.7%	8.4%	9.5%
	strongly oppose	55.6%	43.2%	57.5%	52.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=29.6, df=8, p<0.001

10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
10a) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for livestock loss.	strongly support	26.0%	36.5%	30.5%	30.2%
	somewhat support	25.5%	24.3%	27.5%	25.8%
	neither support nor oppose	10.6%	4.7%	7.2%	8.0%
	somewhat oppose	9.8%	6.8%	9.6%	8.9%
	strongly oppose	28.1%	27.7%	25.1%	27.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.2, df=8, p=0.323

10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
10b) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate hunting dog loss.	strongly support	24.7%	38.5%	19.2%	26.7%
	somewhat support	22.1%	16.2%	18.0%	19.3%
	neither support nor oppose	10.6%	8.1%	12.6%	10.5%
	somewhat oppose	12.3%	10.8%	9.0%	10.9%
	strongly oppose	30.2%	26.4%	41.3%	32.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=22.1, df=8, p=0.005

10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
10c) If wolves are changed to a GAME species and can be hunted in Michigan after federal de-listing, how strongly would you support or oppose using Michigan DNR funds from hunting and trapping to compensate for other pets.	strongly support	21.3%	33.1%	20.4%	24.2%
	somewhat support	20.9%	16.9%	18.6%	19.1%
	neither support nor oppose	12.8%	10.1%	13.2%	12.2%
	somewhat oppose	12.3%	10.1%	9.6%	10.9%
	strongly oppose	32.8%	29.7%	38.3%	33.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.8, df=8, p=0.213

11a) Loss of domestic animals: leave wolves alone. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
11a) Loss of domestic animals: leave wolves alone.	strongly support	1.7%	6.1%	2.4%	3.1%
	somewhat support	2.6%	2.0%	5.4%	3.3%
	neither support nor oppose	5.1%	2.0%	3.6%	3.8%
	somewhat oppose	11.1%	7.5%	15.0%	11.3%
	strongly oppose	79.5%	82.3%	73.7%	78.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.3, df=8, p=0.038

11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
11b) Loss of domestic animals: selectively kill the individual wolves that are causing the loss.	strongly support	56.2%	70.5%	58.7%	60.8%
	somewhat support	27.2%	11.0%	25.7%	22.4%
	neither support nor oppose	4.7%	3.4%	5.4%	4.6%
	somewhat oppose	5.1%	7.5%	4.8%	5.7%
	strongly oppose	6.8%	7.5%	5.4%	6.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.5, df=8, p=0.025

11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
11c) Loss of domestic animals: reduce the risk of loss by killing a portion of wolves to lower the wolf population	strongly support	69.4%	76.9%	64.7%	69.9%
	somewhat support	22.6%	15.6%	24.0%	21.1%
	neither support nor oppose	2.1%	2.0%	3.0%	2.4%
	somewhat oppose	2.6%	2.7%	3.6%	2.9%
	strongly oppose	3.4%	2.7%	4.8%	3.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.4, df=8, p=0.602

11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
11d) Loss of domestic animals: live trap and relocate wolves to reduce risk of loss.	strongly support	14.0%	19.0%	13.8%	15.3%
	somewhat support	14.0%	15.6%	16.2%	15.1%
	neither support nor oppose	12.7%	9.5%	10.2%	11.1%
	somewhat oppose	17.8%	9.5%	14.4%	14.5%
	strongly oppose	41.5%	46.3%	45.5%	44.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.1, df=8, p=0.425

11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
11e) Loss of domestic animals: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	8.9%	17.7%	9.6%	11.5%
	somewhat support	7.2%	14.3%	7.8%	9.3%
	neither support nor oppose	14.8%	9.5%	14.5%	13.3%
	somewhat oppose	12.3%	8.2%	7.2%	9.7%
	strongly oppose	56.8%	50.3%	60.8%	56.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=19.0, df=8, p=0.015

12a) Public concerns for human safety: leave wolves alone * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
12a) Public concerns for human safety: leave wolves alone	strongly support	3.0%	5.5%	2.4%	3.5%
	somewhat support	4.3%	3.4%	4.2%	4.0%
	neither support nor oppose	5.5%	4.8%	5.5%	5.3%
	somewhat oppose	9.8%	6.2%	13.3%	9.9%
	strongly oppose	77.4%	80.1%	74.5%	77.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.0, df=8, p=0.536

12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
12b) Public concerns for human safety: selectively kill the individual wolves that are creating the threat.	strongly support	58.1%	69.4%	61.6%	62.2%
	somewhat support	26.1%	18.1%	23.8%	23.2%
	neither support nor oppose	3.8%	2.8%	6.1%	4.2%
	somewhat oppose	3.8%	2.8%	2.4%	3.1%
	strongly oppose	8.1%	6.9%	6.1%	7.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.7, df=8, p=0.459

12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
12c) Public concerns for human safety: reduce the threat by killing a portion of wolves to lower the wolf population.	strongly support	68.5%	73.5%	63.9%	68.4%
	somewhat support	19.6%	15.0%	22.9%	19.3%
	neither support nor oppose	4.7%	4.8%	5.4%	4.9%
	somewhat oppose	2.6%	1.4%	1.2%	1.8%
	strongly oppose	4.7%	5.4%	6.6%	5.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.6, df=8, p=0.692

12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
12d) Public concerns for human safety: live trap and relocate wolves to reduce the threat	strongly support	16.2%	20.7%	18.2%	18.0%
	somewhat support	14.0%	15.9%	12.7%	14.1%
	neither support nor oppose	9.8%	5.5%	6.1%	7.5%
	somewhat oppose	13.2%	8.3%	13.9%	12.1%
	strongly oppose	46.8%	49.7%	49.1%	48.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=7.0, df=8, p=0.533

12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
12e) Public concerns for human safety: use fertility control (e.g. contraceptives) to limit wolf population size and reduce the threat.	strongly support	8.5%	16.8%	12.7%	12.0%
	somewhat support	8.5%	11.2%	5.5%	8.3%
	neither support nor oppose	13.2%	8.4%	9.7%	10.9%
	somewhat oppose	8.1%	5.6%	10.9%	8.3%
	strongly oppose	61.7%	58.0%	61.2%	60.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=13.3, df=8, p=0.102

13a) Lower number of deer: leave wolves alone * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
13a) Lower number of deer: leave wolves alone	strongly support	1.7%	4.8%	1.2%	2.4%
	somewhat support	3.4%	4.1%	7.3%	4.8%
	neither support nor oppose	3.0%	5.4%	3.6%	3.8%
	somewhat oppose	11.1%	4.8%	10.3%	9.1%
	strongly oppose	80.9%	81.0%	77.6%	79.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.0, df=8, p=0.081

13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
13b) Lower number of deer: reduce the loss of deer by killing a portion of wolves to lower the wolf population.	strongly support	73.2%	77.2%	71.7%	73.8%
	somewhat support	18.3%	14.8%	19.9%	17.8%
	neither support nor oppose	2.1%	2.0%	1.8%	2.0%
	somewhat oppose	3.4%	2.0%	3.0%	2.9%
	strongly oppose	3.0%	4.0%	3.6%	3.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.5, df=8, p=0.961

13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
13c) Lower number of deer: reduce the loss of deer by trapping and relocating a portion of wolves to lower the wolf population.	strongly support	19.6%	23.8%	23.0%	21.8%
	somewhat support	21.3%	17.0%	13.9%	17.9%
	neither support nor oppose	6.0%	6.1%	4.8%	5.7%
	somewhat oppose	8.9%	6.8%	11.5%	9.1%
	strongly oppose	44.3%	46.3%	46.7%	45.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.3, df=8, p=0.617

13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
13d) Lower number of deer: use fertility control to limit wolf population size and reduce risk of loss.	strongly support	10.3%	20.5%	15.2%	14.5%
	somewhat support	9.0%	11.0%	4.9%	8.3%
	neither support nor oppose	12.0%	6.8%	7.9%	9.4%
	somewhat oppose	8.5%	6.8%	11.0%	8.8%
	strongly oppose	60.3%	54.8%	61.0%	59.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=15.5, df=8, p=0.050

14a) use trained, paid professionals to shoot wolves * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
14a) use trained, paid professionals to shoot wolves	strongly support	16.7%	27.7%	15.2%	19.2%
	somewhat support	12.0%	12.8%	13.9%	12.8%
	neither support nor oppose	9.4%	7.4%	4.8%	7.5%
	somewhat oppose	14.5%	6.8%	12.1%	11.7%
	strongly oppose	47.4%	45.3%	53.9%	48.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.8, df=8, p=0.032

14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
14b) provide a limited number of permits to licensed hunters to shoot wolves during a controlled hunting season	strongly support	83.3%	84.6%	84.9%	84.2%
	somewhat support	12.0%	11.4%	9.0%	10.9%
	neither support nor oppose	1.3%	1.3%	3.0%	1.8%
	somewhat oppose	1.3%		1.2%	.9%
	strongly oppose	2.1%	2.7%	1.8%	2.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=4.8, df=8, p=0.770

14c) kill wolves that are trapped by trained, paid professionals * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
14c) kill wolves that are trapped by trained, paid professionals	strongly support	20.5%	27.7%	17.7%	21.6%
	somewhat support	12.4%	16.2%	12.2%	13.4%
	neither support nor oppose	10.7%	8.1%	5.5%	8.4%
	somewhat oppose	13.7%	5.4%	14.6%	11.7%
	strongly oppose	42.7%	42.6%	50.0%	44.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.6, df=8, p=0.035

14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
14d) provide a limited number of permits to licensed trappers for use during a controlled wolf trapping season	strongly support	86.0%	83.9%	87.3%	85.8%
	somewhat support	9.4%	10.7%	9.7%	9.8%
	neither support nor oppose	1.3%	2.0%	1.8%	1.6%
	somewhat oppose	1.3%	1.3%		.9%
	strongly oppose	2.1%	2.0%	1.2%	1.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.3, df=8, p=0.916

15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
15) Currently, farmers can kill individual coyotes on their property anytime they are threatening or damaging livestock. Would you approve or disapprove of allowing farmers to control wolf problems in this way?	strongly approve	74.9%	80.4%	70.9%	75.2%
	somewhat approve	16.0%	14.2%	15.2%	15.3%
	neither approve nor disapprove	.9%	1.4%	3.0%	1.7%
	somewhat disapprove	3.9%	1.4%	4.8%	3.5%
	strongly disapprove	4.3%	2.7%	6.1%	4.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=8.9, df=8, p=0.351

16a) the michigan dnr should let the wolves maintain their own population level in the UP without trying to manage them. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
16a) the michigan dnr should let the wolves maintain their own population level in the UP without trying to manage them.	strongly agree	6.8%	5.4%	4.2%	5.7%
	somewhat agree	11.1%	8.2%	8.4%	9.5%
	neither agree nor disagree	3.4%	3.4%	4.8%	3.8%
	somewhat disagree	20.1%	15.6%	16.9%	17.9%
	strongly disagree	58.5%	67.3%	65.7%	63.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=5.4, df=8, p=0.713

16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
16b) wherever wolves are plentiful in michigan deer range, they will significantly lower the quality of deer hunting.	strongly agree	54.9%	66.9%	57.6%	58.9%
	somewhat agree	22.6%	14.9%	24.2%	21.0%
	neither agree nor disagree	8.9%	8.1%	8.5%	8.6%
	somewhat disagree	9.8%	5.4%	6.1%	7.5%
	strongly disagree	3.8%	4.7%	3.6%	4.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.4, df=8, p=0.313

16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
16c) the chance of a wild michigan gray wolf hurting or killing a human is great enough that it should be an important factor in deciding how many wolves are allowed to live in michigan.	strongly agree	39.7%	47.0%	35.2%	40.3%
	somewhat agree	19.7%	18.1%	21.2%	19.7%
	neither agree nor disagree	10.7%	12.1%	11.5%	11.3%
	somewhat disagree	14.5%	9.4%	14.5%	13.1%
	strongly disagree	15.4%	13.4%	17.6%	15.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.4, df=8, p=0.608

16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
16d) we already have practical and effective methods of reducing wolf fertility (e.g. chemical or surgical procedures) that could be used to limit wolf numbers.	strongly agree	5.1%	12.3%	8.5%	8.1%
	somewhat agree	8.9%	8.9%	7.3%	8.4%
	neither agree nor disagree	19.1%	17.8%	22.4%	19.8%
	somewhat disagree	16.6%	12.3%	10.3%	13.6%
	strongly disagree	50.2%	48.6%	51.5%	50.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.4, df=8, p=0.241

16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
16e) the most effective way to avoid wolf problems is to educate the public on how to live with wolves.	strongly agree	17.1%	20.3%	21.7%	19.3%
	somewhat agree	22.2%	14.9%	24.1%	20.8%
	neither agree nor disagree	12.8%	10.1%	7.8%	10.6%
	somewhat disagree	15.8%	8.1%	13.3%	13.0%
	strongly disagree	32.1%	46.6%	33.1%	36.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.2, df=8, p=0.028

17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
17a) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal hunting season	strongly agree	84.5%	89.9%	81.8%	85.2%
	somewhat agree	10.3%	6.7%	13.9%	10.4%
	neither agree nor disagree	2.6%			1.1%
	somewhat disagree	.4%	2.0%	.6%	.9%
	strongly disagree	2.1%	1.3%	3.6%	2.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.2, df=8, p=0.028

17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
17b) In those areas of Michigan where wolf populations could be hunted without endangering the population, make the wolf a game species and create a controlled, legal trapping season	strongly agree	85.0%	84.6%	89.1%	86.1%
	somewhat agree	9.4%	8.1%	6.7%	8.2%
	neither agree nor disagree	2.6%	.7%	.6%	1.5%
	somewhat disagree	.4%	4.7%	.6%	1.6%
	strongly disagree	2.6%	2.0%	3.0%	2.6%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.5, df=8, p=0.035

18a) The MiDNR will make wolf management decisions that are adequately based on good science * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
18a) The MiDNR will make wolf management decisions that are adequately based on good science	strongly agree	14.5%	14.2%	22.4%	16.8%
	somewhat agree	34.5%	29.7%	24.8%	30.3%
	neither agree nor disagree	11.5%	12.8%	15.8%	13.1%
	somewhat disagree	20.9%	16.9%	18.2%	19.0%
	strongly disagree	18.7%	26.4%	18.8%	20.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=12.6, df=8, p=0.125

18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
18b) The MiDNR will make wolf management decisions that fairly consider the opinions of all MI citizens	strongly agree	16.2%	16.1%	19.5%	17.2%
	somewhat agree	26.4%	18.1%	24.4%	23.5%
	neither agree nor disagree	16.2%	10.1%	18.9%	15.3%
	somewhat disagree	19.6%	26.2%	17.1%	20.6%
	strongly disagree	21.7%	29.5%	20.1%	23.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=14.4, df=8, p=0.071

18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
18c) The MiDNR will make wolf management decisions using proceedures that are sufficiently open and accessible to the public	strongly agree	18.0%	16.9%	25.8%	20.0%
	somewhat agree	29.2%	23.0%	25.8%	26.5%
	neither agree nor disagree	18.9%	20.9%	19.6%	19.7%
	somewhat disagree	15.9%	17.6%	16.6%	16.5%
	strongly disagree	18.0%	21.6%	12.3%	17.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.6, df=8, p=0.291

19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
19) What is your opinion about having wolves in Michigan now that you have thought about the wolf-related issues in this survey?	strongly approve	25.5%	22.3%	31.5%	26.5%
	somewhat approve	23.8%	20.9%	26.7%	23.9%
	undecided	2.1%	5.4%	6.7%	4.4%
	somewhat disapprove	17.4%	12.8%	11.5%	14.4%
	strongly disapprove	31.1%	38.5%	23.6%	30.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=17.1, df=8, p=0.029

20_c1) number of nonmotorized, non consumptive recreational activities * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
20_c1) number of nonmotorized, non consumptive recreational activities	0	9.2%	15.5%	13.5%	12.2%
	1	21.4%	22.5%	24.5%	22.7%
	2	19.2%	23.2%	30.1%	23.6%
	3	22.3%	15.5%	16.0%	18.5%
	4	16.2%	14.8%	12.3%	14.6%
	5	8.7%	7.7%	3.1%	6.7%
	6	3.1%	.7%	.6%	1.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=21.7, df=12, p=0.041

20_c2) number of consumptive recreational activities * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
20_c2) number of consumptive recreational activities	1	.4%	.7%	.6%	.5%
	2	9.4%	13.5%	5.5%	9.3%
	3	31.1%	36.5%	23.6%	30.3%
	4	59.1%	49.3%	70.3%	59.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=15.7, df=6, p=0.016

20_c3) number of non-consumptive wildlife activities * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
20_c3) number of non-consumptive wildlife activities	0	22.3%	28.3%	27.0%	25.3%
	1	31.8%	29.0%	32.7%	31.3%
	2	25.9%	27.5%	24.5%	25.9%
	3	20.0%	15.2%	15.7%	17.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=3.6, df=6, p=0.735

20_c4) number of mechanized recreational activities * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
20_c4) number of mechanized recreational activities	0	13.8%	18.1%	16.0%	15.6%
	1	29.8%	24.3%	42.3%	32.0%
	2	32.9%	36.1%	28.8%	32.6%
	3	23.6%	21.5%	12.8%	19.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.1, df=6, p=0.013

21a) Do you do any of the activities in question 20 in the UP? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
21a) Do you do any of the activities in question 20 in the UP?	yes	87.8%	85.4%	89.8%	87.7%
	no	12.2%	14.6%	10.2%	12.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=1.4, df=2, p=0.491

21b) Do you do any of the activities in question 20 in the NLP? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
21b) Do you do any of the activities in question 20 in the NLP?	yes	56.1%	71.5%	44.9%	56.9%
	no	43.9%	28.5%	55.1%	43.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=23.0, df=2, p<0.001

21c) Do you do any of the activities in question 20 in the SLP? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
21c) Do you do any of the activities in question 20 in the SLP?	yes	47.3%	55.0%	29.9%	44.1%
	no	52.7%	45.0%	70.1%	55.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=21.8, df=2, p<0.001

22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
22) If you were considering a state or national forest area in Michigan as a vacation site, how would the knowledge that wolves lived in that area influence your decision to vacation there?	i definitely would vacation there because of the wolves.	3.9%	5.4%	3.6%	4.2%
	i would be more likely to vacation there because of the wol	4.7%	4.1%	7.2%	5.3%
	the presence of wolves would not affect my choice of a vacat	64.4%	52.4%	63.3%	60.8%
	i would be less likely to vacation there because of the wol	14.6%	16.3%	11.4%	14.1%
	i definitely would not vacation there because of the wolves.	9.0%	15.6%	6.6%	10.1%
	i am undecided how it would affect my use.	3.4%	6.1%	7.8%	5.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=16.5, df=10, p=0.085

23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
23a) In the past three years have you belonged to a conservation organization which is hunting or trapping related?	yes	65.2%	61.9%	49.4%	59.6%
	no	34.8%	38.1%	50.6%	40.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.5, df=2, p=0.005

23a) In the past three years have you belonged to a conservation or environmental organization which is not hunting related? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
23a) In the past three years have you belonged to a conservation or environmental organization which is not hunting related?	yes	8.3%	15.8%	7.6%	10.1%
	no	91.7%	84.2%	92.4%	89.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.9, df=2, p=0.032

23c) In the past three years have you belonged to an animal welfare or animal rights organization? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
23c) In the past three years have you belonged to an animal welfare or animal rights organization?	yes	2.2%	4.3%	1.3%	2.5%
	no	97.8%	95.7%	98.7%	97.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.9, df=2, p=0.230

24a) Is any of your immediate family's income provided directly from farming? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
24a) Is any of your immediate family's income provided directly from farming?	no	81.6%	77.1%	84.7%	81.3%
	yes	18.4%	22.9%	15.3%	18.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.9, df=2, p=0.234

24b) If yes: does this farming involve livestock? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
24b) If yes: does this farming involve livestock?	no	63.3%	72.2%	67.9%	67.3%
	yes	36.7%	27.8%	32.1%	32.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.762, df=2, p=0.683

25) Do you have access to the Internet for personal use either at home or at work? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
25) Do you have access to the Internet for personal use either at home or at work?	yes	76.3%	69.4%	65.2%	71.1%
	no	23.7%	30.6%	34.8%	28.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=6.0, df=2, p=0.050

25a) how often do you use the internet for information about wildlife? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
25a) how often do you use the internet for information about wildlife?	never	6.7%	6.7%	13.3%	8.6%
	rarely	21.8%	29.5%	15.0%	21.9%
	sometimes	45.3%	40.0%	49.6%	45.1%
	fequently	26.3%	23.8%	22.1%	24.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=10.9, df=6, p=0.091

25b) how often do you use the internet to get information from the michigan department of natural resources? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
25b) how often do you use the internet to get information from the michigan department of natural resources?	never	8.4%	16.2%	13.4%	11.9%
	rarely	19.6%	25.7%	28.6%	23.7%
	sometimes	51.4%	47.6%	41.1%	47.5%
	fequently	20.7%	10.5%	17.0%	16.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.9, df=6, p=0.064

26) Please check the region where you currently live * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
26) Please check the region where you currently live	UP	53.2%	34.7%	59.0%	49.9%
	NLP	10.3%	23.8%	13.7%	15.0%
	SLP	36.5%	41.5%	27.3%	35.1%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=25.9, df=4, p<0.001

27) About how many years have you lived in that region?

27) About how many years have you lived in that region?

Dog use	Mean	N	Std. Deviation
non-hound dog hunters	37.19	235	19.227
hound-hunters	34.20	148	19.653
not a dog hunter	36.80	163	20.287
Total	36.26	546	19.669

$F_{(2, 543)}$=1.1, p=0.321

28a) DO not own recreational property other than in the region where you live. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
28a) DO not own recreational property other than in the region where you live.	no	66.2%	58.9%	61.1%	62.7%
	yes	33.8%	41.1%	38.9%	37.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.4, df=2, p=0.305

28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
28b) Own recreational property (such as a cottage or land for hunting, camping, etc.) in UP.	no	62.9%	65.6%	56.9%	61.8%
	yes	37.1%	34.4%	43.1%	38.2%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=2.7, df=2, p=0.256

28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
28c) Own recreational property (such as a cottage or land for hunting, camping, etc.) in NLP.	no	73.0%	80.8%	85.0%	78.7%
	yes	27.0%	19.2%	15.0%	21.3%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=9.0, df=2, p=0.011

28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
28d) Own recreational property (such as a cottage or land for hunting, camping, etc.) in SLP.	no	89.9%	82.1%	94.0%	89.0%
	yes	10.1%	17.9%	6.0%	11.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=11.8, df=2, p=0.003

Question 29 on the furtaker survey differed from question 29 on the general-public survey. The furtaker question examined where respondents trapped and hunted in Michigan and is presented below. Responses to all questions unrelated to hunting deer in the UP were significantly different (p<0.05) between dog-use types. Hunting deer in the UP did not differ significantly between dog-use types (p=0.131)

Please indicate if and where you do the following activities. Circle all areas that apply for each activity.

	I don't do this activity	I do this in the Upper Peninsula	I do this in the Northern Lower Peninsula	I do this in the Southern Lower Peninsula
a) HUNT WITH DOGS	1	2	3	4
b) FUR TRAPPING	1	2	3	4
c) HUNT DEER	1	2	3	4

Trapps in the UP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Trapps in the UP	not a trapper	24.1%	32.5%		19.1%
	UP trapper	49.8%	41.1%	73.1%	54.4%
	trapper but not in UP	26.2%	26.5%	26.9%	26.5%
Total		100.0%	100.0%	100.0%	100.0%

Deer hunts the UP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Deer hunts the UP	not a deer hunter	1.3%	4.0%	2.4%	2.3%
	UP deer hunter	70.5%	62.9%	74.3%	69.5%
	deer hunter but not in UP	28.3%	33.1%	23.4%	28.1%
Total		100.0%	100.0%	100.0%	100.0%

Dog hunts the NLP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Dog hunts the NLP	not a dog hunter			100.0%	30.1%
	NLP dog hunter	36.3%	53.0%		29.9%
	dog hunter but not in NLP	63.7%	47.0%		40.0%
Total		100.0%	100.0%	100.0%	100.0%

Traps in the NLP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Traps in the NLP	not a trapper	24.1%	32.5%		19.1%
	NLP trapper	18.6%	23.8%	24.6%	21.8%
	trapper but not in NLP	57.4%	43.7%	75.4%	59.1%
Total		100.0%	100.0%	100.0%	100.0%

Deer Hunts the NLP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Deer Hunts the NLP	not a deer hunter	1.3%	4.0%	2.4%	2.3%
	NLP deer hunter	42.2%	49.7%	30.5%	40.7%
	deer hunter but not in NLP	56.5%	46.4%	67.1%	56.9%
Total		100.0%	100.0%	100.0%	100.0%

Hunts with dogs in SLP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Hunts with dogs in SLP	not a dog hunter			100.0%	30.1%
	SLP dog hunter	34.2%	45.7%		27.0%
	dog hunter but not in SLP	65.8%	54.3%		42.9%
Total		100.0%	100.0%	100.0%	100.0%

Traps in SLP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Traps in SLP	not a trapper	24.1%	32.5%		19.1%
	NLP trapper	21.1%	28.5%	24.0%	24.0%
	trapper but not in NLP	54.9%	39.1%	76.0%	56.9%
Total		100.0%	100.0%	100.0%	100.0%

Hunt deer in SLP * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
Hunt deer in SLP	not a deer hunter	1.3%	4.0%	2.4%	2.3%
	SLP deer hunter	35.4%	52.3%	28.1%	37.8%
	deer hunter but not in SLP	63.3%	43.7%	69.5%	59.8%
Total		100.0%	100.0%	100.0%	100.0%

Question 30 on the furtaker survey differed from question 30 on the general-public survey. The question as presented on the Furtaker Survey was: "If you hunt with dogs, please check which species you hunt with dogs. If you do not hunt with dogs, please skip to question 31."

____ BEAR ____ RABBIT/HARE ____ WATERFOWL

____ UPLAND BIRDS ____ FURBEARERS (COYOTE, BOBCAT, RACCOON

30a) Do you hunt bear with dogs * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
30a) Do you hunt bear with dogs	0	100.0%	60.0%	100.0%	89.2%
	yes		40.0%		10.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=181.0, df=28, p<0.001

30b) Do you hunt rabbit/hare with dogs? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
30b) Do you hunt rabbit/hare with dogs?	0	40.1%	36.2%	100.0%	57.1%
	yes	59.9%	63.8%		42.9%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=180.0, df=2, p<0.001

30c) Do you hunt waterfowl with dogs? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
30c) Do you hunt waterfowl with dogs?	0	70.0%	79.3%	100.0%	81.6%
	yes	30.0%	20.7%		18.4%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=59.2, df=2, p<0.001

30d) Do you hunt upland birds with dogs? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
30d) Do you hunt upland birds with dogs?	0	30.4%	56.0%	100.0%	58.3%
	yes	69.6%	44.0%		41.7%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=195.8, df=2, p<0.001

30e) DO you hunt furbearers with dogs? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
30e) DO you hunt furbearers with dogs?	0	100.0%	7.9%	100.0%	75.0%
	yes		92.1%		25.0%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=496.2, df=2, p<0.001

Q31) Age of respondent.

age

Dog use	Mean	N	Std. Deviation
non-hound dog hunters	48.5333	225	14.80136
hound-hunters	48.5000	146	14.55465
not a dog hunter	50.8500	160	14.26488
Total	49.2222	531	14.58558

$F_{(2, 528)}$=1.4, p=0.241

32) Are you male or female? * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
32) Are you male or female?	male	96.2%	96.0%	96.4%	96.2%
	female	3.8%	4.0%	3.6%	3.8%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=0.028, df=2, p=0.986

33) Please check your highest completed level of education. * Dog use Crosstabulation

% within Dog use

		Dog use			
		non-hound dog hunters	hound-hunters	not a dog hunter	Total
33) Please check your highest completed level of education.	less than high school	7.2%	10.0%	5.4%	7.4%
	completed high school or ged	23.7%	32.7%	34.9%	29.5%
	vocational or trade school	12.3%	15.3%	10.2%	12.5%
	some college	19.9%	22.7%	23.5%	21.7%
	two year degree	12.3%	5.3%	4.8%	8.2%
	four year degree	15.3%	8.7%	17.5%	14.1%
	graduate school (phd, mba, msc, etc.)	9.3%	5.3%	3.6%	6.5%
Total		100.0%	100.0%	100.0%	100.0%

χ^2=28.1, df=12, p=0.005

APPENDIX VIII:
2005 MICHIGAN WOLF-MEETING SURVEY RESULTS

This appendix reports the findings from the survey distributed to attendees of the ten wolf-focused public meetings held in Michigan in spring 2005. These meetings were an initial step to obtain public input for the revision of the Michigan wolf-management plan. A total of 334 people completed surveys at six meetings in the UP, and 99 people completed surveys at four meetings in the LP. Only the questions germane to wolf management are included here. Because the survey sample was not randomly selected, the results can not be used to describe the views of all Michigan citizens. This appendix contains: (1) a summary of the responses to the wolf-related questions on the survey, segmented by UP and LP meetings; and (2) lists of organizations associated with the attendees.

Summary of Responses to Wolf-related Questions

1. How much did your interest in each of the following topics influence your decision to attend to this meeting?

TOPIC	*Very important influence*	*somewhat important influence*	*not at all an influence*	***not sure***
	UP / LP	**UP / LP**	**UP / LP**	**UP / LP**
A) LOSS OF LIVESTOCK TO WOLVES	43% / 29%	34% / 37%	21% / 33%	2% / 1%
B) WOLF IMPACTS ON DEER AND OTHER WILDLIFE	63% / 34%	19% / 33%	18% / 32%	0% / 1%
C) PUBLIC SAFETY RISKS	37% / 16%	26% / 26%	36% / 55%	1% / 2%
D) LOSS OF HUNTING DOGS TO WOLVES	38% / 25%	24% / 22%	36% / 50%	3% / 3%
E) LOSS OF PETS TO WOLVES	43% / 20%	29% / 35%	26% / 45%	3% / 0%
F) IMPACT OF WOLVES ON TOURISM	19% / 18%	25% / 34%	50% / 43%	6% / 6%
G) CONCERN THAT WOLF POPULATIONS ARE PROPERLY PROTECTED	40% / 67%	19% / 14%	37% / 16%	4% / 3%
H) CONCERN THAT INDIVIDUAL WOLVES ARE PROPERLY PROTECTED	26% / 53%	16% / 18%	52% / 26%	5% / 3%
I) THE POSSIBILITY OF A WOLF HUNTING OR TRAPPING SEASON	59% / 51%	23% / 24%	16% / 23%	2% / 2%

2. How many wolves would you prefer in the Northern Lower Peninsula (NLP) of Michigan?

UP / LP

22% / 20%.... I PREFER THAT NO WOLVES EXIST IN THE NLP
20% / 10%..... I PREFER THAT ONLY A FEW WOLVES EXIST IN THE MOST REMOTE AREAS OF THE NLP
34% / 66%..... I PREFER THAT WOLF NUMBERS INCREASE TO WHATEVER THE HABITAT WILL ALLOW IN THE NLP
7% / 3%... ....I'M NOT SURE
17% / 1%.....I DON'T CARE HOW MANY WOLVES ARE IN THE NLP

3. How many wolves would you prefer in the Upper Peninsula (UP) of Michigan?
(NOTE: This question has been modified from its survey format to facilitate presentation of results)

UP / LP

22% / 8%..... I PREFER THAT NO WOLVES EXIST IN THE UP
36% / 21%..... I PREFER SOME BUT LESS THAN THERE ARE NOW
6% / 4%.....I PREFER THE CURRENT NUMBER OF WOLVES
8% / 8%.....I PREFER MORE BUT NOT AS MANY AS THE HABITAT WILL ALLOW IN THE UP
19% / 54%.....I PREFER WHATEVER THE HABITAT WILL ALLOW IN THE UP
7% / 4%.....I'M NOT SURE
2% / 0%.....I DON'T CARE HOW MANY WOLVES ARE IN THE UP

4. If the Department of Natural Resources was considering ways of reducing or controlling the wolf population to achieve the number of wolves *you* desire, how strongly would you support or oppose each of these options:

	strongly support	somewhat support	undecided	somewhat oppose	strongly oppose
	UP / LP	**UP / LP**	**UP / LP**	**UP / LP**	**UP / LP**
A) USE OF FERTILITY CONTROLS SUCH AS CONTRACEPTIVES OR STERILIZATION.	26% / 15%	16% / 22%	16% / 16%	7% / 10%	36% / 37%
B) A REGULATED HUNT BY MICHIGAN HUNTERS TO TAKE A SPECIFIED NUMBER OF WOLVES.	62% / 33%	12% / 19%	5% / 6%	5% / 8%	16% / 34%
C) A REGULATED TRAPPING SEASON BY MICHIGAN TRAPPERS TO TAKE A SPECIFIED NUMBER OF WOLVES.	57% / 28%	12% / 19%	5% / 5%	6% / 10%	19% / 38%
D) SHOOTING BY SHARPSHOOTERS HIRED BY THE DNR TO TAKE A SPECIFIED NUMBER OF WOLVES.	17% / 3%	16% / 22%	10% / 11%	11% / 11%	46% / 53%
E) TRAPPING AND KILLING A SPECIFIED NUMBER OF WOLVES, DONE BY GOVERNMENT EMPLOYEES	16% / 1%	16% / 14%	9% / 15%	14% / 14%	45% / 55%

5. The DNR counted about 400 different wolves in the UP during the survey it conducted this past winter. What is your opinion of this number in relation to the actual total number of wolves in the UP?

THERE WERE A LOT MORE WOLVES THAN THIS	THE COUNT WAS ABOUT RIGHT	THERE WERE A LOT FEWER WOLVES THAN THIS	I'M NOT SURE
UP / LP 47% /22%	**UP / LP** 25% / 29%	**UP / LP** 2% / 3%	**UP / LP** 26% / 46%

6. How strongly would you support or oppose killing wolves in the following situations?

	strongly support	somewhat support	not sure	somewhat oppose	strongly oppose
	UP / LP	**UP / LP**	**UP / LP**	**UP / LP**	**UP / LP**
A) WOLVES THAT ARE STILL KILLING LIVESTOCK AFTER ALL OTHER PREVENTATIVE MEANS HAD FAILED.	80'% / 54%	11% / 20%	3% / 4%	2% / 9%	4% / 13%
B) WOLVES THAT CONSISTENTLY KILL HUNTING DOGS WITHIN THE HOME TERRITORY OF THE WOLF.	54% / 29%	12% / 11%	6% / 7%	10% / 19%	19% / 34%
C) AFTER ALL ATTEMPTS TO SCARE THEM AWAY HAVE FAILED, WOLVES THAT CONTINUE TO BE SEEN IN AREAS FREQUENTED BY CHILDREN.	67% / 33%	13% / 17%	7% / 15%	6% / 14%	8% / 22%

7. How strongly would you support or oppose using your tax dollars to compensate owners who have lost the following to wolves:

	strongly support	somewhat support	undecided	somewhat oppose	strongly oppose
	UP / LP	**UP / LP**	**UP / LP**	**UP / LP**	**UP / LP**
A) LIVESTOCK (CATTLE, SHEEP, GOATS)	58% / 51%	19% / 27%	3% / 11%	6% / 5%	14% / 6%
B) HUNTING DOGS	32% / 20%	14% / 18%	10% / 14%	14% / 15%	31% / 33%
C) PETS	32% / 19%	16% / 14%	11% / 17%	19% / 27%	22% / 24%
D) PRIVATELY OWNED (FENCED) DEER AND ELK	26% / 18%	17% / 20%	10% / 14%	15% / 9%	33% / 40%

Official Representation of Organizations at Public Meetings

A series of questions on the survey were asked to determine the spectrum of interests attending the meetings. Attendees were asked to indicate whether they were officially representing an organization at the meeting(s) and, if so, to indicate the name of the organization. The following 39 organizations were officially represented by at least one survey participant (organization names in the following list are presented as abbreviations when no additional information was provided and the full name could not be determined).

- Boy Scouts
- Chippewa Co Farm Bureau
- Copper County Farm Bureau
- Earth First!
- Farm Bureau
- FOLK
- Foresters Against Deer
- Great Lakes Sportsmen Club
- Hiawatha Sportsmen Club
- Little Traverse Bay Band of Odawa Indians
- Luce County Sheriff
- Mac-Luce Schoolcraft Farm Bureau
- Mackinaw Forest Council
- Menominee County Pheasant Club
- Michigan Bear Hunting Association
- Michigan Cattlemen Association
- Michigan DNR
- Michigan Forestry Association
- Michigan Hunting Dog Federation
- Michigan Science Teachers
- Michigan United Conservation Clubs
- Michigan Wilderness Leadership School
- Mid-County Sportsmen Club
- National Wildlife Federation
- North Woods Wilderness Recovery
- Ontonagon Valley Sportsman Club
- Public Schools
- Representative Tom Casperson: Michigan House 103rd District
- Sierra Club
- Straits Area Sportsmen
- Tahquamenon Sportsmen Club
- Timber Wolf Alliance

- UM Wildlife Relief Association
- Upper Peninsula Sportsmen's Alliance
- Upper Peninsula Trappers Association
- Upper Peninsula Whitetails Management
- USDA Forest Service
- West Michigan Society for the Prevention of Cruelty to Animals
- Wildlife Defenders

Attendance by Members of Hunting Organizations

Meeting attendees were asked to list the names of hunting organizations to which they belonged. The following 60 hunting organizations were listed by survey participants (organization names in the following list are presented as abbreviations when no additional information was provided and the full name could not be determined). These organizations were not necessarily 'officially represented.'

- Bay de Noc Gobblers
- Birders World
- Calumet - Keweenaw Sportsman Club
- Chelsea Rod and Gun Club
- Commemorative Bucks of Michigan
- Ducks Unlimited
- E UP Wildlife
- Elk Rapids Sportsmen Club
- Hiawatha Sportsmen Club
- Lake Linden Sportsmen Club
- Little Traverse Bay Bands of Odawa Indians
- Mackinaw Forest Council
- Menominee County Pheasant Club
- Michigan Animal Damage Control Association
- Michigan Bear Hunters Association
- Michigan Bowhunters Association
- Michigan Hunting Dog Federation
- Michigan State United Coon Hunters Association
- Michigan Traditional Bowhunters
- Michigan United Conservation Clubs
- Mid-County Sportsmen Club
- National Muzzleloader Rifle Association
- National Wildlife Federation
- Negaunee Rod & Gun Club
- North American Hunting Club
- Northern Michigan Trappers

- Northland Sportsmen Club
- National Rifle Association
- Natural Resources Commission
- National Wild Turkey Federation
- Ontonagon Valley Sportsmen Club
- Ottawa Sportsmen Club
- Pheasants Forever
- Ruffed Grouse Society
- Salmon Trout Sportsman Club
- Safari Club International
- SHAA
- Shooter & Wildlife
- Sierra Club
- Sportsmen Group
- Straits/Soo Area Sportsmen Club
- Tahquamenon Sportsman Club
- The Wildlife Society
- Tri-county Wildlife
- Turkey Federation
- UM Wildlife Association
- Upper Peninsula Bear Hunters
- Upper Peninsula Bowhunters Association
- Upper Peninsula Hunters
- Upper Peninsula Sportsmen Alliance
- Upper Peninsula Trappers Association
- Upper Peninsula Whitetails
- Superior Deer Management
- VDD-GNA
- Whitetails Unlimited
- Wildlife Unlimited of Delta County

Attendance by Members of Non-hunting Organizations

Meeting attendees were asked to list the names of non-hunting organizations to which they belonged. The following 65 hunting organizations were listed by survey participants (organization names in the following list are presented as abbreviations when no additional information was provided and the full name could not be determined). These organizations were not necessarily 'officially represented.'

- 4-H
- Bay de Noc Great Lakes Sport Fisherman, Inc.
- Clinton County Soil Conservation District Director

- Conservation Cycle Club
- Defenders of Wildlife
- Earth First!
- ESO @ NMU
- Farm Bureau
- Federation of Wildlife
- FOLK
- Friends of the Rouge
- Front 40
- Hunter Safety
- International Wolf Center
- Islands Wildlife
- Keweenaw Land Trust
- Little Traverse Conservancy
- Loon Organization
- Luce/West Mackinaw Conservation District
- MAOEA
- MFA
- Michigan Animal Damage Control Association
- Michigan Association of Timbermen
- Michigan Forest Resource Alliance
- Michigan Lakes and Stream Association
- Michigan Nature Association
- Michigan Soil Society
- Michigan Wildlife Conservatory
- Michigan United Conservation Clubs
- National Audubon
- National Geographic
- National Interpreter Association
- National Wildlife Federation
- Natural Resource Defense Council
- Peace Alliance
- PEN
- People for the Ethical Treatment of Animals
- Pigeon River County Association
- Re-Hab of Wildlife
- Sault Naturalists
- Sierra Club
- Sigurd Olson Environmental Institute
- Society for Conservation Biology
- Society of American Foresters
- Society of Wetland Scientists

- South Fishing Association
- Sustainable Forest
- Sweetwater Alliance
- The Nature Conservancy
- The Wildlife Society
- The Yellowstone Foundation / Yellowstone Association
- Timber Wolf Alliance
- The Nature Conservancy
- Trout Unlimited
- TV
- Upper Peninsula Central Sport Fish Association
- Upper Peninsula Environmental Coalition
- US Humane Society
- West Michigan Society for the Prevention of Cruelty to Animals
- Wildlife Defenders
- WNPFID
- World Wildlife Federation
- World Wildlife Fund
- Yellow Dog Watershed Preserve

APPENDIX IX:
2005 MICHIGAN WOLF-MANAGEMENT FOCUS-GROUP MEETING RESULTS

The MSU Department of Fisheries and Wildlife prepared this report to summarize the results of nine focus-group meetings held during summer 2005. The main purpose of the meetings was to identify and better understand wolf-related issues considered to be important by members of different stakeholder groups and to improve questions being considered for the 2005 MSU wolf public-attitude survey.

2005 MICHIGAN WOLF MANAGEMENT FOCUS GROUP MEETING RESULTS

SUBMITTED TO:
WILDLIFE DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

BY:
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MICHIGAN STATE UNIVERSITY
DEPARTMENT OF FISHERIES AND WILDLIFE

NOVEMBER 2005

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INTRODUCTION

During the summer of 2005, nine focus group meetings (Table 1) were held with the following Michigan wolf stakeholder groups: (1) Eastern Upper Peninsula livestock producers, (2) Western Upper Peninsula livestock producers, (3) Upper Peninsula Hunters who use dogs, (4) Northern Lower Peninsula hunters who use dogs, (5) Upper Peninsula deer hunters, (6) Northern Lower Peninsula deer hunters, (7) wolf conservationists, (8) wolf protectionists, and (9) Michigan trappers. For this report, 'wolf conservationists' were citizens whose interests focused on wolves at a population/ecosystem level, while 'wolf protectionists' interests focused on the welfare and rights of individual wolves. A total of 78 citizens participated in the meetings. Participants were compensated $30 for attending the meeting.

Potential attendees were identified from MDNR recommendations, web pages of major organizations, and the sign in sheets from the MDNR Wolf Public Meetings. Appendix A provides a brief profile of attendees at each meeting as determined by a short survey administered at the meeting.

The meetings had two main purposes: (1) to gain a deeper understanding of the issues identified during the spring 2005 Michigan DNR Wolf Public Meetings, and; (2) to test and improve questions being considered for a statewide wolf mail survey. A secondary purpose of the focus groups was to identify research questions previously not identified. These research questions were then developed into questions for the surveys.

Depending on the stakeholder group, the topics of discussion differed, however, six themes were considered at all meetings: (1) benefits of having wolves in Michigan, (2) costs of having wolves in Michigan, and; (3) compensation and losses associated with wolf depredation, (4) preferences for determining wolf numbers in Michigan, (5) topics the participants felt had to be addressed by the Round Table, and (6) the role of the Round Table in the development of the plan. Much of the discussion centered around concerns and problems with the initial drafts of survey questions related these themes. In the course of the question critiques, additional insight about the themes were identified.

Discussions with the wolf conservationists included discussions on two other topics: (1) the preferred number of wolfs for Michigan, and (2) the acceptability of a wolf hunt. While these topics came up in the other meetings, they did not focus on them.

This report provides an overview of the discussions. It focuses on major themes but omits discussions related specifically to the design of the survey questions. The latter information was extremely valuable, but it has already been integrated into the final survey design and little value would be derived from including that in this discussion. It is important to remember that findings relate to the opinions of attendees. **Findings should not be extrapolated to the entire stakeholder group or organizations represented at a meeting.** Findings do suggest the rationale behind held attitudes and pose hypotheses regarding the views of others in the stakeholder group. **Unless specifically noted that there was consensus on an topic, it should not be assumed that all participants in a meeting agreed with a point.** Most meetings included one or more participants who, while fitting the overall meeting profile, held views

substantially different from the others. Participants were informed that disagreements were as important to identify as consensus. For this reason consensus on topics was not always found.

No attempt in this report has been made to identify statements made as true or false. The comments provided should be considered as beliefs held by the person or persons who made the statement.

Table 1. 2005 Wolf Focus Group Meeting Logistics.

Stakeholder Group	**Meeting Date**	**Meeting Location**	**Number of Participants**
Eastern Upper Peninsula Livestock Producers	July 26	Bruce Township Hall, Chippawa County	12
Western Upper Peninsula Livestock Producers	July 27	Stephenson, Menominee County	4
Upper Peninsula Dog Hunters	July 28	Best Western Hotel, Escanaba	9
Northern Lower Peninsula Deer Hunters	August 3	Ralph A. MacMullen Center	9
Upper Peninsula Deer hunters	August 10	Best Western Hotel, Escanaba	11
Northern Lower Peninsula Dog Hunters	August 11	Ralph A. MacMullen Center	5
Wolf Conservationists	August 17	NEW Center, Ann Arbor	7
Animal Protectionists	August 25	NEW Center, Ann Arbor	11
Michigan Trappers	September 14	Quality Inn, St. Ignace	10
TOTAL NUMBER OF PARTICIPANTS			78

WHAT ARE THE BENEFITS OF WOLVES IN MICHIGAN?

Eastern Upper Peninsula Livestock Producers

Participants indicated that although there were potential benefits of having wolves, these were not important benefits for their region nor for them personally. The group identified five potential benefits of wolf presence: (1) lower coyote numbers, (2) lower deer numbers, (3) keeping wildlife and domestic animals healthy by the predation of weaker and sick animals, (4)

potential for a fur market, (5) tourist attraction.

When probed, the group acknowledged that existence value would also be a potential benefit. Most indicated that they were glad there were wolves in places like Alaska and Canada, and were not opposed to them outright. They felt that existence values should be achieved in locations like Alaska or Canada where there was more habitat and no livestock, but not in Michigan. They noted that there are probably many people in the LP who are happy that they "exist" in the UP, but they don't have to live with them.

Ecologically, lower coyote numbers would be a benefit, but they would not trade this for wolves. Some of the group indicated that there was not an over abundance of deer in the UP, so keeping deer numbers down was not an ecological benefit there.

A hunting season for wolves was the benefit with the most value, however, the perception was that this would be of such a limited scope that it would be of little value.

As for wolves being a tourist attraction, the group likened wolves to bears. Despite there being many bears in the UP, they are seldom seen. Thus, the likelihood of them being a draw for tourists was limited.

Western Upper Peninsula Livestock Producers

The only benefit identified was the control of deer, and turkeys. However, a concern existed that while they might initially control deer, deer numbers might go too low and then wolves might shift to livestock. They thought that the potential benefit of limiting deer numbers would vary in regions of the UP, depending on deer densities in an area. The impression was that people in the LP would see the Upper Peninsula as one homogeneous area and they would not differentiate between areas of high and low deer density. The attendees noted that wolves might be able to control coyotes, however if coyotes need to be controlled it should be done by hunters, trappers and farmers, not wolves. As with deer and turkey management, short term control of coyotes would be nice, but in the long term it would not be worth it.

When probed, existence value was not seen as a reason for having wolves in Michigan. An important point stressed by this group was that the wolves should not be allowed to reach their own population level, but should very definitely be managed by the DNR.

Upper Peninsula Hunters who Use Dogs

Two possible benefits were given: they are a nice animal to look at and they can benefit the ecosystem. Neither of these was seen as great enough benefits to have wolves in Michigan. They felt that wolves had not been part of the ecosystem for a long time and thus were not needed, as the habitat has changed since they were part of it.

The group agreed that people could control coyotes and deer better than could wolves. Probing of existence value indicated that it was fine, as long as it was in Alaska or Canada and even then only as long as they are controlled/managed.

Four participants said that they would like to hunt wolves, but it would not be a benefit that made it worth having them. Most thought a hunt will not become reality because of national anti-hunting organizations. Anti-hunting organizations were not viewed as "science based".

Northern Lower Peninsula Hunters who Use Dogs

Overall this group could see no benefit for having wolves in the SLP. While there might be some benefits in the UP, they thought wolves should only exist in the best, most remote Upper Peninsula habitat. The group noted that wolves are in many places other than Michigan, and thus there is no existence benefit from having them here. They noted that while biological diversity is good, it has to be compatible with the ecosystem. Wolves could add to the biodiversity in areas like the Sylvania Tract and Huron and Porcupine Mountains in the Upper Peninsula, but certainly not in the Northern Lower Peninsula as they don't fit the ecology. Nor did they think them suitable in all areas of the UP, as the entire Upper Peninsula was not viewed as good wolf habitat.

They noted that tourism generated from seeing wolves is often given as a benefit. They thought that the chances of seeing a wolf in Michigan was slim, unlike out west where chances are better as one can see for miles. They did note that there was a possibility of hearing them. They noted that while it might be great for someone from the lower peninsula to come up, hear a wolf and then go home to tell their friends, those in the Upper Peninsula would have to live with them long after they had returned back home.

Two marginal benefits noted by the group were the possibility of hunting them with hounds and their perception that the State gets money from the federal government for research on wolves.

Upper Peninsula Deer Hunters

Five members of this group thought there were no benefits of having wolves in Michigan. The greatest benefit seen by four of the participants was a healthier ecosystem. The focus here was on deer. Wolves were thought to possibly make the deer herd more healthy by removing sick animals, and potentially helping in the control of diseases like CWD and TB. Others questioned this however, offering evidence that wolves take big bucks after the rut. These bucks were not "sick".

While wolves as a tourist attraction was raised, some questioned if tourists would ever see a wolf in the UP. Some did concede that they might be able to be heard. Comparing tourism in Yellowstone to the Upper Peninsula was seen as not valid as the terrain and habitat are different in the two areas.

The possibility of a wolf hunting season was given as a benefit. Six participants thought that there might one day be a hunt. One thought the chance of a wolf hunt was greater than for a moose hunt in the UP. The benefits of hunting wolves was thought to be the same as hunting any other species, but if there are only 400 wolves, these would be limited.

Four participants thought that coyotes were a problem and that wolves might act as a means of controlling them. There was some discussion of that actually occurring now, as coyotes were thought to be moving out of the area, and hunters and trappers are not killing as many coyotes as in the past. It was noted by many in the group that people can shoot coyotes, so having wolves as a coyote control would not be a reason to have them. It was noted that the wolves would also be 'controlling" many other things as well, i.e. deer. As a means of controlling deer,

some thought that they could wipe out the deer herd. Others in the group countered that wolves are not going to control deer numbers, stating that would be more a function of habitat.

Northern Lower Peninsula Deer Hunters

The benefits identified by some of this group were, existence value, tourism possibilities and the possibility of a hunt. One participant noted that all the benefits that result from managing species like bear and elk could be achieved with wolves- with the emphasis being on "management". Tourism and hunting were identified. Just as people come to hear elk bugle in the Northern Lower Peninsula, some would come to hear wolves howl. This group noted that there was an existence value for wolves in the UP, but noted that in the LP there was not as much suitable habitat (i.e. wilderness) for them. None in this group saw a benefit of wolves in the Lower Peninsula.

The group disagreed that a benefit would be control of deer numbers by wolves. Wolves were seen by one participant as 'opportunists'. When given the chance for a deer or a cow, they will take the cow. Also, they felt that deer are being managed by people and other predators like bear, coyote and bobcat and there was no need for yet another predator.

Wolf Conservationists

Several benefits for wolves were provided, with many linked to ecosystem health. Wolves were seen as an indicator species and thus their presence was a sign of a healthy environment. As a top predator wolves were described as having a large influence on the entire ecosystem, not just deer. The concept of trophic cascade was explained by one member of the group to others who were unaware of the term. Wolves were seen as adding to the biodiversity of the ecosystem and important for the management of wild areas, despite being competition for human hunters.

Closely related to ecosystem health and the trophic cascade was the wolf's historical presence in Michigan. Because wolves evolved here, their presence in the ecosystem would be for Michigan.

Tourism and other economic benefits were also noted. It was said to be "cool" to hear and or see wolves in the wild. This would be a great tourist draw for areas with wolves. It was noted that many communities currently use the wolf as a symbol for tourism and thus having wolves could add economic value to these areas.

Wolf Protectionists

As Michigan is part of the wolf's historic range the group thought it had a right to exist in Michigan. This was especially the case in the UP where there are plenty of prey species there to support the wolves. The fact that they had been extirpated by humans over the last century made it even more important to have them back in Michigan.

It was stated that wolves have a special position in nature, as they have been treated so badly over the years. Returning them to a healthy population in Michigan would act as a good example for the nation and the world as to what can be done to help wildlife. This would

symbolize protection of biodiversity and would help change the representation of the wolf as an fearful animal. One participant noted that the because of their complex family structure, people could learn a lot from how wolves run their families.

Wolves would better balance Michigan's natural resources. It was thought that there are not many places like the Upper Peninsula where wolves can thrive, thus it was important for Michigan to help them do so here. As they are predators of deer, they can keep populations in check. It was stated that they could be more effective at doing this than hunters as where hunters take the biggest healthiest deer, wolves take the weak, small and sick animals.

Wolves were seen as having great potential for tourism as a "watchable" wildlife species.

Michigan Trappers

Four of the trapper participants saw no benefit for having wolves in Michigan. Of those that did see benefits, most benefits were ecological. Noted was the possibility of wildlife population control to reduce excess deer. One participant stated that wolves take different game than other predators like fox, and bears, as they are in different habitats. Thus, this fact could result in a healthier ecosystem, as has happened in Yellowstone. Some participants questioned this comparison, stating that Upper Peninsula is not a national park. Yellowstone does not have the degree of management from hunting and livestock production as the Upper Peninsula and it should not be assumed that the results occurring in Yellowstone will happen in Michigan. While not wanting the coyote numbers to get low, one person noted the possibility of less coyotes resulting in less disease such as mange.

A possible benefit specific to trappers was the potential for a trapper to bring in a skin in from Canada or Alaska and be able to resell that pelt. Currently, a trapper can't sell a wolf pelt in Michigan. Some hoped that this might change in the future.

Other benefits noted were the potential for tourism, the fact it is a beautiful wildlife species to see in the wild, and a possible trapping season. Some participants noted that if wolves were controlled to the point that they were socially acceptable, they would not be enough of them to be a tourist benefit.

When asked if any of the benefits noted were great enough to have wolves in Michigan, the response was 'no' from all participants. Five participants, however, qualified that sentiment by stating that if wolves were sufficiently controlled then the ecological benefits may be worthwhile.

WHAT ARE THE COSTS OF HAVING WOLVES IN MICHIGAN?

Eastern Upper Peninsula livestock producers

Livestock depredation was the largest cost identified by this group, with several other costs subsumed within it. Wolves were seen to cause loss of future income. This was from not only lost animals, but also from stresses on reproduction and effects on future genetics depending on the animal which is removed from the herd. Other costs included the need for physical

barriers such as fences and repairs to fencing when wolves chase animals. Another cost related to keeping wolves away were the purchase and upkeep of dogs such as great pyrenees.

Wolves were also thought to lead to the devaluation of both hunting and pasture lands. Deer hunters might not be as willing to buy land in the Upper Peninsula if deer numbers go down. In relation to pasture lands, if they have to keep their livestock away from wooded areas, this cuts down on usable pasture, thereby decreasing the value of their land. In times of drought (like they were experiencing at the time of the meeting) they noted that they need all the pasture they can use. Some noted that best husbandry practices can be costly for them.

Public safety risk was also identified. All had concerns that wolves are becoming more aggressive. One commented that if a wolf can take a large dog out of the yard, they would have no trouble taking a small child. When probed about changes in lifestyle, all indicated that people more cautious, with some carrying guns. Everyone said that they were changing lifestyles. Some thought that public safety issues may become related to tourism, with some (e.g. campers, hikers) staying away from the Upper Peninsula because of wolves.

Wildlife losses including deer, birds, small game, etc. was also a concern. One attributed the lower numbers of deer being brought to butchers as a result of wolves, but when probed conceded that doe permits might also be a cause of this. The group was not quick to blame wolves for this perceived decline in deer numbers.

Other costs identified but which did not result in much discussion included depredation on pets near homes and financial costs for the State in terms of wolf management.

Western Upper Peninsula Livestock Producers

The greatest cost identified was livestock depredation. At the time of the meeting, these farmers did not think this too much of a concern, however they were worried that because of the lack of management, this would not remain the case. At some point in the future there could be many costs if the wolves are not managed.

It was thought that wolves have been out of the food chain for many years, and now that they are back they will disrupt the game animals, including small game, birds and deer, etc. They thought that while they may go initially after deer, when deer numbers decline they will go after livestock and public safety will also become more of an issue. This was their rationale for wanting management to begin before the problems start. Related to this will be the disruption to hunters. It will affect not only their satisfaction but also the local economies as hunters from out of state and the Lower Peninsula will not come to the Upper Peninsula to hunt.

While one participant noted that in relation to public safety he was more worried about bears than wolves the others expressed concerns for wolves. They noted that they are more likely to be thinking about the safety of their wives and children when they go for a walk. The group said that many of the wolves they see are fearless, and they were not sure if that was a normal behavior or not. One thought that the normal behavior would be for them to run.

Other costs noted by the group included, pet depredation and Wisconsinites complaining about Michigan Wolves. While the group indicated that the inability to manage the species on their own private land was frustrating, they conceded that there was not much that could be done about it.

Upper Peninsula Hunters who Use Dogs

Losses and concerns for their hunting dogs and pets was central for this group. More on this concern is included in the section on compensation and loss.

The group indicated that the cost to the DNR for managing wolves (financial and labor) was great. They felt that costs of trapping and relocating wolves and other management actions taken hinders management of other species.

Livestock depredation was a major concern for one participant who was a livestock producer. He noted that he had lost a 300lb calf to wolves this year and this was infringing on public property rights. This was not considered a cost of doing business. Costs of doing business include hay, grain, vet bills etc., but wolf depredation should not be a cost to producers.

Many said that there were costs (i.e. negative effects) on wildlife, especially deer, but they felt that it also affected other species including bobcats and bear. One participant conveyed a personal anecdote about following wolf tracks for five miles and finding three deer killed but not eaten by the wolves. He stated that only some meat was taken, but not the entire animal.

Some participants noted that wolves had affected the their personal behaviors. One described a new "fear factor" with people now afraid to put kids out in the backyard. As well, pets are being watched more closely. A participant noted that he now carries a handgun when he picks berries. While many of the participants were not changing their behaviors, they are keeping wolves on their mind when they are out doors. The fact that wolves were a pack animal made them different from bears. The hound hunters noted concern for wolf depredation when they are hunting and this is affecting the enjoyment of their sport. Beagle hunters were less likely to let their dogs run at night because of wolves.

The potential costs of wolves on tourism was identified. Many felt that as the deer herd gets low, hunters will go elsewhere, or may not hunt in the UP. This will result in a loss of tourism dollars from both in state and out of state hunters. Some indicated that this is happening now. Wolves were also thought to possibly be a public safety concern for campers who may stay away from the UP.

How problems with wolves are different than those posed to dog hunters by coyotes or bears was probed. One difference given was that wolves are more likely to go after a dog while the other animals will run. While coyotes will chase smaller dogs like beagles, hunters can legally shoot a coyote.

Also probed were possible actions to lessen the costs associated with having wolves in Michigan. The first and main thing proposed was to start managing them by killing problem wolves. They indicated that they would like also to know where the denning and rendevous sites are. They noted however that when hounds run bears, the bear will often go to more secluded sites where the wolves are more likely to be. They did say, however, that they would make an effort to stay out of these areas as they would not intentionally put their dogs in harms way. They noted that there is a possibility that someone might use denning and rendevous information to find and kill wolves but thought that tourists would also like to know these are thus making such illegal actions more difficult.

Northern Lower Peninsula Hunters who Use Dogs

This group saw many adverse effects on hunters. The group stated that the impact on all wildlife not just game species, effects on property values, loss of hunters, and threat to hunting dogs were all related. They felt that management for wolves will put other restrictions on sportsmen, as the Endangered Species Act puts limits on how resources can be used, and restricts use on public lands by closing areas. They feared that wolves themselves will be used as a management tool. While wolves will have adverse impacts on game species, including bears, deer, coyotes, fox and beaver, impacts will go beyond game species and include species such as moose.

While wolf tourism is often given as a benefit, the group stated that deer are a huge draw for the economy of the UP. They felt that much more money will be lost when the deer numbers drop than would be gained from wolf howling tours. Deer hunters spend a lot of money in the Upper Peninsula and wolves could make a big difference to that economic benefit for the area. One suggested that people look at what TB has done to real estate values in the Northern Lower Peninsula. They believe it has gone down and this will happen in the Upper Peninsula if deer numbers go down because of wolves.

Public safety was viewed as a secondary cost now, but as wolves become more fearless public safety will become more of an issue. When someone gets injured by a wolf it will become number one. They noted that people in the Southern Lower Peninsula get worried over fox and coyotes now, and that a wolf would therefore be too much for them.

Compensation for livestock, hunting dogs and pets were noted along with financial costs to the state were also. It was stated that hunting money should not be spent on programs like wolf fertility control. They thought this would be a case of others placing their values on the hunting culture, a way of life in Michigan. They thought that wolves need to be managed scientifically. If there is a surplus then manage them for the biology, not the politics. The wolf needs to be managed as a resource not as an endangered animal.

Diseases carried by wolves was also identified as a cost.

Upper Peninsula Deer Hunters

Much of the discussion of costs focused on the costs to wildlife populations - turkey, small game, deer etc. which then translated to costs for hunters. Three participants indicated this as the greatest cost associated with wolves. Some suggested that hunters are seeing less deer because of wolves. Some felt is that the overall deer population might not be affected, but that wolves are reducing the number of mature bucks as they are taken after the rut when they are vulnerable. As a result, wolves were said to be having a direct impact on hunter satisfaction. This was then thought to translate to fewer non-resident hunters coming to the area thus impacting the hunting/tourism revenue for the UP. One participant noted that wolves are just one more thing causing a decline in deer numbers (i.e. bobcat, bears, winter kill), however others indicated that they are one more thing they don't need.

Human safety was indicated by two participants as the greatest cost of having wolves, but it was also a concern for most of the others at the meeting. Key to this discussion was the feeling

that Upper Peninsula wolves are now fearless. Some felt that children will be a target when the chance arises. Five participants indicated that they had changed their behaviors because of wolves, however another participant had not and noted that bears and coyotes are more likely to do something than a wolf. There was some discussion that if wolf numbers get too high there is going to be less food to go around and a greater chance of an attack on a human. They felt that wolves are fearless because they know that humans are not a predator for them. To change this, some indicated that a control is needed like wolf hunting and trapping thereby making wolves secluded like other predatory species.

One member noted, and others agreed that meetings like the one they were attending costs state and federal government financially, which then affects funds for on the ground management of other species.

Depredation of domestic animals, livestock, pets and hunting dogs were noted. One participant relayed a story of wolves taking calves as they are being born. Calves were seen just as another food source for wolves.

A cost noted by one participant was that the wolf issue can only cause greater tensions between hunters and anti-hunters.

When asked how problems with wolves different than those posed by coyotes or bears, some responded that the difference is that they are not managed like bears and coyotes. One participant thought that over time, people shifted their concerns from bears to coyotes and now they have shifted to wolves.

Northern Lower Peninsula Deer Hunters

For this group, the costs were discussed in relation to wolves in the Northern Lower Peninsula. Effects on hunters was the main issue for this group. Some noted that hunter satisfaction is key for hunters using an area. When hunters ask what the hunting is like, whether there are wolves in the area may be an important question. Depending on the presence of wolves, property values through leases and sales of hunting lands might depreciate. Other economic costs noted in the meeting were to the DNR. Staff time and costs to state for monitoring wolves and doing meetings such as the one they were attending.

One participant noted that wolves could have a negative affect on tourism in the Northern Lower Peninsula. Elk are currently a tourist draw. While some may want to see wolves, a switch to wolves from elk was thought unlikely as people would not be able to see wolves like they do elk. A reduction in elk numbers might also cause a decline in tourism in the Northern Lower Peninsula. Related to an impact on tourism was the concern that campers might worry about their safety and not visit the area. Public safety was noted as a key issue for all of the meeting participants. The fact that the wolf is a pack animal was given by some participants as a reason why they were more feared than bears.

There was some discussion that the deer population is down greatly in the Northern Lower Peninsula. If wolves were to come into the area, they would likely be more interested in livestock because of that fact. Livestock depredation and compensation was also noted as a cost of having wolves. Similarly pet and hunting dog owners would be affected negatively.

Wolves were seen as different from bears and coyotes as they are a “pack” animal.

Another problem noted was the fact that wolves have been an unmanaged species (due to Endangered Species Act) and this has been frustrating. The fact that wolves have been found in the Northern Lower Peninsula now means that they can't shoot coyotes during the firearm deer season. This was unacceptable for many in attendance as they stated that most coyotes were killed during the gun season and now that management tool has been taken away from them.

Wolf Conservationists

Discussions with this group consisted mostly of identifying and not discussing the costs associated with wolves. The costs identified were: (1) competition with hunters, (2) livestock depredation, (3) a 'fear factor' that wolves will harm people or children, (4) the fact that there is much less habitat now than existed at the turn of the century means that there will be many more interactions between people and wolves, (5) The financial and labor costs for agencies to manage wolves, (6) pets and hunting dog depredation, (7) the possibility of spreading disease, and (8) competition and predation of/with other valued species such as coyotes and the ecological impacts which might result from that.

Wolf Protectionists

Costs identified were: (1) killing of livestock and the conflicts between farmers and wolves because of this depredation, (2) the negative attitude towards wolves, (3) should wolf numbers be seen as too high, there might be increased poaching as there will be more opportunity to break the law, (4) perception of risk- people's perception of danger from fox, possum and coyotes is high and it is going to be even higher for wolves. This stems from a lack of understanding about wolves by the general public, (5) money going to manage wolves will not be available for other species, (6) depredation of pet dogs and cats, and (7) an implied intent for a hunt when the population reaches a certain level.

The group identified a need for effective methods of reducing wolf fertility, i.e. nonlethal control methods. They felt that the DNR should not always look to the easiest method (killing) and should look into these other methods. Some felt that resistance to research from hunters is hampering its development.

Some of the group noted that if/when wolves get established in the Northern Lower Peninsula there will be problems and it won't be a good for the wolves. For these participants, the Northern Lower Peninsula is too developed for wolves. Rather than kill Northern Lower Peninsula wolves, they thought the natural barrier of the straits should be used. Those that do get across should be trapped and relocated to the UP. When given a scenario that they could not be relocated, but rather that every few years a few had to be killed, one adamant animal rightist stated that he was against it in principle, but conceded that euthanasia of the wolves in this situation might be the best and most practical option. The group did not want trapping as it was viewed as cruel for the wolf. One participant recognized that relocating wolves places much stress on the animal. This person suggested the DNR can prevent the need for lethal methods if the concentrate on the non-lethal fertilization control.

The point was made that there was a range of views concerning hunting represented at

this meeting. While some did not differentiate between types of hunting, others had different views depending on the nature of the hunting, i.e. recreational or sustenance. This was made explicit by one participant stating that he was against the idea of someone having fun to kill an animal (ie hunting) and didn't want to perpetuate the idea that it is ok to go out and kill something. A different view was that an economic rational is very important in relation to Michigan's wolves. The State could put a hunt up for auction and make money for the state, as other states are doing with different species. This person didn't like the fact that someone was getting pleasure from it, but did not see a difference between euthanasia and hunting wolves. Many in the group noted that some in the public would rather have hunters pay to do it rather than use taxpayers money.

Michigan Trappers

The main concern for seven participants was the impact that wolves could have on lowering furbearer numbers. The example of lower beaver numbers, especially in drought conditions when wolves will stay around and exterminate a colony. They also noted that they would have a large impact on the deer herd. Some discussed that they would also negatively affect other nongame species.

Management costs to the state was the main concern for three participants. They noted that there are currently lots of financial and employee constraints for the state government, and these will become greater as the wolf population increases.

The presence of wolves will have impacts on other activities as well. They noted changes to when a hunter can shoot a coyote (i.e. not in deer firearm season) has occurred. One participant noted that the potential closing of areas to the public, especially in the spring, would affect both hunters and non-hunters. The changes in the deer herd will also affect the number of hunters utilizing an area.

Changing human behaviors because of public safety concerns was identified. One person stated that California cougars and coyote are now fearless and are harming people. All participants agreed that if a person gets hurt, public safety will be the number one issue. Also, mentioned as costs were livestock and pet depredation.

HOW SHOULD THE DNR ESTIMATE WOLF NUMBERS IN MICHIGAN?

Eastern Upper Peninsula Livestock Producers

There was a lot of distrust in the ability of the DNR to do an accurate wolf count. Only one person was willing to accept the current DNR wolf estimate. The attempt to find three wolves in the Northern Lower Peninsula was proof for some that trying to count wolves might not be as accurate as the DNR would like people to believe. This resulted in them questioning the accuracy of the possible 20% undercounting of wolves for the UP. There was much distrust in the current method, however, one person was satisfied, stating that it is probably as good as it could be. The general sense was that sampling would not be accepted by the general public. It

was noted that as long as Michigan is mandated to have 200 wolves (a concrete number), then it is important to do a count rather than a sample.

Western Upper Peninsula Livestock

One participant who works in forestry doubted that the DNR counts all the wolves. All of the participants thought that there are many more than the 400 now said to exist. They think it could be a better count if the people who work in the woods were doing the counts. If they are having trouble with people accepting a count they will have even more trouble with an estimate from a sample.

Upper Peninsula Hunters who Use Dogs

The general feeling of the group was that there were many more wolves in the Upper Peninsula than the DNR are reporting. Most participants distrusted the science used in estimating their numbers, or indicated that there is no way to get an accurate count. One participant commented that the DNR attempted to count moose, and they missed that actual number by a large extent, thus why should they be any better at counting wolves? Another showed distrust in the DNR by stating that the DNR would purposely underestimate the number of wolves. It was suggested that if the DNR can't do an accurate count now, why should they be able to count them in sampled areas to get an estimate for the UP. A participant stated that someone might believe the numbers now when they are counting the entire UP, but if the sample did not include the county that they lived in, they will be less likely to believe the numbers.

When questioned about the possibility of using sampling rather than a census, most thought that the DNR has to put the current effort into getting a population estimate, despite thinking that it is not accurate. Three participants thought that a sampling method would work just as well.

Because of the level of mistrust in the DNR, some participants thought that the public should be included in the count. This would increase trust in the DNR.

An important consideration agreed upon by the group was that the method should stay consistent, which ever method they decide to use. Switching methods from year to year will not be seen as credible.

Northern Lower Peninsula Hunters who Use Dogs

Most of this group preferred the current method of counting rather than the sampling, despite seeing the importance of the DNR saving money. They stated a lack of credibility of deer estimates has given sampling a bad reputation. One participant did not care which method was used.

There were two different opinions on the accuracy of counting wolves. One participant felt that by actually going into the field, they could get a good count and that the current methods used were good. He noted that as wolves are a hot button issue, the DNR need an accurate number, especially if they want or need a hunt. In such a situation they will need the proof of

wolf numbers and that could only come from an accurate count, not a sample. This person felt that the count should be continued for the near future, but could eventually shift to sampling.

A view supporting sampling was also provided. Because of the nature of the terrain in the Upper Peninsula and Northern Lower, he felt that sampling was probably as accurate as counting and just as good for management. He felt that counts of moose and elk in these areas have not been very accurate. For him it did not matter which method was used.

Upper Peninsula Deer Hunters

All but two from this group thought the DNR was not getting an accurate count on the number of wolves. There was some feeling that the DNR are not covering the entire Upper Peninsula when doing their count.

One participant who was familiar with how the count occurs though it was accurate, but thought that the public should be asked to assist in the count as they are in Wisconsin. He thought this would increase the acceptance of the counts and increase the credibility of the DNR. Some in the group had a fear of interest groups over or under counting wolves to fit their agenda, but agreed that using the public along with the DNR at the same time and in the same areas would provide a comparison between the two counts. Most of the group indicated that they might be interested in volunteering to do the count and agreed it would build trust in the DNR.

All participants preferred the count over the sampling methods. Some participants compared sampling to the pellet count done for deer. They noted that there was too much distrust in the past sampling so the public would not trust results those results. When asked if the count could be done every other year, the group said no. They felt the wolf issue was too important and numbers should be tabulated each year.

Northern Lower Peninsula Deer Hunters

While no one in this group was familiar with how the DNR currently does the count in the UP, most knew about the attempt to count wolves in the LP and the fact that none were found. One person was familiar with the elk count in the Northern Lower Peninsula and thought that was not done well and therefore questioned methods for counting wolves.

Discussions of sampling versus counting focused on what the goals of management were. If it were a hunting season, then there needed to be an accurate count. They recognized that they had to have an accurate count to get them delisted and would also need it to make sure they stay delisted. Most participants thought that the count should be done every year, while some said that would depend on the management goals. There was concern expressed that there is also a need for accurate accounting of the wolf's prey species such as deer, as both species' numbers would be related.

Eight participants favored a count while two preferred a sampling methodology. All participants said that which ever method is used, it had to be done accurately or it wouldn't matter.

Wolf Conservationists

This group thought the choice of sampling or counting depends on what the management goal was. One participant noted that if the state said they wanted to have a maximum of 'X' wolves, then they would need to do a count every year. However, many in the meeting did not think this should be a management goal. If management goals focus on dealing with nuisance wolves, then sampling would be sufficient, as the focus would be on individual wolves and not the populations. Most of the group thought that if the State is managing for biological carrying capacity, they will not have to deal with the population, but only nuisance wolves. There was discussion that regardless of the method chosen, many in the public will not believe the numbers.

Wolf Protectionists

All but two in this group thought that choosing between sampling or counting depended on management goals. If it is for some kind of "trigger" counting should be done every year. Some thought that sampling could be the primary method, but when approaching "trigger" points, then an accurate count would be needed. Two of the participants did not agree with this and suggested that sampling was the preferred method with the money saved better used for wolf education programs.

Michigan Trappers

Many in this group questioned the accuracy of the current counting method. Some questioned how the DNR know that they are not double counting packs. One noted that there are a number of radio collars "die" each year, thus making it suspect that they find all of the packs. Another concern is that there is a lot of area in Upper Peninsula without roads, making an accurate count difficult. Most did agree that the current method of counting probably gives a ballpark value that is good for giving trends in wolf numbers. They thought this was important.

As for using sampling models, many in the group said it depends on the DNR's agenda. There was a definite lack of trust in the DNR for many in the group. One suggested an agenda might be if the DNR want more or less deer. To lessen this trust, some in the group suggested that hunters and trappers should be asked what they think the numbers are. All indicated that they would be interested in learning how to do the count and working with the DNR. They thought it would provide more data and if these data were conflicting, they could be addressed.

Most participants were not in favor of sampling, noting that they would need to know how the sampling is done. They suggested problems arising with deep snow causing wolves to be absent in areas to be sampled in any given year.

Participants favoring the count felt it had to be done every year. Some suggested that it needed to be done till the rate of increase in wolf numbers drops to a very low percentage. As long as it is still increasing, the count should continue annually.

The group needed to know the reasons for counting them. They thought that counting them just for the sake of counting them was not a reason. They would want to know the

management goals. One stated that if there is a goal, then we need to manage for that number of wolves. In the current situation, where there was no perceived management goal, there is no point in counting them.

The question of costs was also raised. They noted that costs are going to be higher now that they will have to be done in the Northern Lower Peninsula. They felt this was another reason for including the public in the counts.

LOSSES and COMPENSATION

Eastern Upper Peninsula Livestock Producers

One person had livestock loss or damage that qualified for compensation. One person reported loss that did not receive compensation, while three people had loss that they didn't report. They did not report these because the response they got from earlier requests were so bad that they never bothered again. The group thought that there were many more depredated livestock than reported by the DNR.

Participants felt that all loss by wolves should be compensated. Thus, there was no number of farms or value lost, that would be reasonable to accept in order to have wolves in Michigan. Some noted that one cow might be 1/3 of a person's herd. On further discussion, a sheep producer of a large operation (800+ animals) indicated that he could tolerate 2-3 a year as part of doing business but losing 10-15 % of his income was not acceptable.

One of the main issues raised was a feeling that they should not have to worry about extra expenses. Having to put cattle away at night means extra costs to the producer. While guard dogs were an option for some participants, it was thought that smaller operations couldn't afford them. It was noted that market costs and future income costs often do not cover losses. A child's 4-H goat has much more value than just livestock. Despite this the consensus was that compensation has to be above current market value to cover future losses.

The issue of public property was raised. Some noted that the wolf is a state entity, while they pay taxes on the land. They felt that the desires of others were imposed upon them at the expense of their private property rights. The inability to control the situation on their property caused much of the participants intolerance.

While compensation might make losses more tolerable, all participants indicated that compensation would not increase tolerance for wolves. Their tolerance was described as "forced" and compensation would not change that.

There was strong support for groups that promote wolves to be the main contributors to compensation funds. Regardless, everyone needs to know who is paying.

When given the choice of shooting wolves on their property or getting compensation, half indicated that they would like to be able to shoot the wolf. The rationale for all participants was that where the wolves are concerned, their hands are tied. If given the ability to shoot them they would become more tolerant. They all felt that compensation should be given for any loss but it didn't really increase tolerance. Most agreed that tolerance would be increased if farmers were able to take some action.

To a person they were intolerant of wolves. Despite not having any losses since becoming heavily invested in dogs and fencing, the sheep producer was still not tolerant of wolves.

Western Upper Peninsula Livestock

This group felt that all depredation should be compensated. A main reason other than economic loss was that others won't think a problem exists if farmers are not compensated. They noted that this is happening with deer crop damage now. With no compensation being paid out, most non-farmers don't see it as a problem. Paying compensation would bring the problem to the public's attention.

Tolerance for this group focused on the management practices of the DNR. They indicated that the would be more tolerant if they saw that the DNR was working with them. They see the wolf as part of the system that needs to be managed before it reaches an intolerable level. They did not believe that they were personally intolerant yet, but did not think the DNR seem to be working towards a good wolf population level. They did not think that compensation increased tolerance for wolves.

There were a mix of views about who should pay for the compensation for depredation. All agreed that those who want them should pay for them. Another view was that it wolves should be managed at a level that can be hunted and then money from hunters should be used for compensation. The person providing this view thought that whoever is managing it, (i.e. Federal Government or the MDNR) should be the ones to pay compensation, with the rationale that if they are doing a good job of managing there should be very little compensation paid out. It would act as a check and balance as if there was no compensation being paid, then constituents would not be upset.

In contrast to the Eastern Upper Peninsula focus group, those attending the Western Upper Peninsula group would not like the farmers to have the ability to shoot wolves. There was some fear of legal ramifications from breaking a law. Another sentiment provided was that the DNR, not farmers, should be managing wolves. Spending time shooting wolves would only cause more economic loss. They didn't want to get to the level where they have to be thinking about managing wolves and carrying a gun in their tractor. Another concern was if the farmers are managing the wolves, they may be seen as the bad guys if the wolf numbers go down. It was compared to block permits and the blame put on farmers by hunters when the deer numbers fell in the UP. For this group tolerance was not going to improve by having the ability to shoot wolves.

This group described themselves as currently tolerant of wolves but skeptical of the future. They don't know what it is going to be like when the wolf numbers increase. They described their tolerance now as questionable, and did not see it as increasing because of the current wolf management.

Upper Peninsula Hunters who Use Dogs

The discussion with this group focused on losses and compensation for hunting dogs. Participants thought that many hunters are not reporting dog loss, as they thought it would be a

waste of their time. This is especially the case when they can't find the dog. The beaglers noted that it would be difficult to differentiate between wolf and coyote depredation as beagles are small and sometimes go a long distance from the hunter.

They felt that the number of dogs taken by wolves is higher than that reported by the DNR because there is no compensation. Houndsmen saw no point in reporting it. The group did not trust the number of confirmed dog kills by wolves as they said they hear many more reports on the radio about pets being taken than the DNR reports. For some, putting the names and locations of pet/hunting dog depredation in a report would make the numbers more believable. One participant questioned why the DNR don't trust a hunters determination if a depredation was by a wolf. He felt that if the DNR included "public reports", they could factor in a percentage that might reflect the actual predation rate. This was thought to be similar to the $\pm$20% noted for the Upper Peninsula wolf counts.

When asked what would increase the chances of losing a dog, the group cited distance from the hunter, running dogs (beagles) at night, and bitches in heat. One bird dog owner stated that some bird dogs are further ranging than others and cited a newspaper report where a bird dog was taken within 25 yards of its owner. Many in the group thought that it was a myth that wolves are afraid of people and thought wolves just as likely to go after close working dogs as well as those that work distances. The size of a dog was not thought to matter for wolf depredation. More vocal dogs were thought easier for wolves to find and were thus more vulnerable. The more vocal dogs were said to be their best dogs, and thus their best and most valuable dogs were the most susceptible to predation.

Letting dog hunters know where wolves are was not viewed as being useful for this group, because they saw wolves as being everywhere. No one was aware of any denning areas. They noted that for much of the wolf denning period they are not allowed to run their dogs. They can run their dogs after July 15, and realized that wolves might still be denning at that time. The beaglers noted that because of their inclosures they can get special permits to run year round.

All participants thought that there should be compensation for dogs lost to wolves and one stated that as dogs are real property, there should always be compensation. The group felt that regardless of the age or condition of the dog, it should be compensated. Some thought that the $2500 offered in Wisconsin as compensation would balance out for good and bad dogs. Many, however, indicated that the dog that is most likely to be taken is the best dog as it is more aggressive, further afield, louder etc. It was stated that it takes years of breeding, effort and training, not just expenses, to get a good dog. One participant thought that if they were compensated there would be more accurate numbers for the information relating to dogs/pets being lost, as there would be more accountability.

When asked if there is there any level of monetary compensation that would make a lost or damaged dog tolerable, some noted that compensation would be a start, but people will never tolerate loses. They noted that it would be hard to fully compensate for a loss as it takes years to develop a good dog. Monetary value was viewed as only one component of a dogs value. One participant stated that the State attempts to protect citizens from automobile accidents by having safe roads, so we don't expect compensation every time there is an accident (unless the State is negligent). As the state have not been managing wolves, there should therefore be compensation.

It was stated that if the DNR were managing wolves, the issue of compensation might not

even come up. When asked if they did start to manage this way would they still need compensation, all participants said 'yes'. For a large part that answer was because too much time has gone by without management and thus, the DNR lacked the credibility to have them believe that they are actually managing the wolves. They noted that frustrations are growing as the wolf population expands without any active management.

They noted that not having control over the situation also affects their intolerance for wolves. Given the ability to shoot a wolf that was going to do damage was thought to increase tolerance. The problem they saw was that this would never happen because of the political pressures from animal rights groups.

When asked where compensation funds should come from, some replied the State, but qualified that hunter monies should not be used. The general feeling was that everyone in the state should have to pay. Some felt that the people who want the wolves should pay. It was questioned if all taxpayers in Michigan would be as sympathetic to wolves if they had to contribute to compensation funds.

When asked if there was a hunting season for wolves if hunter monies should be used to compensate, one persons said no, but some felt that if the state is undertaking management by a hunt, it would be ok.

The group felt that all pets and livestock should be compensated. They did not differentiate between a hunting dog taken in the field and a pet taken from a yard.

Northern Lower Peninsula Hunters who Use Dogs

All of this group felt that there should be compensation for hunting dogs taken by wolves. One person noted that when hunting bears with hounds, harm from a bear is a risk they take. However, a hunter can defend their dogs from a bear, but if you harm a wolf in the process of harming a hound, then the hunter will be in trouble. It was stated that the difference between wolf and bear is that a bear is trying to get away from the dogs while wolves chase the dogs.

The group felt that compensation should be paid by all citizens in the state as the wolves belong to all citizens. There was consensus that the general fund should be where the compensation should come from, as the people of the state own them, they should compensate for them. It was also thought that if a beagle is taken by a coyote, then the beagle owner should be compensated as it was done by a predator. It was thought that compensation goes a long way to making the person tolerant of the event.

The group felt that when they come off the list and are managed, there still should be compensation as they would be a protected species and a predator. They did not think hunter money should be used for compensation as taking funds for hunter licenses could set a trend for funding other compensation such as crop damage.

The point of contention for the group was the feeling that the DNR are not doing anything to manage wolves. They felt that it is only recently that the levels of wolves has reached a level where concern is high. They did not think it was that way three years ago and they expect it to get worse in the coming years. One stated that if the wolf numbers are kept low by managing them at a reasonable level, there would be fewer hounds lost. One noted that in 1997, there was no predation on hunting dogs. If they managed for the number of wolves that existed that year, there

would be no need for compensation. The group felt that the DNR has the technology and ability to manage wolves and opportunity to avoid and solve many of the problems related to dogs and wolves.

The group felt that if they were compensated, they would be more tolerant of the predation (makes the loss easier) but they are not necessarily more tolerant of wolves effects on dogs. They noted that financial restitution is good, but proving a depredation event was caused by a wolf will be difficult. One person stated that if there is management to control wolf numbers, then compensation will not be needed, thus lessening the need to "prove" a wolf kill.

Another means of lessening the need for compensation given was letting hunters know where the wolves' core areas are, thus enabling hunters to avoid them. They all would like to know this and thought they should be given information on where the rendezvous and denning sites are. They did not think this would cause poachers to go to these areas to kill wolves, as anyone wanting to kill wolves will do it anyway.

The group liked they way compensation is given in Wisconsin as it is a set level across the board. They agreed that owners would not be fully compensated, but agreed it would be something. The group also thought that a pet owner who losses a pet in their yard should be compensated.

Upper Peninsula Deer Hunters

This group agreed thought that livestock producers should be compensated for wolf losses and that the state should be the source, not hunters. For some at the meeting, if farmers could legally shoot wolves there should not be any compensation. When asked if shooting wolves by farmers would be an issue for the deer hunters like block permits, they noted that deer hunters would not be stakeholders who would be concerned, it would be the anti-hunters.

If the wolf was made a game species, there were some differences of opinion about compensation. Some thought it should be the same as if hitting a deer with a car - there is no compensation for this. Others thought that as it was reintroduced, the State is to blame for their presence and compensation should be paid out. This was countered by the statement that people are not compensated for vehicle damage after hitting a moose, which was reintroduced.

Habitat loss was a big issue for many in the group. They noted that as the wolf population increases and they are found in more places, there will be more interactions and thus more compensation paid out. The total costs of compensation would then become an issue.

Most in this group felt that compensation should be paid for hunting dogs as long as wolves are protected. Once they are a game animal however, they should be like bears and all other species not requiring compensation. Most in the group did not think other pets required compensation.

Northern Lower Peninsula Deer Hunters

This group thought that livestock losses should be compensated from general tax dollars. One participant thought it should be specifically from federal taxes, while the rest thought State taxes should be used. One participant stated that the DNR puts up fences for elk damage, so they

should do something similar for the wolves. Some participants did not think that best husbandry practices should have to be considered when giving compensation.

None in the group thought that hunters should be the source of compensation dollars if wolves were made a game animal. Some noted that tourists will benefit more than hunters so the burden should not be put on hunters only. Everyone should pay. There was strong support for those desiring wolves in Michigan to be the source of the funds.

None of these participants, even those who owned hunting dogs, felt that hunters should be compensated for dog loss. There was a fear by some that dogs hurt by bears would also need compensation. Others disagreed with this view but justified their view of no compensation by stating that hunters put their dogs in dangerous situations, and thus this should be seen as a potential cost of "doing business".

Pet losses were also seen as not requiring compensation, even if the pet was taken out of a back yard. The difference between pets and livestock was that livestock are the livelihood for the farmer. When asked about a hunting guide running bears who loses a dog, it was again stated that this is a cost of doing business and they are putting their dogs in dangerous areas.

Wolf Conservationists

There was consensus that livestock producers should be compensated for wolf loss. Most thought compensation should come from general funds. A condition for compensation, however, was that the farmer is doing best management practices. None of the group thought that there should be compensation for captive cervids or hunting dogs. There was some support for compensating pet owners who are in control of their pets (i.e. not running loose), however they noted that it would be difficult to place a monetary value on pets.

The group thought that farmers should be able to take non-lethal actions to discourage wolves from their farm. When wolves have been delisted and a wolf is about to do damage to livestock and the farmer is doing best management practices, they felt that rubber bullets could be used. Under these circumstances, lethal methods should not be used. They felt that lethal methods could be used only after there has been a confirmed depredation, not when there is a threat. They noted that farmers would need permits for control and should not be able to use lethal control at their own discretion. Landowner lethal control methods would have to be under strict guidelines.

Wolf Protectionists

While most of the group thought that livestock producers should be compensated, there were some who felt that compensation is not good for any part of society and should not be considered for wolf depredation. One of these people didn't want to create a bureaucracy around wolves, as giving compensation for wolves and not other species would be bad for the species. One participant though it interesting that farmers get compensated for loss from a public species, but when a poacher takes a wolf, then the public is not compensated. Another participant suggested that farms in areas where there are too many predators should be closed down. Another stated that people have to be responsible and use precautions like dogs and donkeys to protect

their herd - farmers have to know the risks of their business.

Most of the group were impressed with the low numbers of livestock depredation that is currently happening in the UP. They thought the current levels of depredation reasonable and that farmers should be able to live with it without compensation. Some participants thought that it important to have the farmers feel they are being treated fairly, as then they would be more likely to be in favor of having wolves in their area. Compensation was thought a means of gaining their cooperation.

Some of the group offered criteria for compensation: (1) There should clearly be a financial loss for the individual farmer. Compensation should not go to large operations which can absorb the loss. It should consider the depredation impacts the livelihood of the farmer. If doesn't impact the livelihood then compensation should not be considered. (2) if a farmer has depredation insurance they should not get compensation, and (3) the farmer has to be responsible and using best management practices.

Most of the group felt that compensation funds should come from hunters. One person stated that hunters are paying for the privilege to do their pursuit, and the State should be able to use that money as it chooses. The group did not think that pet loss should be compensated as pet owners should be responsible.

HOW MANY WOLVES SHOULD THERE BE IN MICHIGAN?

Wolf Conservationists

While all meetings discussed the desired number of wolves for Michigan, most discussions focused on the specific survey question provided to them to evaluate. This topic was probed more deeply with wolf conservationists.

The wolf conservationists thought that wolves self-regulate their populations and thus there is no provide a maximum number of wolves in Michigan. They thought that wolves were limited by habitat, but most agreed that there is a need for some controls where they come into human areas with major conflict. Some noted that researchers are finding that wolves are keeping to the forested areas, not into the farming areas, in Minnesota and Wisconsin. They thought therefore that deciding on management actions should be limited to interactions with wolves and not focus on the number of wolves in a population.

Most thought that the DNR should be working towards the biological carrying capacity. They recognized that the social carrying capacity (SCC) is lower, but that SCC can be increased through education, without undue economic loss or risks.

Many in the group felt that the fewest number of wolves people will accept will depend on if they feel wolves have been controlled or not. When given some means of control, people will be more tolerant of wolves and more accepting of them. The following example was given. A woman walking her dog who has authority to shoot rubber bullets at a wolf will have a higher tolerance than a woman who can't. Another participant countered this statement by questioning why a wolf would be coming around in such a situation and suggested that it would probably be because people in the area are feeding deer. The people in this area would need to be educated of

the consequences of such actions.

When asked if the DNR should be managing for SCC rather than BCC, one participant responded that this would let the DNR off the hook for its poor wolf education program. This person thought that by not educating the public, the public base their ideas on the hearsay.

Two participants thought that SCC could be equal or close to BCC. Another participant thought that if education is number one priority then the SCC could be increased a great deal. Some of the group pointed to Michigan's 1997 Recovery plan and stated that education was a key component. They thought if that had been followed through, the current degree of intolerance for wolves in the UP would not exist.

IS THERE ANY TYPE OF HUNT YOU WOULD ACCEPT?

Wolf Conservationists

Time allowed for a discussion of the following with the wolf conversationists: If we could show that there could be a hunt for recreational purposes only, and there would be no impacts on the wolf population, would you support it? One participant thought that it should only occur if it was on a farm experiencing livestock depredation. This person noted that depredation usually occurs in the spring when the pelts are poor so a hunt would not produce much of a trophy.

Three of the group would want to know the consequences of a hunt. A concern expressed was that taking out breeding males or females will cause more human conflict or livestock depredation. If this could be proven this person would not be opposed to the hunt.

One person was very concerned that 'pseudo science' would show that we need a hunt. This person felt that there are scientists that are skewing their data and any science which could show that there would be no impact on the wolf population would be suspect.

BOTTOM LINE: WHAT NEEDS TO BE ADDRESSED BY THE ROUND TABLE?

Eastern Upper Peninsula Livestock Producers

Empower the farmers to manage wolves and have the DNR set realistic population levels, there are currently too many wolves. Some thought that the state should be giving money to pay for fencing and dogs, but noted that this won't increase their tolerance for wolves. All thought that producers should be compensated for wolf losses

Western Upper Peninsula Livestock Producers

They are fairly tolerant now, but don't want the wolf numbers to increase beyond current levels. Managing now will lessen the chance that a person will be harmed later. All thought that producers should be compensated for wolf losses

Upper Peninsula Hunters who Use Dogs

There has to be compensation for hunting dog loss and there has to be management of the wolves. The current hands off management can't go on.

Northern Lower Peninsula Hunters who Use Dogs

No wolves should be allowed in the Lower Peninsula of Michigan as there is insufficient habitat. There is too much human interaction, and there will be too much conflict. In the Upper Peninsula the wolf numbers have to be kept to a socially acceptable level. The number of wolves have to be managed for the lower end of the spectrum, not for those who want wolves. Those who want to have wolves must be aware that wolves are incompatible with human settlement. To ensure wolves at this level, the round table must talk with people from the Upper Peninsula to get a first hand understanding of what is happening there.

If there are going to be wolves, they need to be in isolated areas, such as the Seney National Wildlife Reserve. For the same reason that they don't want bears in populated areas, the DNR need to be able to kill those that come out of the area. Elk can't be everywhere and neither should wolves.

There needs to be compensation for the loss of hunting dogs.

Upper Peninsula Deer Hunters

Because of the political power of the ant-hunting groups it must be ensured that wolves are managed by science not emotion. Wolves will be here regardless, so don't let them get out of control - start managing before they become a problem. Some of the participants want them to be made a game species.

Other views given identified the need to consider the wolf as just one of the predators in the UP. Need to consider all of the predators in conjunction with wolves. Others indicated that the DNR needs to produce and utilize a good education program. As part of that program, the public should have access to the DNR's wolf data.

Northern Lower Peninsula Deer Hunters

Keep wolves in the Upper Peninsula as there is insufficient habitat in the Northern Lower Peninsula. The more densely populated landscape will create many more problems than exist in the UP. The management plan needs to include the Northern Lower Peninsula and a need to keep them out of it. The Northern Lower Peninsula should become a no go zone with a strong monitoring program.

Return the policy that coyotes can be hunted during the gun season.

Wolf Conservationists

Need to be sure to differentiate between wolves and hybrids, lot of the depredation

attributed to wolves is really hybrids or dogs.

There should not be any trophy wolf hunting. If the idea of a hunt comes up, it will need to be evaluated scientifically. A hunt may cause more depredation than if it was not going on by disrupting the pack's social structure. This needs to be addressed before any hunt is considered. One participant stated that even if there were 1000 wolves in the Upper Peninsula there should not be a hunt. If there were only 1000 deer in the Upper Peninsula a hunt would not be considered. Another participant did not think this a good analogy as deer are not eating other animals. One participant thought that an agency can't decide on a hunt by the number of wolves because Great Lake Wolves are different than those in Canada or Alaska. Michigan's packs were said to be smaller and taking wolves out of packs of 4 or 5 could have adverse effects not seen when taking from larger packs (e.g. 12) like in Canada. This would have a major impact on the survivability of that pack.

Education is very important. The new management plan should not only state that education important, but also include some roadmap of how it will be achieved. People who live in areas with wolves should be given the resources to deal with and told who to call if they see a wolf acting boldly. They will know what to do in different situations. Need to know who to call and what to do. This will empower the people so they won't feel fear and hatred for wolves. This will increase the social carrying capacity.

Can't manage in a vacuum. Have to manage an environment which is highly segmented. Survival will have more to do with how the various land owners (Federal, State, private and industry) work together. The plan needs to be comprehensive, and consider all the components.

Some in the group recognized that many people feel they are not being considered under the current wolf management. The longer there is no management the more dissatisfaction with wolves there will be.

Need to stress the importance of research into nonlethal control methods and provide support for this research.

Need to address poaching of wolves. The DNR turns a blind eye to poachers. They need to get out press releases when dead wolves are found and make sure poachers are not let off easy for their crime.

Deer baiting needs addressing. This brings wolves into towns and backyards and will have adverse consequences. Baiting along with artificial feeding changes feeding patterns of deer and wolves.

Wolf Protectionists

Time did not permit this being specifically addressed by this group. Bottom line messages should be drawn from discussions in the previous sections.

Michigan Trappers

The round table must address wolf population goals and identify what the State is striving for. It should identify how long they are going to be protected in Michigan and where funds to manage them will come from.

WHAT SHOULD BE THE ROLE OF THE ROUND TABLE IN THE PLANNING PROCESS?

The planning process was charted out and explained for each group. The groups were asked whether they trusted that system of deriving a plan and also whether the Round Table should develop the plan itself or provide guidelines to be followed by the agency in developing the plan. All groups were satisfied with the overall process explained to them. The wolf protectionist group was surprised at the extent of public involvement and asked why this wasn't used as a procedure for all wildlife decisions. This group, in particular, believed they were "disenfranchised" from the NRC and expressed dissatisfaction with their treatment by the NRC in particular and the decision making process in general.

The groups also tended to agree that developing the final plan was the job of the agency. It appeared they trusted the MIDNR more than competing public interests to draw up the management plan. Comments also indicated that most wanted the biological expertise of the agency involved. The wolf protectionists were more reserved in this position and less trusting of the agency in drawing up an acceptable plan even with input from the Round Table. However, there was some reluctant acceptance of this approach.

SURVEYS ADMINISTERED TO FOCUS GROUP ATTENDEES

A) Eastern Upper Peninsula Livestock Producers, July 26, 2005. Bruce Township.

11 Attendees

1) About how many head of each type of livestock do you currently have on your operation?

6, 100 BEEF CATTLE (2 did not give a value) | 60, 80, 200, 600 DAIRY CATTLE | 25, 100, 240, 400, 650, 1400 SHEEP/GOATS | 25 POULTRY

OTHER: 20 dairy steers, 100 Feeder Cattle, 2 horses

2) About how many acres of land do you have in production for livestock and crops?

160, 320, 350, 500, 600, 1000,1000, 1100,1100,1200, 2500 ACRES

3) Have you seen evidence that wolves use your property?

9 YES 2 NO

4) How many head of livestock have you had killed or injured by wolves? (If none write 0)

0 @ 8, 1@1, 1@12, 1@100 animals

5) Have any neighbors adjacent to your property had livestock losses or injury due to wolves?

7 YES 3 NO 1 NOT SURE (1 had no neighbors)

6) Are you a deer hunter?

8 YES 3 NO

7) Do you hunt with dogs (hounds, beagles, bird dogs)?

2 YES 9 NO

B) Western Upper Peninsula Livestock Producers, July 27, 2005. Stephenson.

4 Attendees

1) About how many head of each type of livestock do you currently have on your operation?

100, 600 BEEF CATTLE 800 DAIRY CATTLE (1 did not give a value) 0 SHEEP/GOATS 0 POULTRY

OTHER:

2) About how many acres of land do you have in production for livestock and crops?

300, 600,1300, 4000 ACRES

3) Have you seen evidence that wolves use your property?

3 YES 1 NO

4) How many head of livestock have you had killed or injured by wolves? (If none write 0)

0 @ 2, 1@1, 1@2 animals

5) Have any neighbors adjacent to your property had livestock losses or injury due to wolves?

0 YES 2 NO 2 NOT SURE

6) Are you a deer hunter?

3 YES 1 NO

7) Do you hunt with dogs (hounds, beagles, bird dogs)?

0 YES 4 NO

C) Upper Peninsula Deer Hunters, July 28, 2005. Escanaba.

11 Attendees

1) What methods do you use to hunt deer? (Check all that apply)

(5) BOW (9) MUZZLE LOADER (11) RIFLE/SHOTGUN

2) Please list the deer hunting organizations you belong to.

Boon and Crockett (1)
Commerative Bucks of Michigan (2)
Menominee Woods and Stream Sportsmans club (1)
Normenco Sportsmens club (2)
None (3)
National Muzzle loader assoc. (1)
Pope and Young (1)
Shed antler club (1)
UP Whitetails Association (4)
Whitetails Unlimited (2)

3) Do you hunt deer on recreational land in the UP that you own?

(9) YES (2) NO

4) Which UP Wildlife management units do you hunt deer? (See map on back)

(0) EASTERN UP (11) WESTERN UP

5) Have you seen evidence of wolves in the area where you hunt deer?

(10) YES (1) NO

6) Do you hunt with dogs (hounds, beagles, bird dogs)?

(4) YES (7) NO

7) Do you own any livestock in the UP?

(1) YES (10) NO

D) Northern Lower Peninsula Deer Hunters, August 3, 2005. Higgins Lake.

8 Attendees- 6 completed and returned the survey

1) What methods do you use to hunt deer? (Check all that apply)

(2) BOW (3) MUZZLE LOADER (6) RIFLE/SHOTGUN

2) Please list the deer hunting organizations you belong to.

Afton Deer management (2)
Compton Traditional Bowhunters
Michigan Traditional Bow hunters
Michigan Bowhunter
None (2)
Pope and Young Club
Professional bow society
Rocky Mountain Elk Foundation (1)
Whitetails Unlimited

3) Do you hunt deer on recreational land in the NLP that you own?

(5) YES (1) NO

4) Which NLP Wildlife management units do you hunt deer? (See map on back)

(5) NORTH EASTERN (1) NORTH WESTERN

5) Have you ever seen evidence of wolves in the area where you hunt deer?

(3) YES (3) NO

6) Do you hunt with dogs (hounds, beagles, bird dogs)?

(3) YES (3) NO

7) Do you own any livestock in the NLP?

(1) YES (5) NO

E) Upper Peninsula Dog Hunters, July 28, 2005. Escanaba.

11 Attendees

1) How many of each type of hunting dog do you own?

(7) LARGE HOUND (BEAR, RACCOON, ETC.) (4) BEAGLE (1) BIRD DOG

(1) OTHER HUNTING DOG TYPE (PLEASE DESCRIBE): GERMAN SHORT HAIRED POINTER

2) Please list the hunting dog organizations you belong to.

Bay De Noc Beagle Club (2)
Ishpeming Beagle Club (1)
Independent (1)
Michigan Bear Houndsmen Association (1)
Michigan Hunting Dog Federation (1)
Northern Michigan Hare Federation (2)
Upper Peninsula Bear Houndsmen Assoc. (7)
Wisconsin Bear Houndsmen Assoc.

3) Which UP Wildlife management units do you hunt most often with your dogs? (See map on back)

(0) EASTERN UP (11) WESTERN UP

4) Have you seen evidence of wolves in the area where you hunt with dogs?

(11) YES (0) NO

5) How many of your dogs have been killed or injured by wolves? (If none write 0)

(1 HAD 1 DOG ATTACKED)

6) Have hunting dogs belonging to someone else been killed or injured by wolves where you hunt with your dogs?

(9) YES (1) NO (1) NOT SURE

7) Are you a deer hunter?

(9) YES (2) NO

8) Do you own any livestock in the UP?

(2) YES (9) NO

F) Northern Lower Peninsula Dog Hunters, August 11, 2005. Higgins Lake.

5 Attendees

1) How many of each type of hunting dog do you own?

(5) LARGE HOUND (BEAR, RACCOON, ETC.) (2) BEAGLE (1) BIRD DOG

(0) OTHER HUNTING DOG TYPE (PLEASE DESCRIBE)_____

2) Please list the hunting dog organizations you belong to.

Michigan Bear Hunters (5)
Michigan Hunting dog federation (2)
Michigan State Fox Hunters (1)
Top Michigan Coon Hunter Assoc. (1)
UP Bear Hound Assoc. (1)

3) Which Parts of Michigan do you hunt with your dogs?

(5) UP (5) NORTHERN LOWER PEN. (1) SOUTHERN LOWER PEN.

4) Have you seen evidence of wolves in the area where you hunt with dogs?

(5) YES (0) NO

5) How many of your dogs have been killed or injured by wolves? (If none write 0)

(1) DOGS ____NOT SURE

6) Have hunting dogs belonging to someone else been killed or injured by wolves where you hunt with your dogs?

(4) YES (1) NO ____NOT SURE

7) Are you a deer hunter?

(5) YES ___ NO

8) Do you own any livestock in the UP?

(0) YES (5) NO

G) Wolf Conservationists, August 17, 2005. Ann Arbor.
7 Attendees

1) Please list any environmental/conservation organizations you belong to:

American Rivers (1)
Central Rockies Wolf Project (1)
Defenders of Wildlife (1)
Huron Valley conservation Assoc. (2)
International Wolf Center (1)
MUCC (2)
Michigan Alliance of Outdoor and Environmental Educators (1)
National Wildlife Federation (2)
PIRGIM (1)
Sierra Club (2)
The Nature Conservancy (2)
Tri County Sportsmen's league (1)
Trout unlimited (1)
Timber Wolf Alliance (2)
Wolf Park (1)

2) Have you ever seen a wolf in the wild?

(6) YES (1) NO

3) Which category best describes you? (Choose one)

(3) HUNTER
(4) NON-HUNTER, BUT NOT OPPOSED TO HUNTING IN GENERAL
(0) OPPOSED TO ALL FORMS OF RECREATIONAL HUNTING
(0) UNSURE

4) Do you own recreational property in the following areas?

UPPER PENINSULA	**(2) YES**	**___ NO**
NORTHERN LOWER PENINSULA	**(1) YES**	**___ NO**
SOUTHERN LOWER PENINSULA	**(2) YES**	**___ NO**

5) Please indicate where in Michigan you regularly do the following activities?

	I DON'T DO THIS ACTIVITY	UPPER PENINSULA	NORTHER LOWER PENINSULA	SOUTHERN LOWER PENINSULA
A) BIRD WATCHING	(2)	(2)	(2)	(4)
B) WILDLIFE VIEWING		(5)	(6)	(4)
C) HUNTING	(4)	(2)	(1)	(2)
D) HIKING	(1)	(5)	(5)	(5)
E) CAMPING	(3)	(4)	(3)	(3)
F) FISHING	(3)	(3)	(3)	(3)
G) MOUNTAIN BIKING	(6)	(1)	(1)	(1)
H) CANOEING/ KAYAKING	(3)	(3)	(4)	(3)
I) OTHER: CROSS COUNTRY SKIING, LOOKING FOR WILDLIFE TRACKS_				

6) Please indicate how many of the following you have? If none, write 0.

3 DOG OWNERS 0 CAT OWNERS

H) Wolf Protectionists, August 25, 2005. Ann Arbor.

11 attendees.

1) Please list any environmental, conservation or animal welfare organizations you belong to:

ASPCA (1)
Animal Law Section of the State Bar (1)
Attornies for Animals (1)
Animal Legal Defense Fund (2)
Best Friends Animal societies (1)
Citizens United for Action (1)
Committee to restore the Dove Shooting Ban(2)
Defenders of Wildlife (3)
Fund for Animals (1)
Friends of Wildlife (1)
Harpseals.org (2)
Hawk Migration Assoc. (1)
Humane Society of Huron Valley (1)
Humane Society of the United States(3)
International Wolf Center (1)
IPPL (1)
Michigan Environmental Council (1)
Michigan Humane Society (3)
The Nature Conservancy (2)
PAWS (1)
PETA (1)
Primary Primates (1)
Sierra Club (3)
River Raisen Raptor Center (1)
"Numerous environmental and animal rights organizations, plus humane societies and animal sanctuaries, Mi, National, International"(1)

2) Have you ever seen a wolf in the wild?

(5) YES (6) NO

3) Which category best describes you? (Choose one)

(0) HUNTER
(2) NON-HUNTER, BUT NOT OPPOSED TO HUNTING IN GENERAL
(8) OPPOSED TO ALL FORMS OF RECREATIONAL HUNTING
(0) UNSURE

4) Do you own recreational property in the following areas?

UPPER PENINSULA	**___ YES**	**___ NO**
NORTHERN LOWER PENINSULA	**(1) YES**	**___ NO**
SOUTHERN LOWER PENINSULA	**(2) YES**	**___ NO**

5) Please indicate where in Michigan you regularly do the following activities?

	I DON'T DO THIS ACTIVITY	UPPER PENINSULA	NORTHER LOWER PENINSULA	SOUTHERN LOWER PENINSULA
A) BIRD WATCHING	(1)	(3)	(5)	(10)
B) WILDLIFE VIEWING		(3)	(4)	(10)
C) HUNTING	(11)			
D) HIKING		(3)	(4)	(9)
E) CAMPING	(6)	(2)	(2)	(2)
F) FISHING	(11)			
G) MOUNTAIN BIKING	(9)			(2)
H) CANOEING/ KAYAKING	(6)		(3)	(4)
I) OTHER: _____				

6) Please indicate how many of the following you have? If none, write 0.

(6) DOG OWNERS (8) CAT OWNERS

l) Michigan Trappers, September 14, 2005. St. Ignace.

10 in attendance

1) Please list the trapping organizations you belong to.

Fur harvesters of America (1)
FTA (1)
Michigan Trapper Assoc. (5)
Mid Michigan Independent trappers (1)
Mid Michigan Trappers Assoc. (4)
National Trapper Assoc. (6)
Northen Great Lakes Fur Harvesters (8)
NWCOA (1)

2) Which Wildlife management units do you trap? (See map on back)

(6) EASTERN UP (0) WESTERN UP (5) NORTHEASTERN (0) NORTHWESTERN

3) Have you seen evidence of wolves while trapping?

(6) YES (4) NO

4) Are you a deer hunter?

(7)YES (3) NO

5) Do you hunt with dogs (hounds, beagles, bird dogs)?

(3) YES (7) NO

6) Do you own any livestock?

(3) YES (7) NO

Appendix X:
Michigan Department of Natural Resources Wildlife Division Procedure: Draft Guidelines for Management and Lethal Control of Wolves Following Confirmed Depredation Events

The document in this appendix is used by the Michigan DNR and its designated agent, USDA Wildlife Services, to guide management responses following confirmed depredation events caused by wolves.

Michigan Department of Natural Resources
Wildlife Division Procedure

Draft Guidelines for Management and Lethal Control of Wolves Following Confirmed Depredation Events

Background

The eastern timber wolf or gray wolf is protected under both the Federal Endangered Species Act and the Michigan Endangered Species Protection Law. The U.S. Fish and Wildlife Service (USFWS) and the Michigan Department of Natural Resources (DNR) are responsible for ensuring compliance with these statutes.

During development of both Federal and State recovery plans, numerical recovery targets (population levels) were identified. The Federal plan, which was approved in 1992 when there were few wolves in Michigan, did not contain a population objective for reclassifying wolves in Michigan from endangered to threatened status. The plan did specify that wolves in Wisconsin could be reclassified when the population was maintained at 80 or more wolves for three consecutive years. Unofficially, the Eastern Timber Wolf Recovery Team made the assumption the same criteria would apply for Michigan (68 FR 15804). For Federal delisting (i.e., removal from the Federal list of threatened and endangered species (50 CFR 17.11)), the number of wolves in Michigan and Wisconsin combined must be greater than 100 for 5 consecutive years.

The State plan, signed by the Director of the DNR in 1997, calls for reclassification from endangered to threatened status when there are more than 100 wolves in Michigan for five consecutive years (same as the Federal delisting criteria). Wolves were reclassified to State threatened status in June 2002. The State criteria for delisting (i.e., removal from the State list of threatened and endangered species) of a minimum sustainable population of 200 wolves in Michigan for five consecutive years was met in March 2004. As of March 2006, the preliminary population estimate for Michigan's Upper Peninsula was approximately 430 animals, and there have been greater than 200 animals in the Upper Peninsula for seven consecutive years. Although the State delisting criteria has been surpassed, the process to remove wolves from the State list of threatened and endangered species will not begin until after Federal delisting occurs.

The USFWS reclassified wolves in Michigan from endangered to threatened status on April 1, 2003 (65 FR 43450). This reclassification decision included special regulations (per section 4(d) of the Endangered Species Act) that allowed Federal, State and tribal natural resource agencies to lethally control wolves that attacked domestic animals. State and Federal recovery and management plans, wolf experts, and a large percentage of the public recognize that lethal take is a necessary part of a successful wolf recovery and management program.

On January 31, 2005 a United States District Court in Oregon enjoined and vacated the USFWS decision to reclassify wolves. The Oregon Court decision returned wolves to Federal endangered status and abolished the 4(d) regulation that allowed lethal means as an option for managing wolf depredation of domestic animals.

On April 19, 2005 the USFWS issued the DNR a sub-permit, under an existing USFWS endangered species permit, that allowed the take of up to 20 wolves for depredation control during 2005. This sub-permit was issued under the provisions of Section 10(a)(1)(A) of the Endangered Species Act. Implementation rules for the use of lethal control under the sub-permit were similar but more restrictive than the 4(d) regulations. The sub-permit was revoked by the United States District Court for the District of Columbia on September 13, 2005. This decision again restricted wolf depredation management to non-lethal measures. Prior to the court decision, the DNR submitted an application to the USFWS for a Section 10(a)(1)(A) permit (70 FR 54401) to replace the sub-permit which had been challenged via a lawsuit. On May 8, 2006, the USFWS issued the DNR a permit that allows take of no more than 40 wolves during the calendar year.

Under the current 10(a)(1)(A) permit, take of wolves for depredation control must be conducted according to the following conditions:

1) Wolf depredation on lawfully present domestic animals must be verified. Lethal control shall not be used when wolves kill dogs that are free-roaming, hunting or training on public lands, or at livestock operations or other private lands with previous wolf depredations that fail to follow technical assistance guidelines in a timely manner.

2) Lethal wolf control must be preceded by verification that wolves were involved in the depredation.

3) Depredation at the site must be likely to continue in the immediate future.

4) Wolf handling and euthanizing must be carried out in a humane manner.

5) Depredation control activities must occur within 1 mile of the depredation site.

6) Traps and snares must be checked at least every 24 hours.

7) Young of the year captured before August 1 must be released near the capture site. Accidental serious injury or mortality resulting from trapping activities to young of the year prior to August 1 may not exceed one individual in a calendar year. In the event this number is exceeded, all trapping activities shall cease until August 1. Such mortalities or serious injuries shall be reported to USFWS within five calendar days.

8) A lactating female found depredating and trapped before July 1 must be released near the capture site, unless it has been involved in three or more depredation

events, in which case it may be euthanized. Serious injury or mortality resulting from trapping activities to lactating females prior to July 1 may not exceed two individuals in a calendar year. In event this number is met, all trapping shall cease until July 1. Capture of lactating females prior to July 1, regardless of their condition at the time of their release, shall be reported to USFWS within five calendar days.

9) Depredation control activities on tribal lands must be coordinated with tribal natural resources personnel, and lethal control will only be carried out if requested by the Tribe.

10) In circumstances where the depredation site is within 1 mile of tribal trust or fee lands, the DNR shall notify the USFWS if the on-site evaluation verifies a wolf depredation. The DNR will seek advice of the tribal resource representative, if present at the site, as it relates to depredation control on private land within 1 mile of tribal trust or fee lands and will consider the advice along with advice of other members of the control team present. Special consideration to wolf packs shall occur in cases where radio-collar information and evidence from the site makes it clear that wolves involved in the depredation incident either spend the majority of their time or have the rendezvous site on tribal trust or fee lands.

11) If a depredation has not occurred in the current calendar year, lethal control shall only proceed in accordance to conditions 1 through 10 and the following:
    a. Verified depredation occurred at the site, or in the immediate vicinity, during the previous year.
    b. There is strong evidence one or more members of the depredation pack has remained in the area since the verified depredation.
    c. Based on wolf behavior and other factors, the depredation is considered by the DNR to be likely to be repeated.
    d. Trapping is conducted in a location and manner to minimize the likelihood of capturing a wolf or wolves from non-depredating packs.

12) The DNR will inform the USFWS prior to using lethal techniques to address wolf damage issues.

13) The authority for lethal depredation control granted to DNR by the 10(a)(1)(A) permit can be delegated to U.S. Department of Agriculture Wildlife Services (USDA Wildlife Services) or tribal natural resource agencies. Personnel from USDA Wildlife Services will become designated agents of the DNR through a cooperative agreement signed by the DNR Wildlife Division Chief and the State Director of USDA Wildlife Services. Agents are subject to all conditions and requirements of the permit.

14) The DNR and authorized agents may harass wolves with rubber bullets, other non-lethal projectile devices, or other devices intended to scare wolves and provide aversive conditioning to bold or habituated wolves.

15) All mortalities and serious injuries, whether intentional or incidental, shall be reported to the USFWS Region 3 Endangered Species Permits Biologist, the East Lansing Field Office, the Upper Peninsula Sub-office, and the USFWS Law Enforcement Office.

Private citizens are not allowed to kill a wolf during or after an attack on livestock or pets. Citizens are allowed to kill a wolf only in defense of human life (50 CFR 17.21). The 10(a)(1)(A) permit applies only to wolf depredation and does not address other nuisance wolf issues (e.g., wolves exhibiting fearless behavior). Habituated or fearless wolves that pose a non-immediate but demonstrable threat to human safety can be harassed or humanely dispatched by the USFWS, other Federal land-management agencies, State or tribal conservation agencies, or designated agents of any of those agencies under other regulations (50 CFR 17.21). A summary of Federal regulations for taking gray wolves can be found in Appendix A.

The USFWS defines depredation as the injuring or killing of domestic animals which include livestock (R. Refsnider, USFWS, personal communication). Livestock is defined by the Michigan Animal Industry Act (Public Act 466 of 1988) and includes, but is not limited to, cattle, sheep, new world camelids, goats, bison, privately owned cervids, ratites, swine, equine, poultry, aquaculture and rabbits. Livestock does not include dogs and cats.

This procedure details how the State, in cooperation with its designated agents and other affected parties, will manage wolves following confirmed depredation events, including the use of lethal means of control. **However, in all cases, every DNR employee or agent of the State, in consultation with their supervisors or others if so directed, has the discretion to make management decisions on a case-by-case basis in the exercise of his or her judgment.** This procedure will be reviewed periodically and will be revised to reflect the changing ecological and social situations impacting wolves in Michigan.

Wolf Depredation on Livestock

Verifying Wolf Depredation

Before lethal control methods can be used, DNR or USDA Wildlife Services personnel that are trained on depredation investigation techniques must verify depredation during a site visit. Appendix B outlines wolf depredation investigative criteria used successfully in Minnesota (W.J. Paul, USDA Wildlife Services, personal communication).

Wolf depredation is considered to be verified when the event is recorded as **confirmed** or **probable** on the *Report of Livestock Depredation* form completed by investigating personnel. Confirmed depredation is characterized by clear evidence that a wolf or wolves were responsible for the depredation, such as a carcass present with bite marks and associated hemorrhaging and wolf tracks and/or scat in the immediate vicinity. Depredation is considered to be 'probable' when the majority of a carcass has been consumed and direct evidence an attack is therefore missing, but there is good

evidence that depredation occurred, such as a kill site or blood trails with wolf tracks and/or scat in the immediate vicinity. Cases where livestock are missing and additional evidence, such as a kill site, is absent usually will not be considered probable depredation. The only scenario where an on-site depredation investigator might consider a 'missing animal' as indicative of probable wolf depredation would be if the investigator finds fresh wolf sign in the pasture coinciding with the time of loss and/or fresh wolf droppings containing livestock hair (with no livestock carcass dump present). Because wolf depredation must be verified before lethal control can be considered, harassment of livestock by wolves will not constitute verified depredation and lethal control will not be applied in that situation.

Investigations of depredation events are complex; available evidence is often incomplete, and the difficulty of confirming wolf kills varies on a case-by-case basis. Whenever possible, individuals with the most experience investigating depredation incidents should conduct the site visit. However, because it is critical to initiate an investigation as soon as possible, there will be instances when experienced investigators are not available. In those instances, other personnel that have received training should travel to the site, meet with the livestock producer, and begin the investigation. However, if the evidence is not clear-cut, a more experienced investigator should investigate as soon as possible. In all cases, the final determination will be at the discretion of the Management Unit Supervisor.

Use of Non-lethal Means to Resolve Wolf-Livestock Conflicts

Available non-lethal methods to resolve wolf–livestock conflicts include improvement of animal husbandry practices, protection of livestock (e.g., fencing, livestock-guarding animals), harassment (e.g., strobe light/siren devices), and translocation (trapping and relocation of depredating wolves). Non-lethal methods will be offered to livestock producers when wolves are known to be in an area where livestock are being housed or pastured, and there is a legitimate complaint that wolves are harassing, injuring or killing livestock. The legitimacy of these complaints will be evaluated in the field by DNR or USDA Wildlife Services personnel. A credible observation of wolves in an area frequented by livestock does not constitute enough of a threat to initiate the use of harassment techniques or translocation.

Trapping and translocating depredating wolves is a non-lethal management option that can be used if wolf depredation of livestock is verified. All wolves trapped and relocated will be radio-collared.

Unfortunately, trapping and relocating wolves has become increasingly problematic. The *Michigan Gray Wolf Recovery and Management Plan* requires selected relocation sites to be on public land in areas that minimize the likelihood the wolves will cause additional problems. None of the 24 wolves trapped and relocated from five depredation sites (1998–2002) remained in the vicinity of the release site. Thus, the selection of a release site has no bearing on where translocated wolves will eventually settle. In addition, as the wolf population increases, there are fewer suitable places to release wolves where a resident pack does not already exist. Also, trapping and relocating

should occur only during periods of the year when ambient conditions help reduce potential for injury. Trapping during periods of extreme cold or heat may increase the potential for stress or injury. Human social factors also must be considered before relocating depredating animals. The public has expressed concern about moving depredating wolves into 'their' area. There is also a widespread misconception in the Upper Peninsula that the DNR has been engaged in a wolf reintroduction project and the observation of personnel moving animals in cages or releasing animals from cages fuels that misconception.

Use of Lethal Control to Resolve Wolf Depredation of Livestock

Available lethal control methods to resolve wolf depredation of livestock include foothold traps and euthanasia, snares and euthanasia, and shooting. Wolves will be euthanized by shooting or lethal injection. Before lethal control can be considered as a management option, the first two requirements of the 10(a)(1)(A) permit must be met. These requirements are: (1) wolf depredation must be verified; and (2) depredation at the site must be likely to continue in the immediate future if the depredating wolf or wolves are not removed. Requirements for verification of depredation have already been described. The evaluation of whether depredation is likely to occur again will be based on a field review by DNR or USDA Wildlife Services personnel, past history of depredations in the area, known pack locations and movement patterns, and consultation with Management Unit Supervisors. Once these two requirements have been met, lethal control can be used.

On farms that have suffered their first verified wolf depredation, livestock producers will be given the option of using non-lethal or lethal control techniques to be carried out by DNR or USDA Wildlife Services personnel. However, lethal control will be recommended on farms with only one verified depredation in the following circumstances:

1. The farm is known to be frequented by a radio-collared wolf that has previously been associated (usually a translocated animal) with a depredation incident.
2. When control trapping would need to be conducted during periods of extreme cold or heat and these conditions would increase the likelihood of serious injury to a captured wolf.

Lethal control will be recommended on farms that have previously had one or more verified wolf depredations in the last 5 years. Non-lethal control measures usually will not be recommended on farms with chronic depredation problems.

Additional **requirements** for the use of lethal control include:

1. Field personnel will consult with the Management Unit Supervisor before using lethal control. Management Unit Supervisors will be responsible for the final judgment on the likelihood of repeated depredation.

2. Permission from the landowner must be obtained. This permission will be documented on a *Landowner Agreement* form (currently under review).
3. If lethal control is being used at a captive cervid facility, all trapping, snaring and shooting will take place inside of the fence.
4. Snaring can be used only on the farm that suffered the depredation.
5. If trapping or shooting is going to be attempted on adjacent State, Federal or commercial forest lands, the owner or managing authority must be contacted for permission, unless prior arrangements have been made.
6. Snares must have a 'deer stop' to prevent the loop from closing smaller than 4.0 inches.
7. Carcasses of wolves euthanized will be shipped Wildlife Disease Laboratory at Michigan State University for necropsy.
8. Disposal of carcasses and parts will follow the requirements in the USFWS permit and the DNR *Disposal of Wildlife Carcasses and Parts* procedure.

Additional **guidelines** on the use of lethal control include:

1. Snares should be set for a non-lethal capture (e.g., avoid entanglement of the captured animal).
2. The DNR or USDA Wildlife Services personnel are responsible for checking traps and snares. In most instances, the person who sets the traps or snares will be responsible for checking them.
3. Radio-collared or tagged wolves will be treated like any other depredating wolf.
4. Control efforts (trapping and snaring) normally will be carried out for 10 to 15 days, but the duration of control efforts will vary and be determined by the DNR.
5. If trapping is going to be attempted on adjacent State, Federal or commercial forest lands, the area should be signed to alert the public that trapping is occurring. Signs should be placed on all roads that provide access to the area being trapped. If needed, signs can also be placed every 0.5 mile along the roads that are being trapped.
6. On farms that suffer their first loss, control efforts will usually be stopped after two wolves have been captured.
7. Technical assistance will be provided to the extent practical to help address animal husbandry practices that may be contributing to wolf depredation. The DNR will cooperate with Michigan State University Extension, Michigan Farm Bureau, Michigan Cattlemen's Association and other interested organizations to develop and distribute materials detailing appropriate management practices to be used on farms where wolves occur in the vicinity. It is hoped that livestock producers will agree to a minimum set of animal husbandry standards. All technical assistance advised or given to producers prior to or after a depredation incident will be recorded.
8. Dogs captured at depredation sites will be turned over to the owner or local animal control officer.
9. Wolf-dog hybrids captured at depredation sites will be dispatched by DNR or USDA Wildlife Services personnel.

Wolf Depredation of Dogs

Wolf depredation of dogs will be investigated using the same techniques that are used for livestock depredations. The use of lethal control for wolf depredation of dogs is subject to the 10(a)(1)(A) permit restrictions. If wolf depredation is verified and is likely to be repeated, lethal control can be used when wolves have killed dogs that were leashed, confined, or under the owners' control on the owners' lands. Lethal control will not be used when wolves kill dogs that are free-roaming, hunting or training on public lands.

Documentation and Information Transfer

1. Personnel receiving a depredation complaint will fill out the *Wolf Activity Report* form and forward copies to the Management Unit Supervisor and the Wolf Coordinator. The Wolf Coordinator will send copies to Lansing and Research.
2. Personnel investigating a depredation complaint will fill out the *Report of Livestock Depredation* form (Form R- 2566E, Rev. 12/2000). The completed form will be forwarded to the Management Unit Supervisor.
3. The Management Unit Supervisor will forward the signed form to the Michigan Wolf Coordinator who will ensure the appropriate Michigan Department of Agriculture personnel receive the completed form for indemnification payment.
4. If the Management Unit Supervisor authorizes lethal control, field personnel will complete the *Landowner Agreement* form (currently under review).
5. Prior to using lethal control, the Wolf Coordinator or a designee will inform the USFWS. The USFWS contact is Mike DeCapita. If Mr. DeCapita is not available, leaving a message detailing the date, time and location of the depredation activity, and intention to use lethal control measures on voice mail is sufficient.
6. If the DNR, USDA Wildlife Services, Michigan State University Extension, Michigan Farm Bureau, Michigan Cattlemen's Association or other organizations provide technical assistance, that assistance will be documented on the *Landowner Agreement* form. Documentation of the success or failure of implemented measures should be appended to the *Landowner Agreement* form.
7. If trapping or shooting is going to be attempted on adjacent State, Federal or commercial forestlands, the owner or managing authority must be contacted for permission, unless prior arrangements have been agreed upon. Permission can be documented by email.
8. Non-lethal and lethal control activities should be documented in detail by DNR and USDA Wildlife Services personnel. For example, time spent, miles driven, types of technical assistance, and numbers of traps set are all important factors to document.
9. If wolves are euthanized during control efforts, field personnel will affix a wolf necropsy tag and inform the Wolf Coordinator as soon as possible. The Wolf Coordinator will notify the Management Unit Supervisor and the USFWS (including the Region 3 Endangered Species Permits Biologist, East Lansing Field Office, Upper Peninsula Sub-office, and Law Enforcement Office). Notification to the USFWS must be made within five calendar days (email is acceptable).

10. If wolves are captured and euthanized, background information on the incident along with the necropsy tag number should be forwarded with the animal to the Wildlife Disease Laboratory.
11. If any captured wolf sustains a serious injury or if a lactating female is captured, field personnel will inform the Wolf Coordinator as soon as possible. The Wolf Coordinator will notify the Management Unit Supervisor and the USFWS (including the Region 3 Endangered Species Permits Biologist, East Lansing Field Office, Upper Peninsula Sub-Office, and Law Enforcement Office). Notification to the USFWS must be made within five calendar days (email is acceptable).
12. All requests for wolf pelts or skulls should be directed to the Wolf Coordinator.
13. An annual report of activities conducted under the authority of the 10(a)(1)(A) permit will be submitted by the Wolf Coordinator to the USFWS and the Michigan Endangered Species Coordinator by January 31, 2007.

Required Training of Personnel

All Michigan DNR and USDA Wildlife Services personnel making field evaluations to determine whether an incident constitutes a verified wolf depredation event will have undergone the depredation training provided by the DNR Wildlife Division. In addition, all trappers working under the 10(a)(1)(A) permit shall be trained, and receive annual refresher courses, in the trapping, chemical immobilization, and medical handling of animals, with emphasis on wolves, to minimize accidental injury and death to wolves.

Appendix A *(to Appendix IX)*

Summary of Federal Regulations for Taking Gray Wolves in Michigan, May 8, 2006

Gray wolves are classified as endangered under the Federal Endangered Species Act (ESA). The following situations and associated regulations apply to Michigan.

Situation	Regulations
In defense of human life	Any person can kill or injure a wolf in defense of his/her life or the lives of others
Protecting human safety	Wolves that are a 'demonstrable but non-immediate threat to human life or safety' may be removed by the USFWS, other Federal land-management agencies, State or tribal conservation agencies, or designated agents[1] of any of these agencies
Aiding a sick, injured or orphaned wolf; disposing of a dead wolf; or salvaging for scientific study	May be done by the USFWS, other Federal land-management agencies, State or tribal conservation agencies, or their designated agents[1]
Salvaging a dead wolf for traditional cultural purposes by Native American Tribes	May be done by USFWS, other Federal land-management agencies, State or tribal conservation agencies, or their designated agents[1]
Removing wolves attacking lawfully present domestic animals	May be done by the DNR or its designated agents[1]
Taking wolves for research or conservation programs under ESA Section 6 cooperative agreements	State conservation agencies that have approved Section 6 cooperative agreements with the USFWS have full authority for such taking
Other forms of take may be conducted for various purposes under specific USFWS permits, as authorized by 50 CFR 17.32	By various parties, if the take is for: • scientific purposes • enhancement of propagation or survival • zoological exhibition • educational purposes • incidental taking (with an HCP) • special purposes consistent with ESA

[1] Personnel from USDA Wildlife Services will become designated agents of the DNR through a cooperative agreement signed by the DNR Wildlife Division Chief and the State Director of USDA Wildlife Services.

Appendix B *(to Appendix IX)*

Investigative Criteria to Differentiate Wolf Depredation from Depredation by Other Predators or Natural Mortality/Scavenging of Livestock.

The following investigative criteria were provided by William J. Paul, Assistant State Director, USDA Wildlife Services, Grand Rapids, Minnesota.

- The livestock carcass must be reasonably fresh (not more than a few days old). A determination can not be made on carcasses that are already rotted down to bare bones.
- Tracks left by wolves at kill sites are easily distinguishable from those of most other predators except large dogs.
- Wolf attacks on large livestock are characterized by bites and large ragged wounds on the hindquarters, flanks, and sometimes the upper shoulders. Attacks on young calves or sheep are characterized by bites on the throat, head, neck, back, or hind legs. Wolves and coyotes may cause extensive trauma to underlying tissues, but do not always penetrate the skin with their canines.
- Wolves usually begin feeding on the viscera and hindquarters. Much of the carcass may be eaten, with large bones chewed and broken. The carcass is usually torn apart and scattered with subsequent feedings.
- Coyotes also eat the viscera and hindquarters first, but the feeding pattern is not as heavy as for a wolf. Coyotes tend to eat the meat from a carcass rather neatly, leaving most of the skeleton intact in the early stages. They tend to chew off only the tips of the ribs off (i.e., they eat the cartilage). Coyotes (unlike wolves) may also chew the ears or nose off a calf carcass. Coyotes are an important predator on newborn and small calves up to a month old.
- Wolves and coyotes may show similar killing and feeding patterns on small livestock. Where wounds are present, the area should be skinned out so the size and spacing of the tooth holes can be examined. Wolf canine tooth holes are about 1/4 inch (0.6 cm) in diameter whereas those of a coyote are about 1/8 inch (0.3 cm) in diameter. Spacing of wolf canines ranges from 37.3 to 48.2 mm (n=22) and spacing of coyote canines ranges from 22.3 to 35.8 mm (n=30).
- Wolves are attracted to and will scavenge carcasses of livestock that have died of natural causes. It is important to distinguish between predation and scavenging. Evidence of predation includes signs of a struggle and hemorrhaging beneath the skin in the throat, neck, back, or hindquarter areas.
- Animals that have died of natural mortality do not exhibit any obvious wounds and may not be fed upon or may be fed upon very lightly. Skin out appropriate areas of the intact carcass to look for any signs of attack (not all predator bites produce canine punctures). Wolves do not kill livestock animals without feeding upon them, nor do they run animals to death.
- A depredation investigation should include examining all possible clues such as the presence of tracks, feeding pattern, nature of wounds, size of canine tooth holes, and possible mortality factors. Look for all of these factors before giving

the livestock producer a determination. Show the livestock producer any evidence that eliminates wolves but implicates another predator.

- Remember that at most farms in the wolf range, wolves, coyotes and black bears are all present and could be involved in a depredation. Even at farms with chronic wolf problems, other predators such as coyotes may kill livestock or natural mortality may occur. Look at every depredation on a case-by-case basis even though the farm may have a history of wolf damage.
- Missing livestock: The only scenario where an on-site depredation investigator might consider a 'missing animal' as indicative of probable wolf depredation would be if the investigator finds fresh wolf sign in the pasture coinciding with the time of loss and/or fresh wolf droppings containing livestock hair (with no livestock carcass dump present) or a cow with a full bag and bellowing and obviously searching for a missing calf in a particular spot where wolf sign is present. These would be the only situations where physical evidence suggests an animal was killed but no carcass can be found.

Appendix XI:
Federal Fish and Wildlife Permit TE111357-0

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-201
(1/97)

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
530 WEST ALLEGAN
PO BOX 30444
LANSING, MI 48909
U.S.A.

2. AUTHORITY-STATUTES
16 USC 1539(a)

REGULATIONS *(Attached)*
50 CFR 17.22

50 CFR 13

3. NUMBER
TE111357-0

4. RENEWABLE	5. MAY COPY
☒ YES ☐ NO	☒ YES ☐ NO

6. EFFECTIVE	7. EXPIRES
05/08/2006	12/31/2006

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*

9. TYPE OF PERMIT
ENDANGERED SPECIES

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

THROUGHOUT THE STATE OF MICHIGAN.

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE AND ITS AUTHORIZED AGENTS UNDERSTAND AND AGREE TO ABIDE BY THE TERMS OF THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS. SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.

E. Permittee is authorized to take a maximum of 40 wolves annually for depredation control in accordance with the following conditions:

E.1. The depredation occurred on lawfully present domestic animals, including livestock as defined by the Michigan Department of Agriculture. Lethal control shall not be used when wolves kill dogs that are free-roaming, hunting, or training on public lands, or at livestock operations or other private lands with previous wolf depredations that fail to follow technical assistance guidelines in a timely manner.

E.2. Lethal wolf control is preceded by verification that wolves were involved in the depredation. Such verification shall be made by individuals covered by this permit and will follow Michigan Department of Natural Resources (DNR) guidelines for lethal control of depredating wolves (Michigan DNR Guidelines for Management and Lethal Control of Wolves Following Confirmed Depredation Events).

E.3. Depredation at the site is likely to continue in the immediate future if the depredating wolf or wolves are not removed.

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS
ANNUAL REPORT DUE: 1/31

ISSUED BY	TITLE	DATE
T J Miller	PROGRAM MANAGER, TE/HC	05/08/2006

E.4. Wolf handling and euthanizing are carried out in a humane manner.

E.5. Depredation control activities must occur within 1 mile of the depredation site.

E.6. Traps and snares are checked at least every 24 hours.

E.7. Young of the year captured before August 1 are released near the capture site.

E.8. A lactating female found depredating trapped before July 1 must be released near the capture site, unless it has been involved in three or more depredation events, in which case it may be euthanized.

E.9. Depredation control activities on tribal lands must be coordinated with tribal natural resources personnel, and lethal control will only be carried out if requested by the tribe.

E.10. In circumstances where the depredation site is within 1 mile of Tribal trust or fee lands (see attached maps), Permittee shall notify the U.S. Fish and Wildlife Service (Condition N.2.) if the on-site evaluation verifies a wolf depredation. The U.S. Fish and Wildlife Service will contact the Great Lake Indian Fish and Wildlife Commission to support Tribal Trust Responsibilities. Permittee will seek advice of the tribal resource representative, if present at the site, as it relates to depredation control on private land within 1 mile of Tribal trust or fee lands and will consider the advice along with advice of other members of the control team present. Special consideration to wolf packs shall occur in cases where radio-collar information and evidence from the site makes it clear that wolves involved in the depredation incident either spend the majority of their time or have the rendezvous site on Tribal trust or fee lands.

E.11 If a depredation has not occurred in the current calendar year, lethal control shall only proceed in accordance to Conditions E.1. through E.10 and the following:

- Verified depredation occurred at the site, or in the immediate vicinity, during the previous year.
- There is strong evidence one or more members of the depredating pack has remained in the area since the verified depredation.
- Based on wolf behavior and other factors, the depredation is considered by Permittee likely to be repeated.
- Trapping is conducted in a location and manner to minimize the likelihood of capturing a wolf or wolves from non-depredating packs.

E.12. Michigan DNR will inform the U.S. Fish and Wildlife Service (contact Condition N.2.) prior to using lethal techniques to address wolf damage issues.

F. Permittee, and authorized agents, may harass wolves with rubber bullets, other nonlethal projectile devices, or other devices intended to scare wolves and provide aversive conditioning to bold or habituated wolves.

G. Accidental serious injury or mortality resulting from trapping activities to young of the year prior to August 1 may not exceed 1 individual in 2006. In the event this number is exceeded, all trapping activities shall cease until August 1. Such mortalities and serious injuries shall be reported to FWS as specified below within 5 calendar days.

H. Serious injury or mortality resulting from trapping activities to lactating females prior to July 1 may not exceed 2 individuals. In the event this number is met, all trapping shall cease until July 1. Capture of lactating females prior to July 1, regardless of their condition at the time of their release, shall be reported to FWS within 5 calendar days.

I. The authority for lethal depredation control granted by this permit can be delegated to U.S. Department of Agriculture - Wildlife Services or Tribal Natural Resources Agencies. These agents are subject to the same conditions and reporting requirements described within this permit.

J. Wolf trapping and handling by all personnel working under this permit shall follow Michigan Department of Natural Resources wolf trapping and handling protocols, which will be revised to incorporate new information and techniques as appropriate.

K. All trappers working under this permit shall be trained in, and receive annual refresher courses in the trapping, chemical immobilization, and medical handling of animals, with emphasis on wolves, to minimize accidental injury and death to wolves.

L. All mortalities and serious injuries, whether intentional or incidental, shall be reported to the Service's Region 3 Endangered Species Permits Biologist (permitsR3ES@fws.gov), the East Lansing Field Office (mike_decapita@fws.gov), the Upper Peninsula Sub-Office (christie_deloria@fws.gov), and the Service's Law Enforcement Office (robert_lumadue@fws.gov) within 5 calendar days. Notification by e-mail is sufficient. Wolves, or wolf parts, so taken may be transferred to Native Americans for religious and/or cultural purposes, public educational use, or scientific research purposes. A copy of this Permit, or a letter of authorization from this office, must be retained with all specimens so transferred. All requests for carcasses must be made in writing. All specimens retained under authority of this permit remain the property of the United States Government and must be clearly identified as such. Specimens not suitable, or not needed, for such use must be destroyed.

M. An annual report of activities conducted under the authority of this permit is due on January 31, 2007. Failure to furnish any reports that are required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your reports shall include:

M.1. The date, location, age, sex, ear tag number and general description of the physical condition of each wolf captured.

M.2. Description of any medications administered to captured wolves.

M.3. The disposition of any wolves injured, killed, salvaged, held and transported.

M.4. The results of any blood analysis.

M.5. The results of efforts to address and resolve depredation issues, including repeat depredations by wolves.

M.6. A summary that includes the following for each wolf incidental and intentional injury or mortality that occurred (incidental and intentional mortality should be addressed separately in the report):

- Date and time of the taking.
- Name of any persons involved in the takings.
- Record of site evaluations including the activities contributing to and/or predisposing the site to depredation by wolves and the recommendations given to each landowner to reduce the risk of future depredations.
- Circumstances surrounding any taking, including the stimulus for the taking, and/or human activities involved.
- The behavioral responses of any gray wolves trapped and released.
- Actions taken to avoid or minimize taking.

N. Copies of your reports shall be sent to the offices listed below. When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Rich Text Format, or other file format that is compatible with the receiving office.

N.1. Pete Fasbender
Regional Permits Coordinator
U.S. Fish and Wildlife Service, Region 3
Ecological Services Operations
1 Federal Drive
Fort Snelling, Minnesota 55111-4056
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

N.2. Mike DeCapita
U.S. Fish and Wildlife Service
Ecological Services Field Office
2651 Coolidge Road
East Lansing, Michigan 48823
(517/351-6274; fax 517/351-1443)

N.3. Todd Hogrefe
Endangered Species Coordinator
Wildlife Division
Department of Natural Resources
5th Floor, Stevens T. Mason Building
P.O. Box 30444
Lansing, Michigan 48909-7944
(517/373-3337; fax 517/373-6705)

cc: FWS/East Lansing Field Office
Michigan DNR, Endangered Species Coordinator

END